ZYTOVISION

Molecular diagnostics simplified

CATALOG 2023/2024

For finding your local dealer visit www.zytovision.com

ZYTOVISION

ZytoVision GmbH · Fischkai 1
27572 Bremerhaven · Germany · www.zytovision.com

Dear Valued Customer,

ZytoVision GmbH is known to be an innovative Germany-based company focused on the development and production of high quality, state-of-the-art diagnostic products made in Germany. We fulfil this claim by a continuous product development process in cooperation with many international clinical partners as well as strict and thorough quality controls during our production processes.

Nowadays, more and more genetic markers need to be evaluated on a patient's sample to identify the appropriate treatment. In many cases, only small biopsy samples are available resulting in a limited number of slides on which immunohistochemistry, sequencing, PCR, and/or *in situ* hybridization (ISH) should be performed. These diagnostic requirements led us to the development of new and innovative DistinguISH™ and TriCheck™ probe designs for the simultaneous detection of different genetic markers on only one slide.

Since 2021, ZytoVision GmbH belongs to the ZytoMax Group. The Zytomax Group is based in Berlin, Germany and represents the successful acquisition of four IVD focused companies: ZytoVision GmbH (Bremerhaven, Germany), 42 life sciences GmbH & Co. KG (Bremerhaven, Germany), Zytomed Systems GmbH (Berlin, Germany) and Diagomics (Toulouse, France). Based on our successful development and our strong position in the market, we want to further consolidate and systematically expand our technological leadership in the fields of immunohistochemistry, *in situ* hybridization, and molecular pathology.
The ZytoMax Group is on track to align its portfolio with the In Vitro Diagnostic Medical Devices Regulation (IVDR) which is in effect since May of 2017. This new EU legislation mandates significant changes to the previous In Vitro Diagnostics Directive. Over the past few months, the team has achieved several key milestones in the journey toward full IVDR compliance. If you have any questions with regards to IVDR, please reach out to us at any time.

This catalog presents our most current product portfolio of ZytoVision ISH probes and associated reagents, introducing many new products.

We believe in a long-lasting relationship with our customers and support you via our worldwide network of highly qualified local distributors allowing us to respond to your needs immediately. Always to meet your expectations is one of our major strategies.

Sincerely,

Your ZytoVision Team

Table of Contents

ZytoLight®

FlexISH®

ZytoMation®

ZytoDot® ZytoDot® 2C

ZytoFast® ZytoFast® PLUS

VisionArray®

General Information

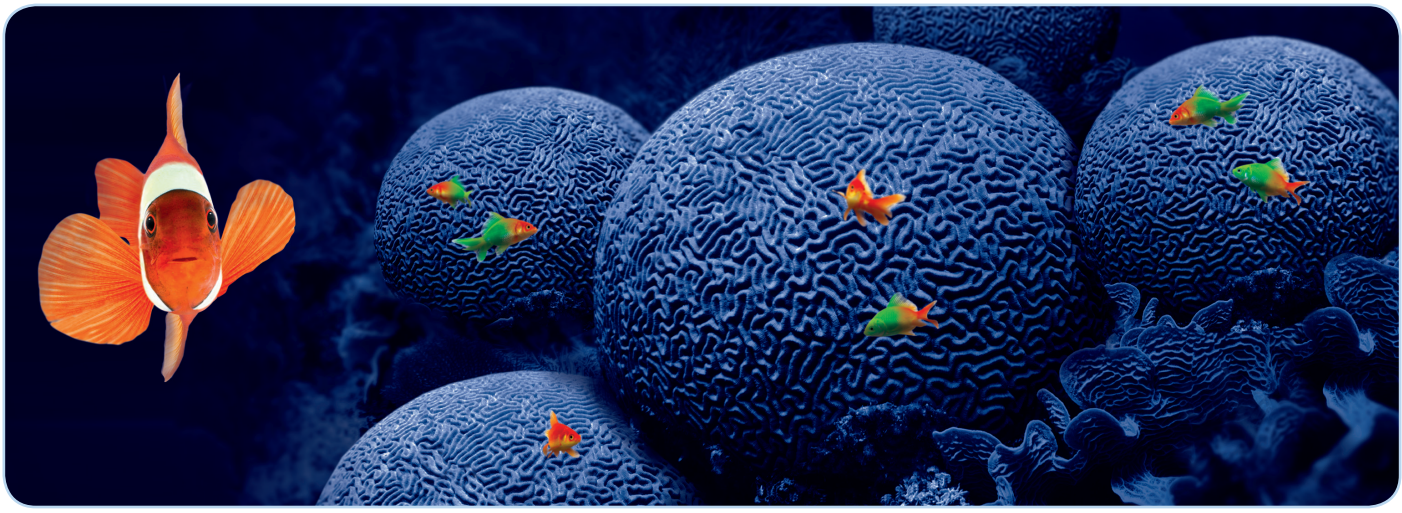
5

ZytoLight®

Products for FISH analysis

6

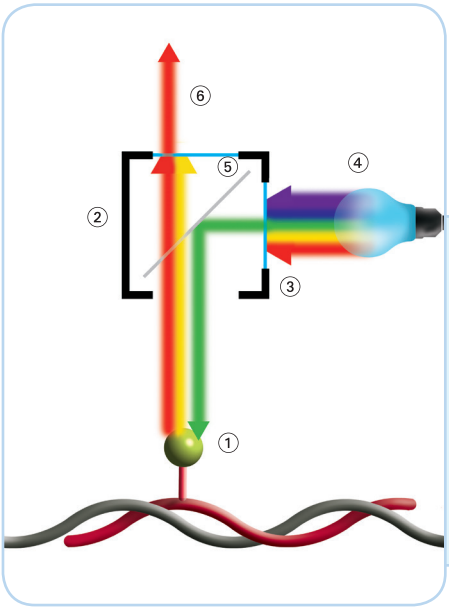
Reliable Multi-Target Detection using Fluorescence *in situ* Hybridization!



Introduction
ZytoLight® products are designed for the identification of genetic aberrations e.g. translocations, deletions, amplifications, and chromosomal aneuploidies by Fluorescence *in situ* Hybridization (FISH) in formalin-fixed, paraffin-embedded (FFPE) tissue sections or cytology specimens.

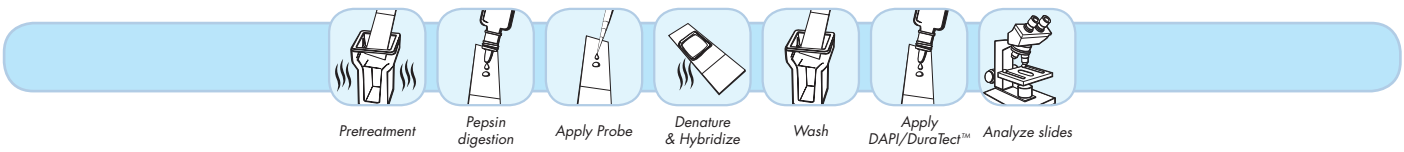
ZytoLight® SPEC and CEN Probes
ZytoLight® FISH probes are direct labeled FISH probes. ZytoLight® SPEC ™ probes are designed for the detection of single copy human DNA sequences.
ZytoLight® CEN ™ probes hybridize to highly repetitive human satellite DNA sequences of chromosomes producing signals specific for each individual chromosome.

ZytoLight® Kits – Convenient Solutions
For making FISH analysis reliable and user-friendly, all ZytoLight® FISH probes can be combined with the ZytoLight® FISH-Tissue Implementation Kit (Z-2028-5/-20) for FISH anlyses on FFPE specimens and/or the ZytoLight® FISH-Cytology Implementation Kit (Z-2099-20) for FISH analyses on cytology specimens. Both Implementation Kits include all necessary pretreatment solutions, wash buffers and DAPI/DuraTect™-Solution and a detailed protocol to perform successful FISH experiments.



The ZytoLight® system uses direct-labeled FISH probes ①, eliminating the need to detect the probes with fluorophore-coupled antibodies. The probes are detected by fluorescence microscopy using appropriate filter sets ②. Due to an exciter filter ③, full-spectrum light, emitted by the microscope lamp ④, is reduced to light of a defined wavelength that specifically excites the fluorophore of the probe. This light is reflected onto the specimen by a dichroic mirror ⑤. The fluorophore emits light of longer wavelengths that passes the mirror. Finally, a barrier filter ⑥ reduces the emitted light to a defined wavelength that can be detected.

Protocol Overview



Chromosome Index

Chr. Band	Product Name	Product No.	Quantity	Page
1				
1p36.3	ZytoLight Glioma 1p/19q Probe Set CE IVD	Z-2272-20	20 tests	23
	ZytoLight SPEC 1p36/1q25 Dual Color Probe CE IVD	Z-2075-50/-200	50/200 µl	24
1p36.1	ZytoLight SPEC FOXO1/PAX7 Dual Color Single Fusion Probe CE IVD	Z-2019-50/-200	50/200 µl	130
1p32.2	ZytoLight SPEC CKS1B/CDKN2C Dual Color Probe CE IVD	Z-2276-50	50 µl	26
1p12	ZytoLight SPEC 1p12 Probe RUO	Z-2101-200	200 µl	177 f.
	ZytoLight SPEC VHL/1p12/CEN 7/17 Quadruple Color Probe CE IVD	Z-2102-200	200 µl	40
1q21	ZytoLight SPEC CKS1B/CDKN2C Dual Color Probe CE IVD	Z-2276-50	50 µl	26
	ZytoLight SPEC MCL1/1p12 Dual Color Probe CE IVD	Z-2173-200	200 µl	27
1q23.1	ZytoLight SPEC NTRK1 Dual Color Break Apart Probe CE IVD	Z-2167-50/-200	50/200 µl	28
1q23.3	ZytoLight SPEC TCF3/PBX1 Dual Color Dual Fusion Probe CE IVD	Z-2308-50	50 µl	29
1q25.2	ZytoLight SPEC ABL2 Dual Color Break Apart Probe CE IVD	Z-2200-50	50 µl	30
1q25.3	ZytoLight Glioma 1p/19q Probe Set CE IVD	Z-2272-20	20 tests	23
	ZytoLight SPEC 1p36/1q25 Dual Color Probe CE IVD	Z-2075-50/-200	50/200 µl	24
1q32.1	ZytoLight SPEC MDM4/1p12 Dual Color Probe CE IVD	Z-2080-200	200 µl	31
2				
2p24	ZytoLight SPEC MYCN/2q11 Dual Color Probe CE IVD	Z-2074-50/-200	50/200 µl	32
2p23	ZytoLight SPEC ALK/EML4 TriCheck™ Probe CE IVD	Z-2117-50/-200	50/200 µl	33
	ZytoLight SPEC ALK Dual Color Break Apart Probe CE IVD	Z-2124-50/-200	50/200 µl	34
	ZytoLight SPEC ALK/2q11 Dual Color Probe CE IVD	Z-2161-200	200 µl	35
2p21	ZytoLight SPEC EML4 Dual Color Break Apart Probe RUO	Z-2136-50	50 µl	36
	ZytoLight SPEC ALK/EML4 TriCheck™ Probe CE IVD	Z-2117-50/-200	50/200 µl	33
2p11.2	ZytoLight SPEC IGK Dual Color Break Apart Probe CE IVD	Z-2288-50	50 µl	37
2q11.2	ZytoLight SPEC 2q11 Probe RUO	Z-2049-200	200 µl	177 f.
	ZytoLight SPEC CCND1 Break Apart/2q11/CEN 6 Quadruple Color Probe CE IVD	Z-2118-200	200 µl	41
2q34	ZytoLight SPEC ERBB4/2q11 Dual Color Probe RUO	Z-2057-200	200 µl	38
2q36	ZytoLight SPEC FOXO1/PAX3 Dual Color Single Fusion Probe CE IVD	Z-2018-50/-200	50/200 µl	128
	ZytoLight SPEC FOXO1/PAX3 TriCheck™ Probe CE IVD	Z-2185-50	50 µl	129
3				
3p25	ZytoLight SPEC VHL/CEN 3 Dual Color Probe CE IVD	Z-2084-200	200 µl	39
	ZytoLight SPEC VHL/1p12/CEN 7/17 Quadruple Color Probe CE IVD	Z-2102-200	200 µl	40
3p14.2	ZytoLight SPEC FHIT/CEN 3 Dual Color Probe RUO	Z-2062-200	200 µl	42
3p11.1-q11.1	ZytoLight Bladder Cancer Quadruple Color Probe CE IVD	Z-2305-50/-200	50/200 µl	43
	ZytoLight CEN 3 Probe RUO	Z-2001-200	200 µl	177 f.
	ZytoLight SPEC CDKN2A/CEN 3/7/17 Quadruple Color Probe CE IVD	Z-2081-50/-200	50/200 µl	91
3q21	ZytoLight SPEC GATA2/MECOM Dual Color Dual Fusion Probe CE IVD	Z-2287-50	50 µl	44
3q25.1	ZytoLight SPEC WWTR1 Dual Color Break Apart Probe CE IVD	Z-2212-50	50 µl	45
3q26.2	ZytoLight SPEC GATA2/MECOM Dual Color Dual Fusion Probe CE IVD	Z-2287-50	50 µl	44
	ZytoLight SPEC TERC/CEN 3 Dual Color Probe RUO	Z-2284-200	200 µl	46
3q26.3	ZytoLight SPEC PIK3CA/CEN 3 Dual Color Probe CE IVD	Z-2140-200	200 µl	47
	ZytoLight SPEC SOX2/CEN 3 Dual Color Probe RUO	Z-2127-200	200 µl	48
	ZytoLight SPEC TP63/TBL1XR1 TriCheck™ Probe CE IVD	Z-2320-50	50 µl	49
3q27	ZytoLight SPEC BCL6 Dual Color Break Apart Probe CE IVD	Z-2177-50/-200	50/200 µl	50
3q28	ZytoLight SPEC TP63/TBL1XR1 TriCheck™ Probe CE IVD	Z-2320-50	50 µl	49

IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.

RUO For Research Use Only. Not for use in diagnostic procedures.

Chromosome Index

Chr.	Band	Product Name	Product No.	Quantity	Page
4	4p16.3	ZytoLight SPEC FGFR3 Dual Color Break Apart Probe CE IVD	Z-2170-50/-200	50/200 µl	51
		ZytoLight SPEC FGFR3/4p11 Dual Color Probe CE IVD	Z-2082-200	200 µl	52
		ZytoLight SPEC FGFR3/IGH Dual Color Dual Fusion Probe CE IVD	Z-2282-50	50 µl	53
	4p11	ZytoLight SPEC 4p11 Probe RUO	Z-2083-200	200 µl	177 f.
		ZytoLight SPEC 4p11/CEN 10/17 Triple Color Probe CE IVD	Z-2307-50	50 µl	54
	4q12	ZytoLight SPEC PDGFRA/FIP1L1 TriCheck™ Probe CE IVD	Z-2209-50	50 µl	55
5	5p15.3	ZytoLight SPEC TERT Dual Color Break Apart Probe CE IVD	Z-2273-50	50 µl	56
		ZytoLight SPEC TERT/5q31 Dual Color Probe CE IVD	Z-2091-50/-200	50/200 µl	57
	5p13.1	ZytoLight SPEC RICTOR/5q31.1 Dual Color Probe RUO	Z-2278-200	200 µl	58
	5q31.2	ZytoLight SPEC EGR1/D5S23,D5S721 Dual Color Probe CE IVD	Z-2211-50	50 µl	59
	5q32	ZytoLight SPEC CSF1R Dual Color Break Apart Probe CE IVD	Z-2202-50	50 µl	60
		ZytoLight SPEC CSF1R/D5S23,D5S721 Dual Color Probe CE IVD	Z-2268-50	50 µl	61
		ZytoLight SPEC NRG1/CD74 TriCheck™ Probe CE IVD	Z-2194-200	200 µl	80
		ZytoLight SPEC PDGFRB Dual Color Break Apart Probe CE IVD	Z-2197-50	50 µl	62
6	6p25	ZytoLight SPEC IRF4,DUSP22 Dual Color Break Apart Probe CE IVD	Z-2210-50	50 µl	63
	6p24	ZytoLight SPEC RREB1/MYB/CEN 6 Triple Color Probe CE IVD	Z-2152-50/-200	50/200 µl	64
	6p21.3	ZytoLight SPEC PHF1 Dual Color Break Apart Probe CE IVD	Z-2215-50	50 µl	65
	6p21.1	ZytoLight SPEC VEGFA/CEN 6 Dual Color Probe CE IVD	Z-2195-200	200 µl	66
	6p11.1-q11	ZytoLight CEN 6 Probe RUO	Z-2002-200	200 µl	177 f.
		ZytoLight SPEC CCND1 Break Apart/2q11/CEN 6 Quadruple Color Probe CE IVD	Z-2118-200	200 µl	41
	6q22.1	ZytoLight SPEC ROS1 Dual Color Break Apart Probe CE IVD	Z-2144-50/-200	50/200 µl	67
		ZytoLight SPEC ROS1/CEN 6 Dual Color Probe CE IVD	Z-2162-200	200 µl	68
	6q23.3	ZytoLight SPEC MYB Dual Color Break Apart Probe CE IVD	Z-2143-50/-200	50/200 µl	69
		ZytoLight SPEC MYB/CEN 6 Dual Color Probe CE IVD	Z-2281-50	50 µl	70
		ZytoLight SPEC RREB1/MYB/CEN 6 Triple Color Probe CE IVD	Z-2152-50/-200	50/200 µl	64
	6q25.1	ZytoLight SPEC ESR1/CEN 6 Dual Color Probe CE IVD	Z-2069-50/-200	50/200 µl	71
7	7p15.2-p15.1	ZytoLight SPEC JAZF1 Dual Color Break Apart Probe CE IVD	Z-2132-50	50 µl	72
	7p12	ZytoLight SPEC IKZF1/CEN 7 Dual Color Probe CE IVD	Z-2304-50	50 µl	73
	7p11.2	ZytoLight SPEC EGFR/CEN 7 Dual Color Probe CE IVD	Z-2033-50/-200	50/200 µl	74
	7p11.1-q11.1	ZytoLight Bladder Cancer Quadruple Color Probe CE IVD	Z-2305-50/-200	50/200 µl	43
		ZytoLight CEN 7 Probe RUO	Z-2003-200	200 µl	177 f.
		ZytoLight SPEC CDKN2A/CEN 3/7/17 Quadruple Color Probe CE IVD	Z-2081-50/-200	50/200 µl	91
		ZytoLight SPEC VHL/1p12/CEN 7/17 Quadruple Color Probe CE IVD	Z-2102-200	200 µl	40
	7q11.23	ZytoLight SPEC Williams-Beuren Dual Color Probe CE IVD	Z-2302-50	50 µl	75
	7q22	ZytoLight SPEC CUX1/EZH2/CEN 7 Triple Color Probe CE IVD	Z-2214-50	50 µl	76
	7q31.2	ZytoLight SPEC MET/CEN 7 Dual Color Probe CE IVD	Z-2087-50/-200	50/200 µl	77
	7q34	ZytoLight SPEC BRAF Dual Color Break Apart Probe CE IVD	Z-2189-200	200 µl	78
		ZytoLight SPEC BRAF/CEN 7 Dual Color Probe CE IVD	Z-2191-200	200 µl	79
	7q36	ZytoLight SPEC CUX1/EZH2/CEN 7 Triple Color Probe CE IVD	Z-2214-50	50 µl	76

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

Chromosome Index

Chr. Band	Product Name	Product No.	Quantity	Page
8				
8p12	ZytoLight SPEC NRG1 Dual Color Break Apart Probe CE IVD	Z-2181-200	200 µl	81
	ZytoLight SPEC NRG1/CD74 TriCheck™ Probe CE IVD	Z-2194-200	200 µl	80
8p11.2	ZytoLight SPEC FGFR1 Dual Color Break Apart Probe CE IVD	Z-2168-50/-200	50/200 µl	82
	ZytoLight SPEC FGFR1/CEN 8 Dual Color Probe CE IVD	Z-2072-50/-200	50/200 µl	83
8p11.1-q11.1	ZytoLight CEN 8 Probe CE IVD	Z-2004-50/-200	50/200 µl	175 f.
8q21.3	ZytoLight SPEC RUNX1/RUNX1T1 Dual Color Dual Fusion Probe CE IVD	Z-2112-50/-200	50/200 µl	84
8q24.21	ZytoLight SPEC MYC Dual Color Break Apart Probe CE IVD	Z-2090-50/-200	50/200 µl	85
	ZytoLight SPEC MYC/CEN 8 Dual Color Probe CE IVD	Z-2092-50/-200	50/200 µl	86
	ZytoLight SPEC MYC/IGH Dual Color Dual Fusion Probe CE IVD	Z-2105-50/-200	50/200 µl	87
9				
9p24	ZytoLight SPEC CD274,PDCD1LG2/CEN 9 Dual Color Probe CE IVD	Z-2179-50/-200	50/200 µl	88
	ZytoLight SPEC JAK2 Dual Color Break Apart Probe CE IVD	Z-2294-50	50 µl	89
9p21	ZytoLight Bladder Cancer Quadruple Color Probe CE IVD	Z-2305-50/-200	50/200 µl	43
	ZytoLight SPEC CDKN2A/CEN 9 Dual Color Probe CE IVD	Z-2063-50/-200	50/200 µl	90
	ZytoLight SPEC CDKN2A/CEN 3/7/17 Quadruple Color Probe CE IVD	Z-2081-50/-200	50/200 µl	91
9p13	ZytoLight SPEC PAX5 Dual Color Break Apart Probe CE IVD	Z-2300-50	50 µl	92
9q12	ZytoLight CEN 9 Probe RUO	Z-2067-200	200 µl	177 f.
9q21.3	ZytoLight SPEC NTRK2 Dual Color Break Apart Probe CE IVD	Z-2205-50/-200	50/200 µl	93
9q22.3-q31	ZytoLight SPEC NR4A3 Dual Color Break Apart Probe CE IVD	Z-2145-50	50 µl	94
9q34.1	ZytoLight SPEC ABL1 Dual Color Break Apart Probe CE IVD	Z-2199-50	50 µl	95
	ZytoLight SPEC BCR/ABL1 Dual Color Dual Fusion Probe CE IVD	Z-2111-50/-200	50/200 µl	96
	ZytoLight SPEC NUP214 Dual Color Break Apart Probe CE IVD	Z-2265-50	50 µl	97
10				
10p11.2	ZytoLight SPEC KIF5B Dual Color Break Apart Probe RUO	Z-2131-50	50 µl	98
10p11.1-q11.1	ZytoLight CEN 10 Probe RUO	Z-2079-200	200 µl	177 f.
	ZytoLight SPEC 4p11/CEN 10/17 Triple Color Probe CE IVD	Z-2307-50	50 µl	54
10q11.2	ZytoLight SPEC RET Dual Color Break Apart Probe CE IVD	Z-2148-50/-200	50/200 µl	99
10q23.3	ZytoLight SPEC PTEN/CEN 10 Dual Color Probe CE IVD	Z-2078-50/-200	50/200 µl	100
10q26.1	ZytoLight SPEC FGFR2 Dual Color Break Apart Probe CE IVD	Z-2169-50/-200	50/200 µl	101
	ZytoLight SPEC FGFR2/CEN 10 Dual Color Probe CE IVD	Z-2122-200	200 µl	102
11				
11p15.4	ZytoLight SPEC CARS Dual Color Break Apart Probe RUO	Z-2137-50	50 µl	103
	ZytoLight SPEC NUP98 Dual Color Break Apart Probe CE IVD	Z-2266-50	50 µl	104
11p13	ZytoLight SPEC WT1 Dual Color Break Apart Probe CE IVD	Z-2142-50	50 µl	105
11p11.2	ZytoLight SPEC SPI1 Dual Color Break Apart Probe CE IVD	Z-2291-50	50 µl	106
11p11.11-q11	ZytoLight CEN 11 Probe CE IVD	Z-2005-200	200 µl	175 f.
11q13.3	ZytoLight SPEC CCND1 Dual Color Break Apart Probe CE IVD	Z-2108-50/-200	50/200 µl	107
	ZytoLight SPEC CCND1 Break Apart/2q11/CEN 6 Quadruple Color Probe CE IVD	Z-2118-200	200 µl	41
	ZytoLight SPEC CCND1/CEN 11 Dual Color Probe CE IVD	Z-2071-50/-200	50/200 µl	108
	ZytoLight SPEC CCND1/IGH Dual Color Dual Fusion Probe CE IVD	Z-2125-50/-200	50/200 µl	109
11q21	ZytoLight SPEC MAML2 Dual Color Break Apart Probe CE IVD	Z-2014-50/-200	50/200 µl	110
11q22.2	ZytoLight SPEC BIRC3/MALT1 Dual Color Dual Fusion Probe CE IVD	Z-2146-50/-200	50/200 µl	111
11q22.3	ZytoLight SPEC ATM/CEN 11 Dual Color Probe CE IVD	Z-2297-50	50 µl	112
	ZytoLight SPEC ATM/CEN 12 Dual Color Probe CE IVD	Z-2296-50	50 µl	113
	ZytoLight SPEC TP53/ATM Dual Color Probe CE IVD	Z-2159-50/-200	50/200 µl	114
11q23.3	ZytoLight SPEC 11q gain/loss Triple Color Probe CE IVD	Z-2216-50	50 µl	117
	ZytoLight SPEC KMT2A Dual Color Break Apart Probe CE IVD	Z-2193-50/-200	50/200 µl	118
11q24.3	ZytoLight SPEC 11q gain/loss Triple Color Probe CE IVD	Z-2216-50	50 µl	117
	ZytoLight SPEC EWSR1/FLI1 TriCheck™ Probe CE IVD	Z-2183-50	50 µl	170

IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.

RUO For Research Use Only. Not for use in diagnostic procedures.

Chromosome Index

Chr.	Band	Product Name	Product No.	Quantity	Page
12	12p13.3	ZytoLight SPEC ZNF384 Dual Color Break Apart CE IVD	Z-2275-50	50 µl	119
	12p13.2	ZytoLight SPEC ETV6 Dual Color Break Apart Probe CE IVD	Z-2176-50/-200	50/200 µl	120
		ZytoLight SPEC ETV6/RUNX1 Dual Color Dual Fusion Probe CE IVD	Z-2157-50/-200	50/200 µl	121
	12p12.1	ZytoLight SPEC KRAS/CEN 12 Dual Color Probe CE IVD	Z-2115-200	200 µl	122
	12p11.1-q11	ZytoLight CEN 12 Probe CE IVD	Z-2050-200	200 µl	175 f.
		ZytoLight SPEC ATM/CEN 12 Dual Color Probe CE IVD	Z-2296-50	50 µl	113
		ZytoLight SPEC D13S319/13q34/CEN 12 Triple Color Probe CE IVD	Z-2160-50/-200	50/200 µl	115
	12q13.2	ZytoLight SPEC ERBB3/CEN 12 Dual Color Probe RUO	Z-2056-200	200 µl	123
	12q13.3	ZytoLight SPEC DDIT3 Dual Color Break Apart Probe CE IVD	Z-2100-50/-200	50/200 µl	124
	12q14	ZytoLight SPEC CDK4/CEN 12 Dual Color Probe CE IVD	Z-2103-50/-200	50/200 µl	125
	12q15	ZytoLight SPEC MDM2/CEN 12 Dual Color Probe CE IVD	Z-2013-50/-200	50/200 µl	126
13	13q12.1	ZytoLight SPEC 13q12 Probe RUO	Z-2085-200	200 µl	177 f.
		ZytoLight SPEC 13/CEN 18/SPEC 21 Triple Color Probe CE IVD	Z-2095-50/-200	50/200 µl	175 f.
		ZytoLight SPEC 13/21 Dual Color Probe CE IVD	Z-2164-200	200 µl	175 f.
		ZytoLight Aneuploidy Panel 18/X/Y and 13/21 CE IVD	Z-2279-20	20 tests	179
		ZytoLight Aneuploidy Panel X/Y and 13/18/21 CE IVD	Z-2104-5/-20	5/20 tests	180
	13q14.1	ZytoLight SPEC FOXO1 Dual Color Break Apart Probe CE IVD	Z-2139-50	50 µl	127
		ZytoLight SPEC FOXO1/PAX3 Dual Color Single Fusion Probe CE IVD	Z-2018-50/-200	50/200 µl	128
		ZytoLight SPEC FOXO1/PAX3 TriCheck™ Probe CE IVD	Z-2185-50	50 µl	129
		ZytoLight SPEC FOXO1/PAX7 Dual Color Single Fusion Probe CE IVD	Z-2019-50/-200	50/200 µl	130
	13q14.2	ZytoLight SPEC D13S319/13q34/CEN 12 Triple Color Probe CE IVD	Z-2160-50/-200	50/200 µl	115
		ZytoLight SPEC D13S319/13q34 Dual Color Probe CE IVD	Z-2280-50	50 µl	116
		ZytoLight SPEC RB1/13q34 Dual Color Probe CE IVD	Z-2324-50/-200	50/200 µl	131
14	14q32.3	ZytoLight SPEC IGH Dual Color Break Apart Probe CE IVD	Z-2110-50/-200	50/200 µl	132
		ZytoLight SPEC BCL2/IGH Dual Color Dual Fusion Probe CE IVD	Z-2114-50/-200	50/200 µl	157
		ZytoLight SPEC CCND1/IGH Dual Color Dual Fusion Probe CE IVD	Z-2125-50/-200	50/200 µl	109
		ZytoLight SPEC FGFR3/IGH Dual Color Dual Fusion Probe CE IVD	Z-2282-50	50 µl	53
		ZytoLight SPEC MAF/IGH Dual Color Dual Fusion Probe CE IVD	Z-2270-50	50 µl	141
		ZytoLight SPEC MAFB/IGH Dual Color Dual Fusion Probe CE IVD	Z-2271-50	50 µl	142
		ZytoLight SPEC MYC/IGH Dual Color Dual Fusion Probe CE IVD	Z-2105-50/-200	50/200 µl	87
15	15q11.2	ZytoLight SPEC Prader-Willi Dual Color Probe CE IVD	Z-2318-50	50 µl	133
	15q11.2-q12	ZytoLight SPEC Angelman Dual Color Probe CE IVD	Z-2319-50	50 µl	134
	15q14	ZytoLight SPEC NUTM1 Dual Color Break Apart Probe CE IVD	Z-2208-200	200 µl	135
	15q24	ZytoLight SPEC Angelman Dual Color Probe CE IVD	Z-2319-50	50 µl	134
		ZytoLight SPEC PML/RARA Dual Color Dual Fusion Probe CE IVD	Z-2113-50/-200	50/200 µl	136
		ZytoLight SPEC Prader-Willi Dual Color Probe CE IVD	Z-2318-50	50 µl	133
	15q25	ZytoLight SPEC NTRK3 Dual Color Break Apart Probe CE IVD	Z-2206-50/-200	50/200 µl	137
16	16p13.3	ZytoLight SPEC CREBBP Dual Color Break Apart Probe CE IVD	Z-2267-50	50 µl	138
	16p11.2	ZytoLight SPEC FUS Dual Color Break Apart Probe CE IVD	Z-2130-50	50 µl	139
	16q22	ZytoLight SPEC CBFB Dual Color Break Apart Probe CE IVD	Z-2207-50	50 µl	140
	16q23	ZytoLight SPEC MAF/IGH Dual Color Dual Fusion Probe CE IVD	Z-2270-50	50 µl	141

IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.

RUO For Research Use Only. Not for use in diagnostic procedures.

Chromosome Index

Chr. Band	Product Name	Product No.	Quantity	Page
17				
17p13	ZytoLight SPEC TP53/17q22 Dual Color Probe CE IVD	Z-2198-50	50 µl	143
	ZytoLight SPEC TP53/ATM Dual Color Probe CE IVD	Z-2159-50/-200	50/200 µl	114
	ZytoLight SPEC TP53/CEN 17 Dual Color Probe CE IVD	Z-2153-50/-200	50/200 µl	144
	ZytoLight SPEC USP6 Dual Color Break Apart Probe CE IVD	Z-2151-50/-200	50/200 µl	145
	ZytoLight SPEC YWHAE Dual Color Break Apart Probe CE IVD	Z-2175-50	50 µl	146
17p11.1-q11.1	ZytoLight Bladder Cancer Quadruple Color Probe CE IVD	Z-2305-50/-200	50/200 µl	43
	ZytoLight CEN 17 Probe RUO	Z-2006-200	200 µl	177 f.
	ZytoLight SPEC 4p11/CEN 10/17 Triple Color Probe CE IVD	Z-2307-50	50 µl	54
	ZytoLight SPEC CDKN2A/CEN 3/7/17 Quadruple Color Probe CE IVD	Z-2081-50/-200	50/200 µl	91
	ZytoLight SPEC VHL/1p12/CEN 7/17 Quadruple Color Probe CE IVD	Z-2102-200	200 µl	40
17q12	ZytoLight SPEC ERBB2/CEN 17 Dual Color Probe CE IVD	Z-2015-50/-200	50/200 µl	147
	ZytoLight SPEC ERBB2/CEN 17 Dual Color Probe Kit CE IVD	Z-2020-5/-20	5/20 tests	147
	ZytoLight CEN 17/SPEC ERBB2 Dual Color Probe CE IVD	Z-2077-50/-200	50/200 µl	148
	ZytoLight SPEC ERBB2/D17S122 Dual Color Probe CE IVD	Z-2190-50/-200	50/200 µl	149
	ZytoLight SPEC ERBB2/TOP2A/CEN 17 Triple Color Probe CE IVD	Z-2093-50/-200	50/200 µl	150
17q21.2	ZytoLight SPEC ERBB2/TOP2A/CEN 17 Triple Color Probe CE IVD	Z-2093-50/-200	50/200 µl	150
	ZytoLight SPEC PML/RARA Dual Color Dual Fusion Probe CE IVD	Z-2113-50/-200	50/200 µl	136
17q21.3	ZytoLight SPEC COL1A1 Dual Color Break Apart Probe CE IVD	Z-2121-200	200 µl	151
	ZytoLight SPEC COL1A1/PDGFB Dual Color Dual Fusion Probe CE IVD	Z-2116-50/-200	50/200 µl	152
17q22	ZytoLight SPEC TP53/17q22 Dual Color Probe CE IVD	Z-2198-50	50 µl	143
18				
18p11.1-q11.1	ZytoLight CEN 18 Probe RUO	Z-2007-200	200 µl	177 f.
	ZytoLight SPEC 13/CEN 18/SPEC 21 Triple Color Probe CE IVD	Z-2095-50/-200	50/200 µl	175 f.
	ZytoLight Aneuploidy Panel 18/X/Y and 13/21 CE IVD	Z-2279-20	20 tests	179
	ZytoLight Aneuploidy Panel X/Y and 13/18/21 CE IVD	Z-2104-5/-20	5/20 tests	180
18q11.2	ZytoLight SPEC SS18 Dual Color Break Apart Probe CE IVD	Z-2097-50/-200	50/200 µl	153
	ZytoLight SPEC SS18/SSX1 TriCheck™ Probe CE IVD	Z-2184-50	50 µl	154
18q21.3	ZytoLight SPEC 18/CEN X/Y Triple Color Probe CE IVD	Z-2163-200	200 µl	175 f.
	ZytoLight SPEC BCL2 Dual Color Break Apart Probe CE IVD	Z-2192-50/-200	50/200 µl	155
	ZytoLight SPEC BCL2/CEN 18 Dual Color Probe RUO	Z-2174-50	50 µl	156
	ZytoLight SPEC BCL2/IGH Dual Color Dual Fusion Probe CE IVD	Z-2114-50/-200	50/200 µl	157
	ZytoLight SPEC BIRC3/MALT1 Dual Color Dual Fusion Probe CE IVD	Z-2146-50/-200	50/200 µl	111
	ZytoLight SPEC MALT1 Dual Color Break Apart Probe CE IVD	Z-2196-50/-200	50/200 µl	158
19				
19p13.3	ZytoLight Glioma 1p/19q Probe Set CE IVD	Z-2272-20	20 tests	23
	ZytoLight SPEC 19q13/19p13 Dual Color Probe CE IVD	Z-2076-50/-200	50/200 µl	25
	ZytoLight SPEC TCF3/PBX1 Dual Color Dual Fusion Probe CE IVD	Z-2308-50	50 µl	29
19q13.2	ZytoLight SPEC CIC Dual Color Break Apart Probe CE IVD	Z-2285-50	50 µl	159
19q13.3	ZytoLight Glioma 1p/19q Probe Set CE IVD	Z-2272-20	20 tests	23
	ZytoLight SPEC 19q13/19p13 Dual Color Probe CE IVD	Z-2076-50/-200	50/200 µl	25
19q13.4	ZytoLight SPEC C19MC/19p13 Dual Color Probe CE IVD	Z-2274-50	50 µl	160
20				
20q11.2	ZytoLight SPEC BCL2L1/CEN 20 Dual Color Probe RUO	Z-2171-200	200 µl	161
20q12	ZytoLight SPEC MAFB/IGH Dual Color Dual Fusion Probe CE IVD	Z-2271-50	50 µl	142
20q12-q13.1	ZytoLight SPEC PTPRT/20q11 Dual Color Probe CE IVD	Z-2213-50	50 µl	162

IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.

RUO For Research Use Only. Not for use in diagnostic procedures.

Chromosome Index

Chr. Band	Product Name	Product No.	Quantity	Page
21				
21q22.1	ZytoLight SPEC RUNX1/RUNX1T1 Dual Color Dual Fusion Probe CE IVD	Z-2112-50/-200	50/200 µl	84
	ZytoLight SPEC ETV6/RUNX1 Dual Color Dual Fusion Probe CE IVD	Z-2157-50/-200	50/200 µl	121
21q22.1-q22.2	ZytoLight SPEC 21q22 Probe RUO	Z-2086-200	200 µl	177 f.
	ZytoLight SPEC 21/CEN X/Yq12 Triple Color Probe CE IVD	Z-2180-200	200 µl	175 f.
	ZytoLight SPEC 13/21 Dual Color Probe CE IVD	Z-2164-200	200 µl	175 f.
	ZytoLight SPEC 13/CEN 18/SPEC 21 Triple Color Probe CE IVD	Z-2095-50/-200	50/200 µl	175 f.
	ZytoLight Aneuploidy Panel 18/X/Y and 13/21 CE IVD	Z-2279-20	20 tests	179
	ZytoLight Aneuploidy Panel X/Y and 13/18/21 CE IVD	Z-2104-5/-20	5/20 tests	180
21q22.2	ZytoLight SPEC ERG Dual Color Break Apart Probe CE IVD	Z-2138-200	200 µl	163
	ZytoLight SPEC ERG/TMPRSS2 TriCheck™ Probe CE IVD	Z-2135-200	200 µl	164
21q22.3	ZytoLight SPEC ERG/TMPRSS2 TriCheck™ Probe CE IVD	Z-2135-200	200 µl	164
22				
22q11.2	ZytoLight SPEC BCR/ABL1 Dual Color Dual Fusion Probe CE IVD	Z-2111-50/-200	50/200 µl	96
	ZytoLight SPEC DiGeorge/Phelan McDermid Dual Color Probe CE IVD	Z-2299-50	50 µl	165
	ZytoLight SPEC DiGeorge Triple Color Probe CE IVD	Z-2289-50	50 µl	166
	ZytoLight SPEC IGL Dual Color Break Apart Probe CE IVD	Z-2286-50	50 µl	167
	ZytoLight SPEC SMARCB1/22q12 Dual Color Probe CE IVD	Z-2178-50	50 µl	168
22q12.2	ZytoLight SPEC EWSR1 Dual Color Break Apart Probe CE IVD	Z-2096-50/-200	50/200 µl	169
	ZytoLight SPEC EWSR1/FLI1 TriCheck™ Probe CE IVD	Z-2183-50	50 µl	170
22q13.1	ZytoLight SPEC PDGFB Dual Color Break Apart Probe CE IVD	Z-2119-50/-200	50/200 µl	171
	ZytoLight SPEC COL1A1/PDGFB Dual Color Dual Fusion Probe CE IVD	Z-2116-50/-200	50/200 µl	152
22q13.3	ZytoLight SPEC DiGeorge/Phelan McDermid Dual Color Probe CE IVD	Z-2299-50	50 µl	165
X				
Xp22.33	ZytoLight SPEC CRLF2 Dual Color Break Apart Probe CE IVD	Z-2201-50	50 µl	172
Xp11.4	ZytoLight SPEC BCOR Dual Color Break Apart Probe CE IVD	Z-2310-50	50 µl	173
Xp11.23	ZytoLight SPEC SS18/SSX1 TriCheck™ Probe CE IVD	Z-2184-50	50 µl	154
	ZytoLight SPEC TFE3 Dual Color Break Apart Probe CE IVD	Z-2109-50/-200	50/200 µl	174
Xp11.1-q11.1	ZytoLight CEN X Probe RUO	Z-2008-200	200 µl	177 f.
	ZytoLight CEN X/Yq12 Dual Color Probe CE IVD	Z-2016-50/-200	50/200 µl	175 f.
	ZytoLight CEN X/Y Dual Color Probe CE IVD	Z-2120-200	200 µl	175 f.
	ZytoLight SPEC 18/CEN X/Y Triple Color Probe CE IVD	Z-2163-200	200 µl	175 f.
	ZytoLight SPEC 21/CEN X/Yq12 Triple Color Probe CE IVD	Z-2180-200	200 µl	175 f.
	ZytoLight Aneuploidy Panel 18/X/Y and 13/21 CE IVD	Z-2279-20	20 tests	179
	ZytoLight Aneuploidy Panel X/Y and 13/18/21 CE IVD	Z-2104-5/-20	5/20 tests	180
Y				
Yp11.32	ZytoLight SPEC CRLF2 Dual Color Break Apart Probe CE IVD	Z-2201-50	50 µl	172
Yp11.1-q11.1	ZytoLight CEN Y (DYZ3) Probe RUO	Z-2123-200	200 µl	177 f.
	ZytoLight CEN X/Y Dual Color Probe CE IVD	Z-2120-200	200 µl	175 f.
	ZytoLight SPEC 18/CEN X/Y Triple Color Probe CE IVD	Z-2163-200	200 µl	175 f.
Yq12	ZytoLight CEN Yq12 Probe RUO	Z-2010-200	200 µl	177 f.
	ZytoLight CEN X/Yq12 Dual Color Probe CE IVD	Z-2016-50/-200	50/200 µl	175 f.
	ZytoLight SPEC 21/CEN X/Yq12 Triple Color Probe CE IVD	Z-2180-200	200 µl	175 f.
	ZytoLight Aneuploidy Panel 18/X/Y and 13/21 CE IVD	Z-2279-20	20 tests	179
	ZytoLight Aneuploidy Panel X/Y and 13/18/21 CE IVD	Z-2104-5/-20	5/20 tests	180

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

Gene Index

HUGO Name	Synonym	Product Name	Product No.	Quantity	Page
ABL1	ABL, c-ABL	ZytoLight SPEC ABL1 Dual Color Break Apart Probe CE IVD	Z-2199-50	50 µl	95
		ZytoLight SPEC BCR/ABL1 Dual Color Dual Fusion Probe CE IVD	Z-2111-50/-200	50/200 µl	96
ABL2	ARG	ZytoLight SPEC ABL2 Dual Color Break Apart Probe CE IVD	Z-2200-50	50 µl	30
ALK	CD246	ZytoLight SPEC ALK/EML4 TriCheck™ Probe CE IVD	Z-2117-50/-200	50/200 µl	33
		ZytoLight SPEC ALK Dual Color Break Apart Probe CE IVD	Z-2124-50/-200	50/200 µl	34
		ZytoLight SPEC ALK/2q11 Dual Color Probe CE IVD	Z-2161-200	200 µl	35
ARSA	ASA, MLD	ZytoLight SPEC DiGeorge/Phelan McDermid Dual Color Probe CE IVD	Z-2299-50	50 µl	165
ATM	ATA, TEL1	ZytoLight SPEC ATM/CEN 11 Dual Color Probe CE IVD	Z-2297-50	50 µl	112
		ZytoLight SPEC ATM/CEN 12 Dual Color Probe CE IVD	Z-2296-50	50 µl	113
		ZytoLight SPEC TP53/ATM Dual Color Probe CE IVD	Z-2159-50/-200	50/200 µl	114
BCL2	Bcl-2, PPP1R50	ZytoLight SPEC BCL2 Dual Color Break Apart Probe CE IVD	Z-2192-50/-200	50/200 µl	155
		ZytoLight SPEC BCL2/CEN 18 Dual Color Probe RUO	Z-2174-50	50 µl	156
		ZytoLight SPEC BCL2/IGH Dual Color Dual Fusion Probe CE IVD	Z-2114-50/-200	50/200 µl	157
BCL2L1	BCLX	ZytoLight SPEC BCL2L1/CEN 20 Dual Color Probe RUO	Z-2171-200	200 µl	161
BCL6	ZNF51, LAZ3	ZytoLight SPEC BCL6 Dual Color Break Apart Probe CE IVD	Z-2177-50/-200	50/200 µl	50
BCOR	KIAA1575	ZytoLight SPEC BCOR Dual Color Break Apart Probe CE IVD	Z-2310-50	50 µl	173
BCR	ALL, BCR1	ZytoLight SPEC BCR/ABL1 Dual Color Dual Fusion Probe CE IVD	Z-2111-50/-200	50/200 µl	96
BIRC3	C-IAP, MALT2	ZytoLight SPEC BIRC3/MALT1 Dual Color Dual Fusion Probe CE IVD	Z-2146-50/-200	50/200 µl	111
BRAF	BRAF1, NS7	ZytoLight SPEC BRAF Dual Color Break Apart Probe CE IVD	Z-2189-200	200 µl	78
		ZytoLight SPEC BRAF/CEN 7 Dual Color Probe CE IVD	Z-2191-200	200 µl	79
C19MC	-	ZytoLight SPEC C19MC/19p13 Dual Color Probe CE IVD	Z-2274-50	50 µl	160
CARS	CARS1	ZytoLight SPEC CARS Dual Color Break Apart Probe RUO	Z-2137-50	50 µl	103
CBFB	PEBP2B	ZytoLight SPEC CBFB Dual Color Break Apart Probe CE IVD	Z-2207-50	50 µl	140
CCND1	BCL1, PRAD1	ZytoLight SPEC CCND1 Dual Color Break Apart Probe CE IVD	Z-2108-50/-200	50/200 µl	107
		ZytoLight SPEC CCND1 Break Apart/2q11/CEN 6 Quadruple Color Probe CE IVD	Z-2118-200	200 µl	41
		ZytoLight SPEC CCND1/CEN 11 Dual Color Probe CE IVD	Z-2071-50/-200	50/200 µl	108
		ZytoLight SPEC CCND1/IGH Dual Color Dual Fusion Probe CE IVD	Z-2125-50/-200	50/200 µl	109
CD274	PD-L1, PDL1	ZytoLight SPEC CD274,PDCD1LG2/CEN 9 Dual Color Probe CE IVD	Z-2179-50/-200	50/200 µl	88
CD74	-	ZytoLight SPEC NRG1/CD74 TriCheck™ Probe CE IVD	Z-2194-200	200 µl	80
CDK4	PSK-J3	ZytoLight SPEC CDK4/CEN 12 Dual Color Probe CE IVD	Z-2103-50/-200	50/200 µl	125

IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.

RUO For Research Use Only. Not for use in diagnostic procedures.

Gene Index

HUGO Name	Synonym	Product Name	Product No.	Quantity	Page
CDKN2A	p16, ARF, INK4	ZytoLight Bladder Cancer Quadruple Color Probe CE IVD	Z-2305-50/-200	50/200 µl	43
		ZytoLight SPEC CDKN2A/CEN 9 Dual Color Probe CE IVD	Z-2063-50/-200	50/200 µl	90
		ZytoLight SPEC CDKN2A/CEN 3/7/17 Quadruple Color Probe CE IVD	Z-2081-50/-200	50/200 µl	91
CDNK2C	-	ZytoLight SPEC CKS1B/CDKN2C Dual Color Probe CE IVD	Z-2276-50	50 µl	26
CIC	KIAA0306	ZytoLight SPEC CIC Dual Color Break Apart Probe CE IVD	Z-2285-50	50 µl	159
CKS1B	-	ZytoLight SPEC CKS1B/CDKN2C Dual Color Probe CE IVD	Z-2276-50	50 µl	26
COL1A1	OI4	ZytoLight SPEC COL1A1 Dual Color Break Apart Probe CE IVD	Z-2121-200	200 µl	151
		ZytoLight SPEC COL1A1/PDGFB Dual Color Dual Fusion Probe CE IVD	Z-2116-50/-200	50/200 µl	152
CREBBP	CBP, RTS	ZytoLight SPEC CREBBP Dual Color Break Apart Probe CE IVD	Z-2267-50	50 µl	138
CRKL	-	ZytoLight SPEC DiGeorge Triple Color Probe CE IVD	Z-2289-50	50 µl	166
CRLF2	CRL2, TSLPR	ZytoLight SPEC CRLF2 Dual Color Break Apart Probe CE IVD	Z-2201-50	50 µl	172
CSF1R	FMS	ZytoLight SPEC CSF1R Dual Color Break Apart Probe CE IVD	Z-2202-50	50 µl	60
		ZytoLight SPEC CSF1R/D5S23,D5S721 Dual Color Probe CE IVD	Z-2268-50	50 µl	61
CUX1	CUT	ZytoLight SPEC CUX1/EZH2/CEN 7 Triple Color Probe CE IVD	Z-2214-50	50 µl	76
DDIT3	CHOP, GADD153	ZytoLight SPEC DDIT3 Dual Color Break Apart Probe CE IVD	Z-2100-50/-200	50/200 µl	124
DLEU1	BCMS1, LEU1	ZytoLight SPEC D13S319/13q34/CEN 12 Triple Color Probe CE IVD	Z-2160-50/-200	50/200 µl	115
		ZytoLight SPEC D13S319/13q34 Dual Color Probe CE IVD	Z-2280-50	50 µl	116
DUSP22	JKAP	ZytoLight SPEC IRF4,DUSP22 Dual Color Break Apart Probe CE IVD	Z-2210-50	50 µl	63
EGFR	HER1, ERBB1	ZytoLight SPEC EGFR/CEN 7 Dual Color Probe CE IVD	Z-2033-50/-200	50/200 µl	74
EGR1	KROX-24	ZytoLight SPEC EGR1/D5S23,D5S721 Dual Color Probe CE IVD	Z-2211-50	50 µl	59
ELN	WBS	ZytoLight SPEC Williams-Beuren Dual Color Probe CE IVD	Z-2302-50	50 µl	75
EML4	ROPP120	ZytoLight SPEC EML4 Dual Color Break Apart Probe RUO	Z-2136-50	50 µl	36
		ZytoLight SPEC ALK/EML4 TriCheck™ Probe CE IVD	Z-2117-50/-200	50/200 µl	33
ERBB2	HER2, HER-2, NEU	ZytoLight SPEC ERBB2/CEN 17 Dual Color Probe CE IVD	Z-2015-50/-200	50/200 µl	147
		ZytoLight SPEC ERBB2/CEN 17 Dual Color Probe Kit CE IVD	Z-2020-5/-20	5/20 tests	147
		ZytoLight CEN 17/SPEC ERBB2 Dual Color Probe CE IVD	Z-2077-50/-200	50/200 µl	148
		ZytoLight SPEC ERBB2/D17S122 Dual Color Probe CE IVD	Z-2190-50/-200	50/200 µl	149
		ZytoLight SPEC ERBB2/TOP2A/CEN 17 Triple Color Probe CE IVD	Z-2093-50/-200	50/200 µl	150
ERBB3	HER3	ZytoLight SPEC ERBB3/CEN 12 Dual Color Probe RUO	Z-2056-200	200 µl	123
ERBB4	HER4, ALS19	ZytoLight SPEC ERBB4/2q11 Dual Color Probe RUO	Z-2057-200	200 µl	38

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

Gene Index

HUGO Name	Synonym	Product Name	Product No.	Quantity	Page
ERG	erg-3, p55	ZytoLight SPEC ERG Dual Color Break Apart Probe CE IVD	Z-2138-200	200 µl	163
		ZytoLight SPEC ERG/TMPRSS2 TriCheck™ Probe CE IVD	Z-2135-200	200 µl	164
ESR1	Era, NR3A1	ZytoLight SPEC ESR1/CEN 6 Dual Color Probe CE IVD	Z-2069-50/-200	50/200 µl	71
ETV6	TEL	ZytoLight SPEC ETV6 Dual Color Break Apart Probe CE IVD	Z-2176-50/-200	50/200 µl	120
		ZytoLight SPEC ETV6/RUNX1 Dual Color Dual Fusion Probe CE IVD	Z-2157-50/-200	50/200 µl	121
EWSR1	EWS	ZytoLight SPEC EWSR1 Dual Color Break Apart Probe CE IVD	Z-2096-50/-200	50/200 µl	169
		ZytoLight SPEC EWSR1/FLI1 TriCheck™ Probe CE IVD	Z-2183-50	50 µl	170
EZH2	KMT6A	ZytoLight SPEC CUX1/EZH2/CEN 7 Triple Color Probe CE IVD	Z-2214-50	50 µl	76
FGFR1	FLT2, BFGFR	ZytoLight SPEC FGFR1 Dual Color Break Apart Probe CE IVD	Z-2168-50/-200	50/200 µl	82
		ZytoLight SPEC FGFR1/CEN 8 Dual Color Probe CE IVD	Z-2072-50/-200	50/200 µl	83
FGFR2	BEK, CD332	ZytoLight SPEC FGFR2 Dual Color Break Apart Probe CE IVD	Z-2169-50/-200	50/200 µl	101
		ZytoLight SPEC FGFR2/CEN 10 Dual Color Probe CE IVD	Z-2122-200	200 µl	102
FGFR3	CD333, JTK4	ZytoLight SPEC FGFR3 Dual Color Break Apart Probe CE IVD	Z-2170-50/-200	50/200 µl	51
		ZytoLight SPEC FGFR3/4p11 Dual Color Probe CE IVD	Z-2082-200	200 µl	52
		ZytoLight SPEC FGFR3/IGH Dual Color Dual Fusion Probe CE IVD	Z-2282-50	50 µl	53
FHIT	FRA3B	ZytoLight SPEC FHIT/CEN 3 Dual Color Probe RUO	Z-2062-200	200 µl	42
FIP1L1	FIP1	ZytoLight SPEC PDGFRA/FIP1L1 TriCheck™ Probe CE IVD	Z-2209-50	50 µl	55
FLI1	EWSR2	ZytoLight SPEC EWSR1/FLI1 TriCheck™ Probe CE IVD	Z-2183-50	50 µl	170
FOXO1	FKHR, FKH1	ZytoLight SPEC FOXO1 Dual Color Break Apart Probe CE IVD	Z-2139-50	50 µl	127
		ZytoLight SPEC FOXO1/PAX3 Dual Color Single Fusion Probe CE IVD	Z-2018-50/-200	50/200 µl	128
		ZytoLight SPEC FOXO1/PAX3 TriCheck™ Probe CE IVD	Z-2185-50	50 µl	129
		ZytoLight SPEC FOXO1/PAX7 Dual Color Single Fusion Probe CE IVD	Z-2019-50/-200	50/200 µl	130
FUS	FUS1	ZytoLight SPEC FUS Dual Color Break Apart Probe CE IVD	Z-2130-50	50 µl	139
GATA2	NFE1B	ZytoLight SPEC GATA2/MECOM Dual Color Dual Fusion Probe CE IVD	Z-2287-50	50 µl	44
HIRA	TUPLE1, TUP1	ZytoLight SPEC DiGeorge/Phelan McDermid Dual Color Probe CE IVD	Z-2299-50	50 µl	165
		ZytoLight SPEC DiGeorge Triple Color Probe CE IVD	Z-2289-50	50 µl	166
IGH	IGH@	ZytoLight SPEC IGH Dual Color Break Apart Probe CE IVD	Z-2110-50/-200	50/200 µl	132
		ZytoLight SPEC BCL2/IGH Dual Color Dual Fusion Probe CE IVD	Z-2114-50/-200	50/200 µl	157
		ZytoLight SPEC CCND1/IGH Dual Color Dual Fusion Probe CE IVD	Z-2125-50/-200	50/200 µl	109
		ZytoLight SPEC FGFR3/IGH Dual Color Dual Fusion Probe CE IVD	Z-2282-50	50 µl	53
		ZytoLight SPEC MAF/IGH Dual Color Dual Fusion Probe CE IVD	Z-2270-50	50 µl	141
		ZytoLight SPEC MAFB/IGH Dual Color Dual Fusion Probe CE IVD	Z-2271-50	50 µl	142
		ZytoLight SPEC MYC/IGH Dual Color Dual Fusion Probe CE IVD	Z-2105-50/-200	50/200 µl	87

IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.

RUO For Research Use Only. Not for use in diagnostic procedures.

Gene Index

HUGO Name	Synonym	Product Name	Product No.	Quantity	Page
IGK	IGK@	*ZytoLight* SPEC IGK Dual Color Break Apart Probe CE IVD	Z-2288-50	50 µl	37
IGL	IGL@	*ZytoLight* SPEC IGL Dual Color Break Apart Probe CE IVD	Z-2286-50	50 µl	167
IKZF1	IKAROS	*ZytoLight* SPEC IKZF1/CEN 7 Dual Color Probe CE IVD	Z-2304-50	50 µl	73
IRF4	MUM1	*ZytoLight* SPEC IRF4,DUSP22 Dual Color Break Apart Probe CE IVD	Z-2210-50	50 µl	63
JAK2	JTK10	*ZytoLight* SPEC JAK2 Dual Color Break Apart Probe CE IVD	Z-2294-50	50 µl	89
JAZF1	TIP27, ZNF802	*ZytoLight* SPEC JAZF1 Dual Color Break Apart Probe CE IVD	Z-2132-50	50 µl	72
KIF5B	KNS1	*ZytoLight* SPEC KIF5B Dual Color Break Apart Probe RUO	Z-2131-50	50 µl	98
KMT2A	MLL	*ZytoLight* SPEC KMT2A Dual Color Break Apart Probe CE IVD	Z-2193-50/-200	50/200 µl	118
KRAS	KRAS1	*ZytoLight* SPEC KRAS/CEN 12 Dual Color Probe CE IVD	Z-2115-200	200 µl	122
LAMP1	CD107a	*ZytoLight* SPEC D13S319/13q34/CEN 12 Triple Color Probe CE IVD *ZytoLight* SPEC D13S319/13q34 Dual Color Probe CE IVD	Z-2160-50/-200 Z-2280-50	50/200 µl 50 µl	115 116
MAF	-	*ZytoLight* SPEC MAF/IGH Dual Color Dual Fusion Probe CE IVD	Z-2270-50	50 µl	141
MAFB	-	*ZytoLight* SPEC MAFB/IGH Dual Color Dual Fusion Probe CE IVD	Z-2271-50	50 µl	142
MALT1	MLT	*ZytoLight* SPEC MALT1 Dual Color Break Apart Probe CE IVD *ZytoLight* SPEC BIRC3/MALT1 Dual Color Dual Fusion Probe CE IVD	Z-2196-50/-200 Z-2146-50/-200	50/200 µl 50/200 µl	158 111
MAML2	MAM3	*ZytoLight* SPEC MAML2 Dual Color Break Apart Probe CE IVD	Z-2014-50/-200	50/200 µl	110
MAPK1	PRKM2, ERK	*ZytoLight* SPEC DiGeorge Triple Color Probe CE IVD	Z-2289-50	50 µl	166
MCL1	BCL2L3	*ZytoLight* SPEC MCL1/1p12 Dual Color Probe CE IVD	Z-2173-200	200 µl	27
MDM2	HDM2	*ZytoLight* SPEC MDM2/CEN 12 Dual Color Probe CE IVD	Z-2013-50/-200	50/200 µl	126
MDM4	MDMX	*ZytoLight* SPEC MDM4/1p12 Dual Color Probe CE IVD	Z-2080-200	200 µl	31
MECOM	MDS1, EVI1	*ZytoLight* SPEC GATA2/MECOM Dual Color Dual Fusion Probe CE IVD	Z-2287-50	50 µl	44
MET	HGFR, RCCP2	*ZytoLight* SPEC MET/CEN 7 Dual Color Probe CE IVD	Z-2087-50/-200	50/200 µl	77
MYB	c-myb	*ZytoLight* SPEC MYB Dual Color Break Apart Probe CE IVD *ZytoLight* SPEC MYB/CEN 6 Dual Color Probe CE IVD *ZytoLight* SPEC RREB1/MYB/CEN 6 Triple Color Probe CE IVD	Z-2143-50/-200 Z-2281-50 Z-2152-50/-200	50/200 µl 50 µl 50/200 µl	69 70 64
MYC	CMYC, bHLHe39, c-Myc	*ZytoLight* SPEC MYC Dual Color Break Apart Probe CE IVD *ZytoLight* SPEC MYC/CEN 8 Dual Color Probe CE IVD *ZytoLight* SPEC MYC/IGH Dual Color Dual Fusion Probe CE IVD	Z-2090-50/-200 Z-2092-50/-200 Z-2105-50/-200	50/200 µl 50/200 µl 50/200 µl	85 86 87

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

Gene Index

HUGO Name	Synonym	Product Name	Product No.	Quantity	Page
MYCN	NMYC, N-myc	ZytoLight SPEC MYCN/2q11 Dual Color Probe CE IVD	Z-2074-50/-200	50/200 µl	32
NR4A3	CHN, CSMF	ZytoLight SPEC NR4A3 Dual Color Break Apart Probe CE IVD	Z-2145-50	50 µl	94
NRG1	HGL, GGF	ZytoLight SPEC NRG1 Dual Color Break Apart Probe CE IVD ZytoLight SPEC NRG1/CD74 TriCheck™ Probe CE IVD	Z-2181-200 Z-2194-200	200 µl 200 µl	81 80
NTRK1	MTC, TRK	ZytoLight SPEC NTRK1 Dual Color Break Apart Probe CE IVD	Z-2167-50/-200	50/200 µl	28
NTRK2	TRKB	ZytoLight SPEC NTRK2 Dual Color Break Apart Probe CE IVD	Z-2205-50/-200	50/200 µl	93
NTRK3	TRKC	ZytoLight SPEC NTRK3 Dual Color Break Apart Probe CE IVD	Z-2206-50/-200	50/200 µl	137
NUP98	NUP96	ZytoLight SPEC NUP98 Dual Color Break Apart Probe CE IVD	Z-2266-50	50 µl	104
NUP214	CAN, CAIN	ZytoLight SPEC NUP214 Dual Color Break Apart Probe CE IVD	Z-2265-50	50 µl	97
NUTM1	NUT	ZytoLight SPEC NUTM1 Dual Color Break Apart Probe CE IVD	Z-2208-200	200 µl	135
PAX3	HUP2	ZytoLight SPEC FOXO1/PAX3 Dual Color Single Fusion Probe CE IVD ZytoLight SPEC FOXO1/PAX3 TriCheck™ Probe CE IVD	Z-2018-50/-200 Z-2185-50	50/200 µl 50 µl	128 129
PAX5	BSAP	ZytoLight SPEC PAX5 Dual Color Break Apart Probe CE IVD	Z-2300-50	50 µl	92
PAX7	HUP1	ZytoLight SPEC FOXO1/PAX7 Dual Color Single Fusion Probe CE IVD	Z-2019-50/-200	50/200 µl	130
PBX1		ZytoLight SPEC TCF3/PBX1 Dual Color Dual Fusion Probe CE IVD	Z-2308-50	50 µl	29
PDCD1LG2	PD-L2, PDL2	ZytoLight SPEC CD274,PDCD1LG2/CEN 9 Dual Color Probe CE IVD	Z-2179-50/-200	50/200 µl	88
PDGFB	SIS, SSV	ZytoLight SPEC PDGFB Dual Color Break Apart Probe CE IVD ZytoLight SPEC COL1A1/PDGFB Dual Color Dual Fusion Probe CE IVD	Z-2119-50/-200 Z-2116-50/-200	50/200 µl 50/200 µl	171 152
PDGFRA	GAS9	ZytoLight SPEC PDGFRA/FIP1L1 TriCheck™ Probe CE IVD	Z-2209-50	50 µl	55
PDGFRB	JTK12, PDGFR1	ZytoLight SPEC PDGFRB Dual Color Break Apart Probe CE IVD	Z-2197-50	50 µl	62
PHF1	MTF2L2, PCL1	ZytoLight SPEC PHF1 Dual Color Break Apart Probe CE IVD	Z-2215-50	50 µl	65
PIK3CA	PI3K	ZytoLight SPEC PIK3CA/CEN 3 Dual Color Probe CE IVD	Z-2140-200	200 µl	47
PML	MYL, RNF71	ZytoLight SPEC PML/RARA Dual Color Dual Fusion Probe CE IVD	Z-2113-50/-200	50/200 µl	136
PTEN	MMAC1, TEP1	ZytoLight SPEC PTEN/CEN 10 Dual Color Probe CE IVD	Z-2078-50/-200	50/200 µl	100
PTPRT	KIAA0283	ZytoLight SPEC PTPRT/20q11 Dual Color Probe CE IVD	Z-2213-50	50 µl	162
RARA	NR1B1, RAR	ZytoLight SPEC PML/RARA Dual Color Dual Fusion Probe CE IVD	Z-2113-50/-200	50/200 µl	136

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

Gene Index

HUGO Name	Synonym	Product Name	Product No.	Quantity	Page
RB1	PPP1R130	ZytoLight SPEC RB1/13q34 Dual Color Probe CE IVD	Z-2324-50/-200	50/200 µl	131
RET	HSCR1, CDHF12	ZytoLight SPEC RET Dual Color Break Apart Probe CE IVD	Z-2148-50/-200	50/200 µl	99
RICTOR	AVO3, KIAA1999	ZytoLight SPEC RICTOR/5q31.1 Dual Color Probe RUO	Z-2278-200	200 µl	58
ROS1	MCF3, ROS	ZytoLight SPEC ROS1 Dual Color Break Apart Probe CE IVD	Z-2144-50/-200	50/200 µl	67
		ZytoLight SPEC ROS1/CEN 6 Dual Color Probe CE IVD	Z-2162-200	200 µl	68
RREB1	HNT	ZytoLight SPEC RREB1/MYB/CEN 6 Triple Color Probe CE IVD	Z-2152-50/-200	50/200 µl	64
RUNX1	AML1, AMLCR1	ZytoLight SPEC RUNX1/RUNX1T1 Dual Color Dual Fusion Probe CE IVD	Z-2112-50/-200	50/200 µl	84
		ZytoLight SPEC ETV6/RUNX1 Dual Color Dual Fusion Probe CE IVD	Z-2157-50/-200	50/200 µl	121
RUNX1T1	ETO, CDR, MTG8	ZytoLight SPEC RUNX1/RUNX1T1 Dual Color Dual Fusion Probe CE IVD	Z-2112-50/-200	50/200 µl	84
SHANK3	prosap2	ZytoLight SPEC DiGeorge/Phelan McDermid Dual Color Probe CE IVD	Z-2299-50	50 µl	165
SMARCB1	BAF47	ZytoLight SPEC SMARCB1/22q12 Dual Color Probe CE IVD	Z-2178-50	50 µl	168
SNRPN	PWCR	ZytoLight SPEC Prader-Willi Dual Color Probe CE IVD	Z-2318-50	50 µl	133
SOX2	ANOP3	ZytoLight SPEC SOX2/CEN 3 Dual Color Probe RUO	Z-2127-200	200 µl	48
SPI1	PU.1, SPI-A	ZytoLight SPEC SPI1 Dual Color Break Apart Probe CE IVD	Z-2291-50	50 µl	106
SS18	SYT, SSXT	ZytoLight SPEC SS18 Dual Color Break Apart Probe CE IVD	Z-2097-50/-200	50/200 µl	153
		ZytoLight SPEC SS18/SSX1 TriCheck™ Probe CE IVD	Z-2184-50	50 µl	154
SSX1	-	ZytoLight SPEC SS18/SSX1 TriCheck™ Probe CE IVD	Z-2184-50	50 µl	154
TBL1XR1	IRA1	ZytoLight SPEC TP63/TBL1XR1 TriCheck™ Probe CE IVD	Z-2320-50	50 µl	49
TCF3	E2A	ZytoLight SPEC TCF3/PBX1 Dual Color Dual Fusion Probe CE IVD	Z-2308-50	50 µl	29
TERC	hTERC, TRC3	ZytoLight SPEC TERC/CEN 3 Dual Color Probe RUO	Z-2284-200	200 µl	46
TERT	EST2, TCS1	ZytoLight SPEC TERT Dual Color Break Apart Probe CE IVD	Z-2273-50	50 µl	56
		ZytoLight SPEC TERT/5q31 Dual Color Probe CE IVD	Z-2091-50/-200	50/200 µl	57
TFE3	TFEA	ZytoLight SPEC TFE3 Dual Color Break Apart Probe CE IVD	Z-2109-50/-200	50/200 µl	174
TMPRSS2	PRSS10	ZytoLight SPEC ERG/TMPRSS2 TriCheck™ Probe CE IVD	Z-2135-200	200 µl	164
TOP2A	TOP2	ZytoLight SPEC ERBB2/TOP2A/CEN 17 Triple Color Probe CE IVD	Z-2093-50/-200	50/200 µl	150
TP53	LSF1, TRP53	ZytoLight SPEC TP53/17q22 Dual Color Probe CE IVD	Z-2198-50	50 µl	143
		ZytoLight SPEC TP53/ATM Dual Color Probe CE IVD	Z-2159-50/-200	50/200 µl	114
		ZytoLight SPEC TP53/CEN 17 Dual Color Probe CE IVD	Z-2153-50/-200	50/200 µl	144

IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.

RUO For Research Use Only. Not for use in diagnostic procedures.

Gene Index

HUGO Name	Synonym	Product Name	Product No.	Quantity	Page
TP63	TP73L	ZytoLight SPEC TP63/TBL1XR1 TriCheck™ Probe CE IVD	Z-2320-50	50 µl	49
UBE3A	AS	ZytoLight SPEC Angelman Dual Color Probe CE IVD	Z-2319-50	50 µl	134
USP6	Tre-2, TRE17	ZytoLight SPEC USP6 Dual Color Break Apart Probe CE IVD	Z-2151-50/-200	50/200 µl	145
VEGFA	VEGF, VPF	ZytoLight SPEC VEGFA/CEN 6 Dual Color Probe CE IVD	Z-2195-200	200 µl	66
VHL	VHL1	ZytoLight SPEC VHL/CEN 3 Dual Color Probe CE IVD ZytoLight SPEC VHL/1p12/CEN 7/17 Quadruple Color Probe CE IVD	Z-2084-200 Z-2102-200	200 µl 200 µl	39 40
WT1	AWT1	ZytoLight SPEC WT1 Dual Color Break Apart Probe CE IVD	Z-2142-50	50 µl	105
WWTR1	TAZ	ZytoLight SPEC WWTR1 Dual Color Break Apart Probe CE IVD	Z-2212-50	50 µl	45
YWHAE	14-3-3 epsilon	ZytoLight SPEC YWHAE Dual Color Break Apart Probe CE IVD	Z-2175-50	50 µl	146
ZNF384	CIZ	ZytoLight SPEC ZNF384 Dual Color Break Apart Probe CE IVD	Z-2275-50	50 µl	119

The **Gene Index** list includes only those probes directed against DNA sequences assigned to known genes. It does not contain probes directed against other genomic sequences as e.g. repetitive satellite DNA sequences. For a complete overview of all ZytoLight® probes, please refer to the **Chromosome Index**.

IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.

RUO For Research Use Only. Not for use in diagnostic procedures.

Indication Index

Indication	Product Name	Product No.	Quantity	Page
Solid Tumors Specific Probes				
Breast Cancer				
Breast Cancer	*ZytoLight* SPEC ERBB2/CEN 17 Dual Color Probe CE IVD	Z-2015-50/-200	50/200 µl	147
	ZytoLight SPEC ERBB2/CEN 17 Dual Color Probe Kit CE IVD	Z-2020-5/-20	5/20 tests	147
	ZytoLight CEN 17/SPEC ERBB2 Dual Color Probe CE IVD	Z-2077-50/-200	50/200 µl	148
	ZytoLight SPEC FGFR1/CEN 8 Dual Color Probe CE IVD	Z-2072-50/-200	50/200 µl	83
	ZytoLight SPEC MYC/CEN 8 Dual Color Probe CE IVD	Z-2092-50/-200	50/200 µl	86
Gastrointestinal Cancer				
Gastric/Gastroesophageal Junction Cancer	*ZytoLight* SPEC ERBB2/CEN 17 Dual Color Probe CE IVD	Z-2015-50/-200	50/200 µl	147
	ZytoLight SPEC ERBB2/CEN 17 Dual Color Probe Kit CE IVD	Z-2020-5/-20	5/20 tests	147
	ZytoLight CEN 17/SPEC ERBB2 Dual Color Probe CE IVD	Z-2077-50/-200	50/200 µl	148
Lung Cancer				
Non-Small Cell Lung Cancer (NSCLC)	*ZytoLight* SPEC ALK/EML4 TriCheck™ Probe CE IVD	Z-2117-50/-200	50/200 µl	33
	ZytoLight SPEC ALK Dual Color Break Apart Probe CE IVD	Z-2124-50/-200	50/200 µl	34
	ZytoLight SPEC EGFR/CEN 7 Dual Color Probe CE IVD	Z-2033-50/-200	50/200 µl	74
	ZytoLight SPEC MET/CEN 7 Dual Color Probe CE IVD	Z-2087-50/-200	50/200 µl	77
	ZytoLight SPEC RET Dual Color Break Apart Probe CE IVD	Z-2148-50/-200	50/200 µl	99
	ZytoLight SPEC ROS1 Dual Color Break Apart Probe CE IVD	Z-2144-50/-200	50/200 µl	67
Squamous Cell Lung Cancer	*ZytoLight* SPEC FGFR1/CEN 8 Dual Color Probe CE IVD	Z-2072-50/-200	50/200 µl	83
Renal Cell Carcinomas (RCC)				
Renal Cell Carcinoma (RCC)	*ZytoLight* SPEC TFE3 Dual Color Break Apart Probe CE IVD	Z-2109-50/-200	50/200 µl	174
Salivary Gland Tumors				
Adenoid Cystic Carcinoma (ACC)	*ZytoLight* SPEC MYB Dual Color Break Apart Probe CE IVD	Z-2143-50/-200	50/200 µl	69
Mucoepidermoid Carcinoma (MEC)	*ZytoLight* SPEC MAML2 Dual Color Break Apart Probe CE IVD	Z-2014-50/-200	50/200 µl	110
Soft Tissue and Bone Tumors				
Alveolar Rhabdomyosarcoma (ARMS)	*ZytoLight* SPEC FOXO1 Dual Color Break Apart Probe CE IVD	Z-2139-50	50 µl	127
	ZytoLight SPEC FOXO1/PAX3 Dual Color Single Fusion Probe CE IVD	Z-2018-50/-200	50/200 µl	128
	ZytoLight SPEC FOXO1/PAX3 TriCheck™ Probe CE IVD	Z-2185-50	50 µl	129
	ZytoLight SPEC FOXO1/PAX7 Dual Color Single Fusion Probe CE IVD	Z-2019-50/-200	50/200 µl	130
Aneurysmal Bone Cyst (ABC)	*ZytoLight* SPEC USP6 Dual Color Break Apart Probe CE IVD	Z-2151-50/-200	50/200 µl	145
Atypical Lipomatous Tumor/Well-Differentiated Liposarcoma (ALT/WDLPS)	*ZytoLight* SPEC CDK4/CEN 12 Dual Color Probe CE IVD	Z-2103-50/-200	50/200 µl	125
	ZytoLight SPEC MDM2/CEN 12 Dual Color Probe CE IVD	Z-2013-50/-200	50/200 µl	126
Dedifferentiated Liposarcoma (DDLPS)	*ZytoLight* SPEC CDK4/CEN 12 Dual Color Probe CE IVD	Z-2103-50/-200	50/200 µl	125
	ZytoLight SPEC MDM2/CEN 12 Dual Color Probe CE IVD	Z-2013-50/-200	50/200 µl	126
Dermatofibrosarcoma Protuberans (DFSP)	*ZytoLight* SPEC COL1A1/PDGFB Dual Color Dual Fusion Probe CE IVD	Z-2116-50/-200	50/200 µl	152
	ZytoLight SPEC PDGFB Dual Color Break Apart Probe CE IVD	Z-2119-50/-200	50/200 µl	171
Endometrial Stromal Sarcoma (ESS)	*ZytoLight* SPEC YWHAE Dual Color Break Apart Probe CE IVD	Z-2175-50	50 µl	146
Ewing Sarcoma	*ZytoLight* SPEC EWSR1 Dual Color Break Apart Probe CE IVD	Z-2096-50/-200	50/200 µl	169
	ZytoLight SPEC EWSR1/FLI1 TriCheck™ Probe CE IVD	Z-2183-50	50 µl	170
Myxoid Liposarcoma (MLPS)	*ZytoLight* SPEC DDIT3 Dual Color Break Apart Probe CE IVD	Z-2100-50/-200	50/200 µl	124
Nodular Fasciitis (NF)	*ZytoLight* SPEC USP6 Dual Color Break Apart Probe CE IVD	Z-2151-50/-200	50/200 µl	145
Synovial Sarcoma	*ZytoLight* SPEC SS18 Dual Color Break Apart Probe CE IVD	Z-2097-50/-200	50/200 µl	153

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

Indication Index

Indication	Product Name	Product No.	Quantity	Page
Thyroid Cancer				
Papillary Thyroid Carcinoma (PTC)	ZytoLight SPEC RET Dual Color Break Apart Probe CE IVD	Z-2148-50/-200	50/200 µl	99
Tumors of the Central Nervous System				
Glioma	ZytoLight Glioma 1p/19q Probe Set CE IVD	Z-2272-20	20 tests	23
	ZytoLight SPEC 1p36/1q25 Dual Color Probe CE IVD	Z-2075-50/-200	50/200 µl	24
	ZytoLight SPEC 19q13/19p13 Dual Color Probe CE IVD	Z-2076-50/-200	50/200 µl	25
	ZytoLight SPEC EGFR/CEN 7 Dual Color Probe CE IVD	Z-2033-50/-200	50/200 µl	74
Medulloblastoma	ZytoLight SPEC MYCN/2q11 Dual Color Probe CE IVD	Z-2074-50/-200	50/200 µl	32
Neuroblastoma	ZytoLight SPEC MYCN/2q11 Dual Color Probe CE IVD	Z-2074-50/-200	50/200 µl	32
Hematology Specific Probes				
Chronic Myelogenous Leukemia (CML)				
Chronic Myeloid Leukemia (CML)	ZytoLight SPEC BCR/ABL1 Dual Color Dual Fusion Probe CE IVD	Z-2111-50/-200	50/200 µl	96
Lymphoma				
B-Cell Lymphoma	ZytoLight SPEC BCL2 Dual Color Break Apart Probe CE IVD	Z-2192-50/-200	50/200 µl	155
	ZytoLight SPEC BCL6 Dual Color Break Apart Probe CE IVD	Z-2177-50/-200	50/200 µl	50
Burkitt Lymphoma (BL)	ZytoLight SPEC MYC Dual Color Break Apart Probe CE IVD	Z-2090-50/-200	50/200 µl	85
Diffuse Large B-Cell Lymphoma (DLBCL)	ZytoLight SPEC MYC Dual Color Break Apart Probe CE IVD	Z-2090-50/-200	50/200 µl	85

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

ZytoLight® Glioma 1p/19q Probe Set

CE IVD

Background

The ZytoLight® Glioma 1p/19q Probe Set is intended to be used for the qualitative detection of deletions involving the human chromosomal region 1p36.31 as well as deletions involving the human chromosomal region 19q13.32-q13.33 in formalin-fixed, paraffin-embedded specimens, such as gliomas, by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of gliomas and therapeutic measures should not be initiated based on the test result alone.

Probe Description

The ZytoLight® Glioma 1p/19q Probe Set is a set comprising two separate probes and a quenching solution:

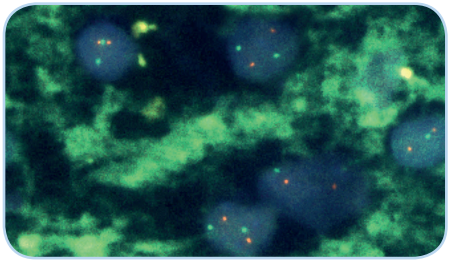
- ZytoLight® SPEC 1p36/1q25 Dual Color Probe (Prod. No. Z-2075-200)
- ZytoLight® SPEC 19q13/19p13 Dual Color Probe (Prod. No. Z-2076-200)
- ZyBlack Quenching Solution (Prod. No. BS-0002-8)
- The ZytoLight® SPEC 1p36/1q25 Dual Color Probe (PL34) is composed of:
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 1p36.31** (chr1:5,808,946-6,176,336).
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 1q25.3** (chr1:184,271,714-184,986,522).
- Formamide based hybridization buffer

The ZytoLight® SPEC 19q13/19p13 Dual Color Probe (PL35) is composed of:

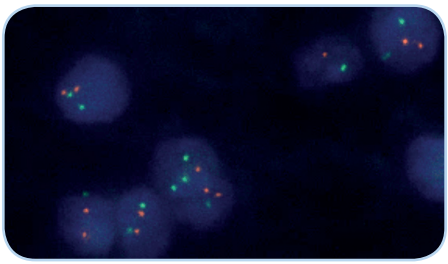
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 19q13.32-q13.33** (chr19:47,857,776-48,374,564)
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 19p13.3** (chr19:658,555-1,144,465).
- Formamide based hybridization buffer

Results

Using the SPEC 1p36/1q25 Dual Color Probe or the SPEC 19q13/19p13 Dual Color Probe in a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletions affecting the 1p36 or 19q13 locus, one or no copy of the orange signal will be observed.

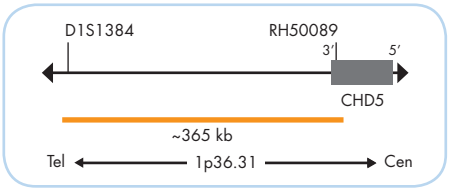


Brain tissue section hybridized with the ZytoLight® SPEC 1p36/1q25 Dual Color Probe without ZyBlack™ Quenching Solution.

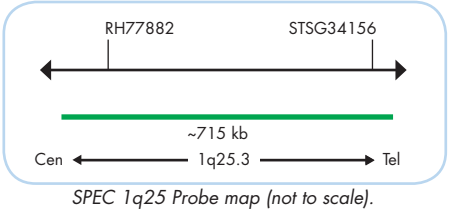


Brain tissue section hybridized with the ZytoLight® SPEC 1p36/1q25 Dual Color Probe with ZyBlack™ Quenching Solution.

ZytoLight® SPEC 1p36/1q25 Dual Color Probe

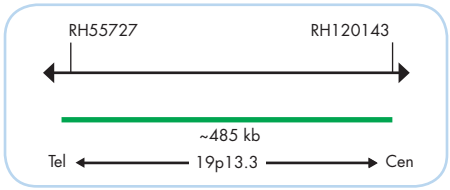


SPEC 1p36 Probe map (not to scale).

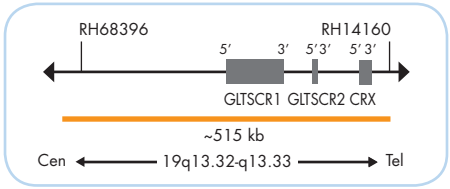


SPEC 1q25 Probe map (not to scale).

ZytoLight® SPEC 19q13/19p13 Dual Color Probe



SPEC 19p13 Probe map (not to scale).



SPEC 19q13 Probe map (not to scale).

Prod. No.	Product	Label	Tests* (Volume)
Z-2272-20	ZytoLight Glioma 1p/19q Probe Set CE IVD Incl. ZytoLight SPEC 1p36/1q25 Dual Color Probe, 0.2 ml; ZytoLight SPEC 19q13/19p13 Dual Color Probe, 0.2 ml; ZyBlack Quenching Solution, 8 ml		20
Related Products			
Z-2075-200	ZytoLight SPEC 1p36/1q25 Dual Color Probe CE IVD	●/●	20 (200 µl)
Z-2076-200	ZytoLight SPEC 19q13/19p13 Dual Color Probe CE IVD	●/●	20 (200 µl)
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC 1p36/1q25 Dual Color Probe

CE IVD

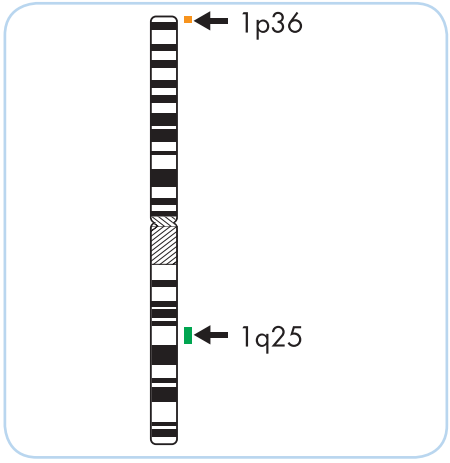
Background

The ZytoLight® SPEC 1p36/1q25 Dual Color Probe (PL34) is intended to be used for the qualitative detection of deletions involving the human chromosomal region 1p36.31 as well as the detection of chromosome 1q25.3 specific sequences in formalin-fixed, paraffin-embedded specimens, such as glioma, by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of glioma and therapeutic measures should not be initiated based on the test result alone.

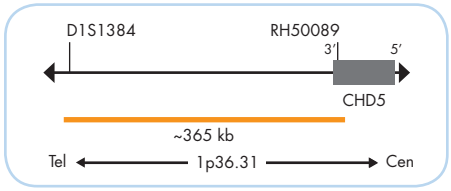
Probe Description

The ZytoLight® SPEC 1p36/1q25 Dual Color Probe is composed of:

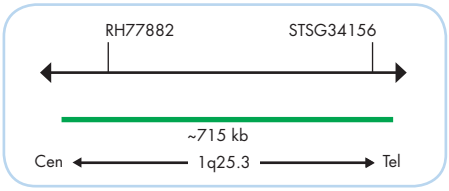
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 1p36.31** (chr1:5,808,946-6,176,336)
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 1q25.3** (chr1:184,271,714-184,986,522).
- Formamide based hybridization buffer



Ideogram of chromosome 1 indicating the hybridization locations.



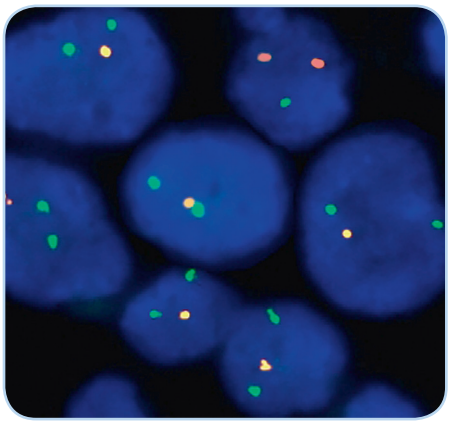
SPEC 1p36 Probe map (not to scale).



SPEC 1q25 Probe map (not to scale).

Results

Using the SPEC 1p36/1q25 Dual Color Probe in a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletions affecting the 1p36 locus, one or no copy of the orange signal will be observed.



SPEC 1p36/1q25 Dual Color Probe hybridized to a glioma tissue section with 1p36 deletion as indicated by one orange signal in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2075-50	ZytoLight SPEC 1p36/1q25 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2075-200	ZytoLight SPEC 1p36/1q25 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2272-20	ZytoLight Glioma 1p/19q Probe Set CE IVD Incl. ZytoLight SPEC 1p36/1q25 Dual Color Probe, 0.2 ml; ZytoLight SPEC 19q13/19p13 Dual Color Probe, 0.2 ml; ZyBlack Quenching Solution, 8 ml		20
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC 19q13/19p13 Dual Color Probe

CE IVD

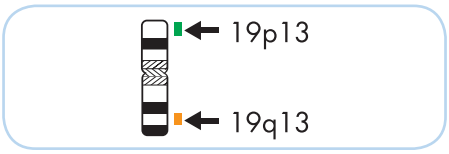
Background

The ZytoLight® SPEC 19q13/19p13 Dual Color Probe (PL35) is intended to be used for the qualitative detection of deletions involving the human chromosomal region 19q13.32-q13.33 as well as the detection of chromosome 19p13.3 specific sequences in formalin-fixed, paraffin-embedded specimens, such as glioma, by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of glioma and therapeutic measures should not be initiated based on the test result alone.

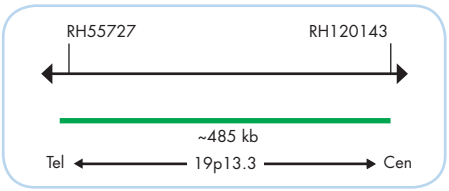
Probe Description

The ZytoLight® SPEC 19q13/19p13 Dual Color Probe is composed of:

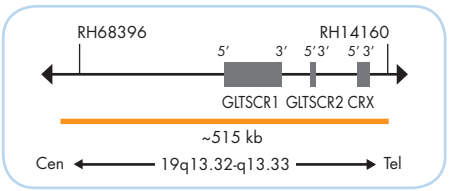
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 19q13.32-q13.33** (chr19:47,857,776-48,374,564).
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 19p13.3** (chr19:658,555-1,144,465).
- Formamide based hybridization buffer



Ideogram of chromosome 19 indicating the hybridization locations.



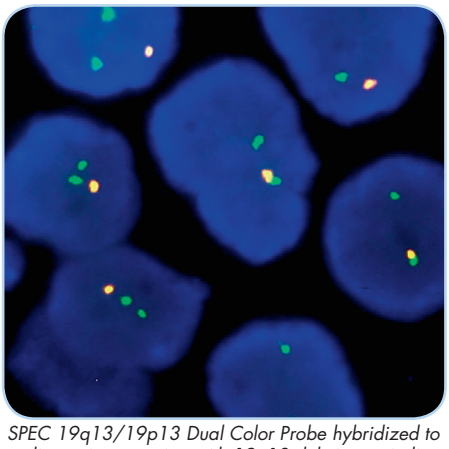
SPEC 19p13 Probe map (not to scale).



SPEC 19q13 Probe map (not to scale).

Results

Using the SPEC 19q13/19p13 Dual Color Probe in a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletions affecting the 19q13 locus, one or no copy of the orange signal will be observed.



SPEC 19q13/19p13 Dual Color Probe hybridized to a glioma tissue section with 19q13 deletion as indicated by one orange signal in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2076-50	ZytoLight SPEC 19q13/19p13 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2076-200	ZytoLight SPEC 19q13/19p13 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2272-20	ZytoLight Glioma 1p/19q Probe Set CE IVD Incl. ZytoLight SPEC 1p36/1q25 Dual Color Probe, 0.2 ml; ZytoLight SPEC 19q13/19p13 Dual Color Probe, 0.2 ml; ZyBlack Quenching Solution, 8 ml		20
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC CKS1B/CDKN2C Dual Color Probe

CE IVD

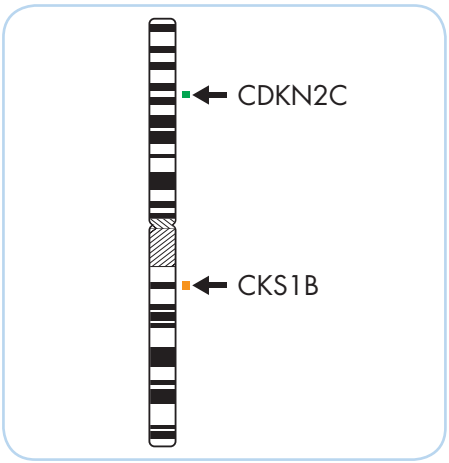
Background

The ZytoLight® SPEC CKS1B/CDKN2C Dual Color Probe (PL232) is intended to be used for the qualitative detection of amplifications/gains involving the human CKS1B gene at 1q21.3-q22 and deletions involving the human CDKN2C gene at 1p32.3 in cytologic specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

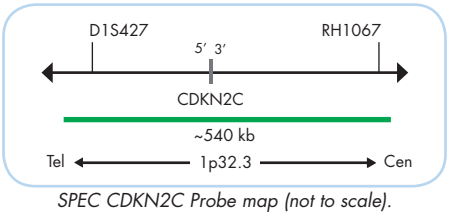
Probe Description

The ZytoLight® SPEC CKS1B/CDKN2C Dual Color Probe is composed of:

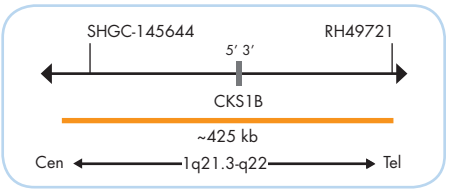
- ZyOrange (excitation 547 nm/ emission at 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 1q21.3-q22** (chr1:154,722,168-155,144,639) harboring the CKS1B gene.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 1p32.3** (chr1:51,196,272-51,737,475) harboring the CDKN2C gene.
- Formamide based hybridization buffer



Ideogram of chromosome 1 indicating the hybridization locations.



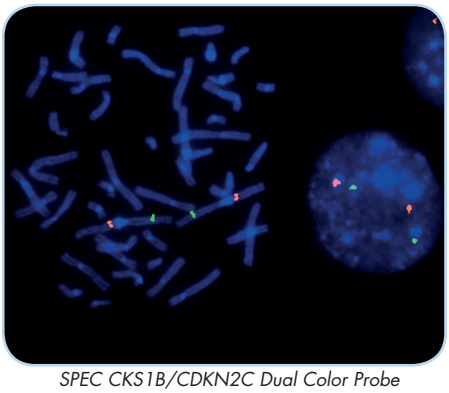
SPEC CDKN2C Probe map (not to scale).



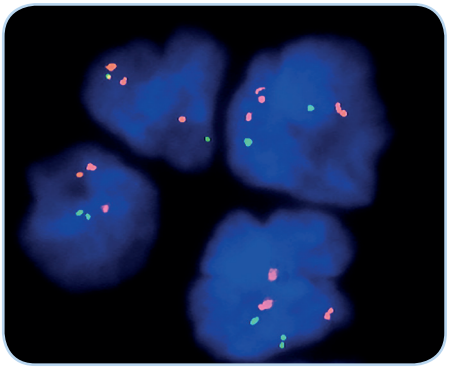
SPEC CKS1B Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected.
In a cell with a gain/amplification of the CKS1B gene locus, multiple copies of the orange signal or orange signal clusters will be observed.
In a cell with deletion of the CDKN2C gene locus one or no copy of the green signal will be observed. Deletions affecting only parts of the CDKN2C locus might result in a normal signal pattern with green signals of reduced size.



SPEC CKS1B/CDKN2C Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals and to metaphase chromosomes of a normal cell.



Example of an aberrant signal pattern: Bone marrow smear of a pediatric ALL case with amplification affecting the CKS1B locus as indicated by three or more orange signals.

Material kindly provided by Paediatric Oncology/ Haematology, Charieté – Universitätsmedizin Berlin.

Prod. No.	Product	Label	Tests* (Volume)
Z-2276-50	ZytoLight SPEC CKS1B/CDKN2C Dual Color Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC MCL1/1p12 Dual Color Probe

CE IVD

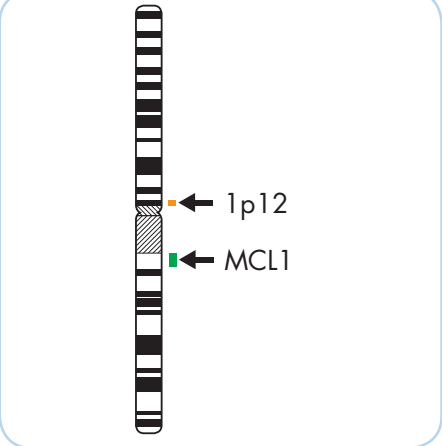
Background

The ZytoLight® SPEC MCL1/1p12 Dual Color Probe (PL129) is intended to be used for the qualitative detection of amplifications involving the human MCL1 gene as well as the detection of chromosome 1p12 specific sequences in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

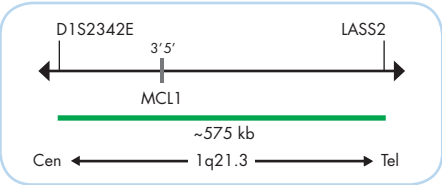
Probe Description

The ZytoLight® SPEC MCL1/1p12 Dual Color Probe is composed of:

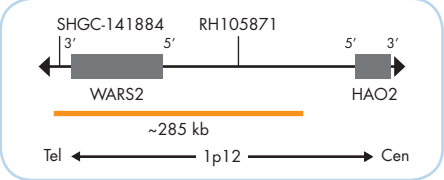
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 1q21.3** (chr1:150,363,209-150,940,432) harboring the MCL1 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 1p12** (chr1:119,537,102-119,823,147).
- Formamide based hybridization buffer



Ideogram of chromosome 1 indicating the hybridization locations.



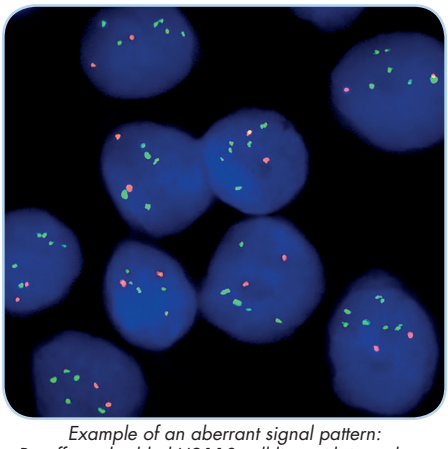
SPEC MCL1 Probe map (not to scale).



SPEC 1p12 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the MCL1 gene locus, multiple copies of the green signal or green signal clusters will be observed.



Example of an aberrant signal pattern: Paraffin-embedded H2110 cell line with interphase cells showing amplification of the MCL1 gene locus as indicated by multiple green signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2173-200	ZytoLight SPEC MCL1/1p12 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC NTRK1 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC NTRK1 Dual Color Break Apart Probe (PL123) is intended to be used for the qualitative detection of translocations involving the human NTRK1 gene at 1q23.1 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

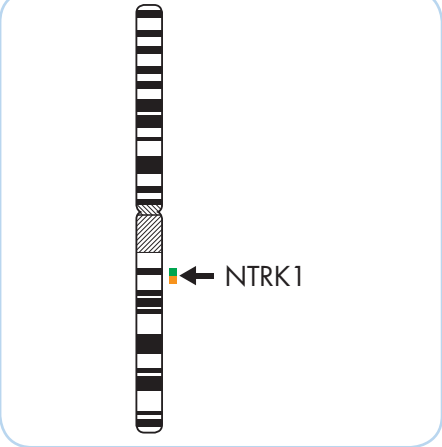
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

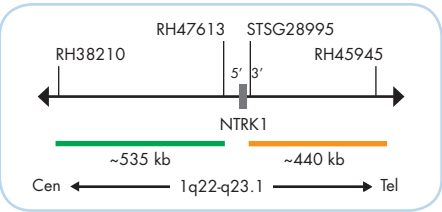
Probe Description

The ZytoLight® SPEC NTRK1 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 1q22-q23.1** (chr1:156,245,849-156,781,745) proximal to the NTRK1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 1q23.1** (chr1:156,854,527-157,296,918) distal to the NTRK1 breakpoint region.
- Formamide based hybridization buffer



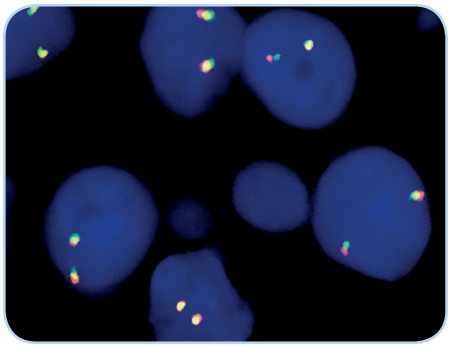
Ideogram of chromosome 1 indicating the hybridization locations.



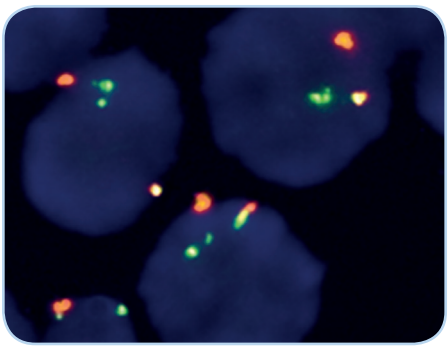
SPEC NTRK1 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 1q22-q23.1 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 1q22-q23.1 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 1q22-q23.1 locus and one 1q22-q23.1 locus affected by a translocation. Isolated orange signals are the result of deletions proximal to the NTRK1 breakpoint region or are due to unbalanced translocations affecting this chromosomal region.



SPEC NTRK1 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: Lung cancer tissue section with translocation of the NTRK1 gene as indicated by one non-rearranged orange/green fusion signal, one orange and one separate green signal.

Image kindly provided by Prof. Büttner, Cologne, Germany.

Prod. No.	Product	Label	Tests* (Volume)
Z-2167-50	ZytoLight SPEC NTRK1 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2167-200	ZytoLight SPEC NTRK1 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC TCF3/PBX1 Dual Color Dual Fusion Probe

CE IVD

Background

The ZytoLight® SPEC TCF3/PBX1 Dual Color Dual Fusion Probe is designed to detect rearrangements affecting the chromosomal region 19p13.3 harboring the TCF3 (transcription factor 3, a.k.a E2A) gene and the chromosomal region 1q23.3 harboring the PBX1 (PBX homeobox 1) gene.

TCF3 is the target of several known recurrent rearrangements in ALL that create TCF3 fusion proteins. The balanced t(1;19)(q23.3;p13.3) and the more common unbalanced der(19)t(1;19)(q23.3;p13.3), which occur in approximately 6% of pediatric B-ALL cases and in 20-25% of all pre-B-ALL cases, fuse the TCF3 gene to the PBX1 gene. The t(17;19)(q22;p13.3) fuses TCF3 to the HLF gene in <1% of cases. TCF3-PBX1 and TCF3-HLF are chimeric transcription factors that contain the same portion of TCF3, including two transcriptional activation domains, fused to regions of PBX1 or HLF that contain unique DNA binding domains.

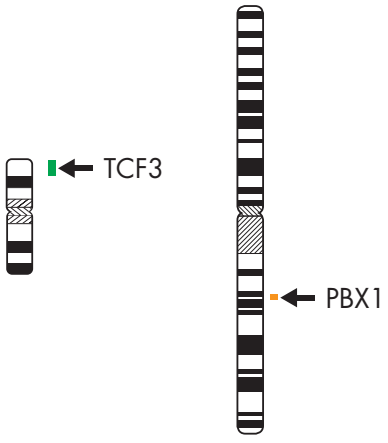
As a sole abnormality, t(1;19)/der(19)t(1;19) is associated with an intermediate prognosis. In the context of hyperdiploid B-ALL, this translocation is associated with a poor prognosis. TCF3-HLF fusion has an extremely poor prognosis.

In the revised 2016 WHO classification of myeloid neoplasms and acute leukemia, "B-lymphoblastic leukemia/lymphoma with t(1;19)(q23.3;p13.3);TCF3-PBX1" is classified as its own cytogenetic subgroup of ALL. Because more intensive therapy improves the outcome of patients with TCF3-PBX1 gene fusions, it is critical to identify this subset of patients so that appropriate therapy can be administered.

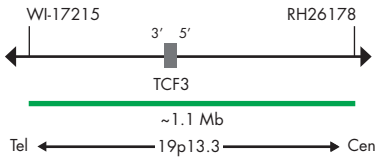
References
Arber DA, et al. (2016) Blood 127: 2391-405.
Boomer T, et al. (2001) Leukemia 15: 95-102.
Mellentin JD, et al. (1989) Science 246: 379-82.
Rowsey RA, et al. (2019) Blood Cancer J 9 :81.
Shearer BM, et al. (2005) Br J Haematol 129: 45-52.
Tirado CA, et al. (2015) Biomark Res 3: 4.

Probe Description

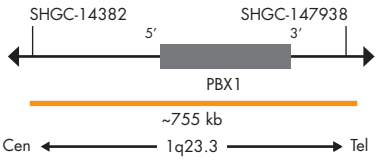
- The ZytoLight® SPEC TCF3/PBX1 Dual Color Dual Fusion Probe is composed of:
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~12.0 ng/µl), which target sequences mapping in 19p13.3** (chr19:1,152,432-2,233,487) harboring the TCF3 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~6.0 ng/µl), which target sequences mapping in 1q23.3** (chr1:164,223,543-164,979,228) harboring the PBX1 gene region.
- Formamide based hybridization buffer



Ideograms of chromosomes 19 (left) and 1 (right) indicating the hybridization locations.



SPEC TCF3 Probe map (not to scale).



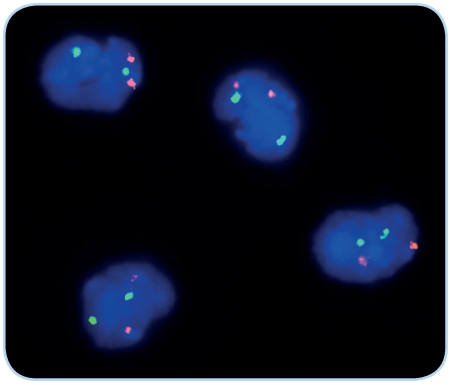
SPEC PBX1 Probe map (not to scale).

Results

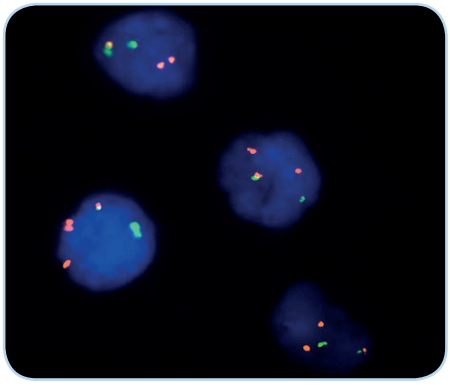
In a normal interphase nucleus, two green and two orange signals are expected.

A balanced translocation involving the chromosomal regions of TCF3 and PBX1 is indicated by one separate green signal, one separate orange signal, and two green/orange fusion signals. A signal pattern showing one fusion signal, one separate green and two separate orange signals can occur due to an unbalanced translocation.

Other relevant signal patterns may also be observed as a result of TCF3 rearrangements without the involvement of the PBX1 locus.



SPEC TCF3/PBX1 Dual Color Dual Fusion Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Bone marrow smear with rearrangement affecting the TCF3/PBX1 loci as indicated by two separate orange signals, one separate green signal, and one orange/green fusion signals.

Prod. No.	Product	Label	Tests* (Volume)
Z-2308-50	ZytoLight SPEC TCF3/PBX1 Dual Color Dual Fusion Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC ABL2 Dual Color Break Apart Probe

CE IVD

Background

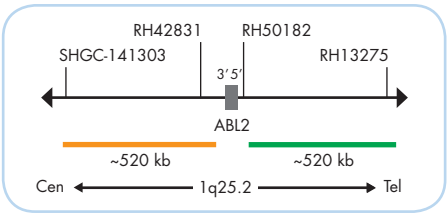
The ZytoLight® SPEC ABL2 Dual Color Break Apart Probe (PL158) is intended to be used for the qualitative detection of translocations involving the human ABL2 gene at 1q25.2 in cytologic specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

Probe Description

The ZytoLight® SPEC ABL2 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 1q25.2** (chr1:179,141,608-179,659,091) distal to the ABL2 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 1q25.2** (chr1:178,496,704-179,015,312) proximal to the ABL2 breakpoint region.
- Formamide based hybridization buffer

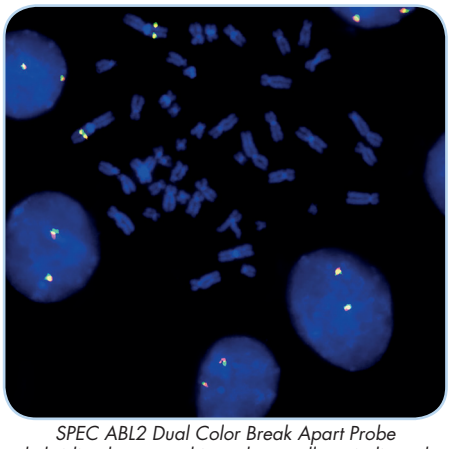
Ideogram of chromosome 1 indicating the hybridization locations.



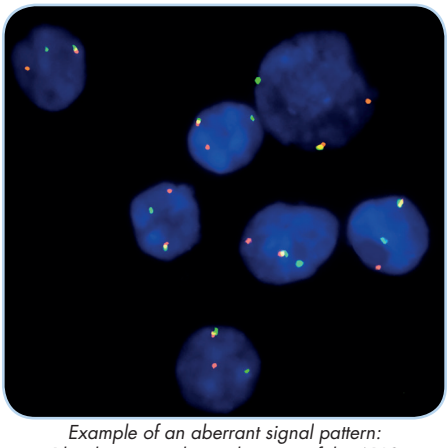
SPEC ABL2 Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 1q25.2 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 1q25.2 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 1q25.2 locus and one 1q25.2 locus affected by a translocation.



SPEC ABL2 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus and to metaphase chromosomes of a normal cell.



Example of an aberrant signal pattern: Blood smear with translocation of the ABL2 gene as indicated by one non-rearranged orange/green fusion signal, one orange and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2200-50	ZytoLight SPEC ABL2 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC MDM4/1p12 Dual Color Probe

CE IVD

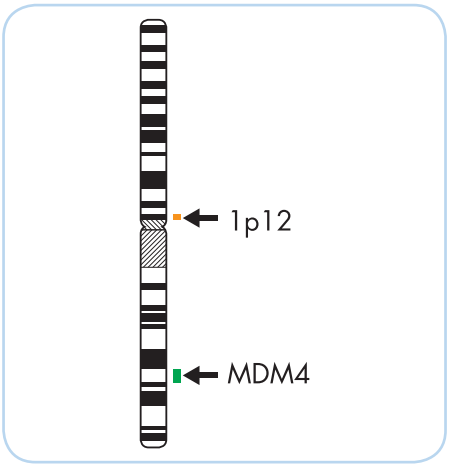
Background

The ZytoLight® SPEC MDM4/1p12 Dual Color Probe (PL39) is intended to be used for the qualitative detection of amplifications involving the human MDM4 gene as well as the detection of chromosome 1p12 specific sequences in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

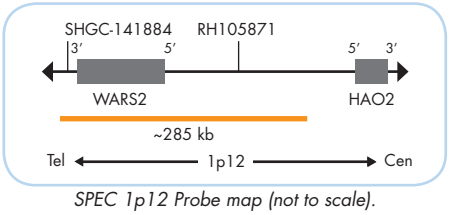
Probe Description

The ZytoLight® SPEC MDM4/1p12 Dual Color Probe is composed of:

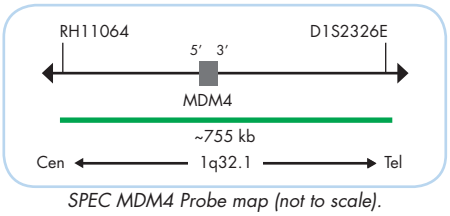
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 1q32.1** (chr1:204,126,022-204,882,307) harboring the MDM4 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 1p12** (chr1:119,537,102-119,823,147).
- Formamide based hybridization buffer



Ideogram of chromosome 1 indicating the hybridization locations.



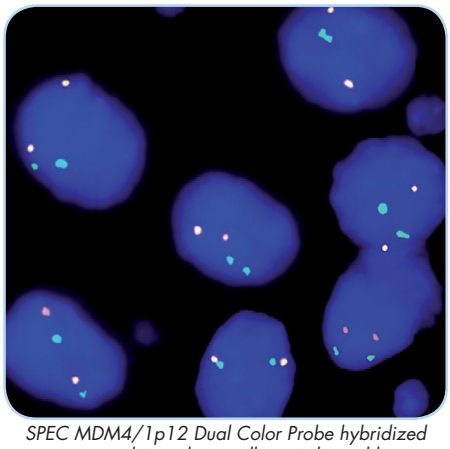
SPEC 1p12 Probe map (not to scale).



SPEC MDM4 Probe map (not to scale).

Results

In a normal interphase nucleus two orange and two green signals are expected. Nuclei with amplification of the MDM4 gene locus or aneuploidy of chromosome 1 will show multiple copies of the green signal or large green signal clusters.



SPEC MDM4/1p12 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2080-200	ZytoLight SPEC MDM4/1p12 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC MYCN/2q11 Dual Color Probe

CE IVD

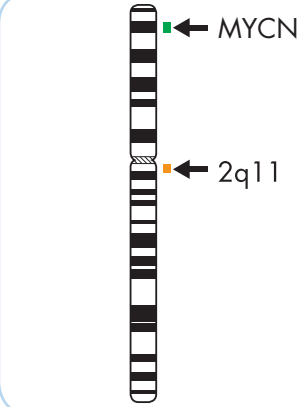
Background

The ZytoLight® SPEC MYCN/2q11 Dual Color Probe (PL33) is intended to be used for the qualitative detection of amplifications involving the human MYCN gene as well as the detection of chromosome 2q11 specific sequences in formalin-fixed, paraffin-embedded specimens, such as neuroblastoma and medulloblastoma, by fluorescence *in situ* hybridization (FISH).
The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of neuroblastoma and medulloblastoma and therapeutic measures should not be initiated based on the test result alone.

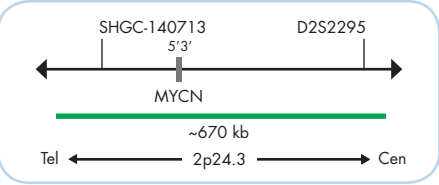
Probe Description

The ZytoLight® SPEC MYCN/2q11 Dual Color Probe is composed of:

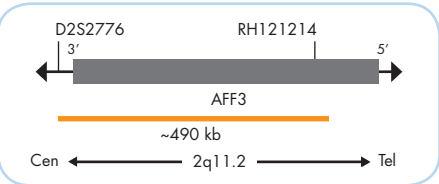
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 2p24.3** (chr2:15,846,046-16,517,671) harboring the MYCN gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 2q11.2** (chr2:100,132,806-100,621,725).
- Formamide based hybridization buffer



Ideogram of chromosome 2 indicating the hybridization locations.



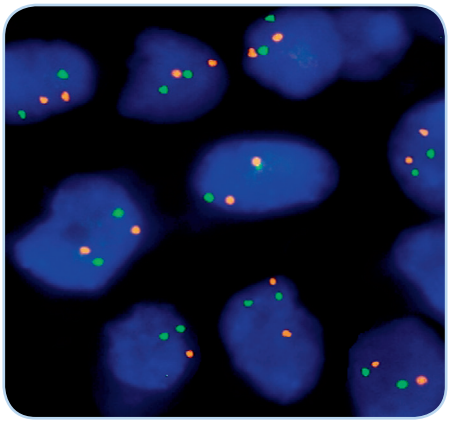
SPEC MYCN Probe map (not to scale).



SPEC 2q11 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the MYCN gene locus, multiple copies of the green signal or green signal clusters will be observed.



SPEC MYCN/2q11 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2074-50	ZytoLight SPEC MYCN/2q11 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2074-200	ZytoLight SPEC MYCN/2q11 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC ALK/EML4 TriCheck™ Probe

CE IVD

Background

The ZytoLight® SPEC ALK/EML4 TriCheck™ Probe (PL74) is intended to be used for the qualitative detection of rearrangements involving the human ALK gene at 2p23.1-p23.2 and the human EML4 gene at 2p21 in formalin-fixed, paraffin-embedded specimens, such as non-small cell lung cancer (NSCLC), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of NSCLC and therapeutic measures should not be initiated based on the test result alone.

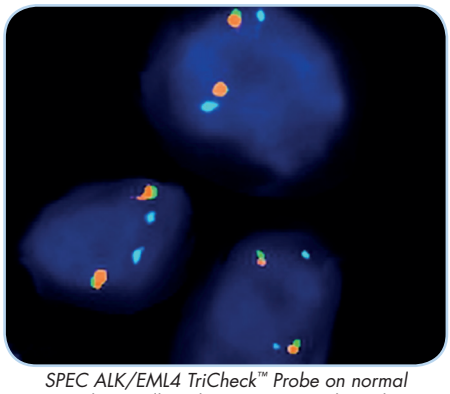
Probe Description

The ZytoLight® SPEC ALK/EML4 TriCheck™ Probe is composed of:

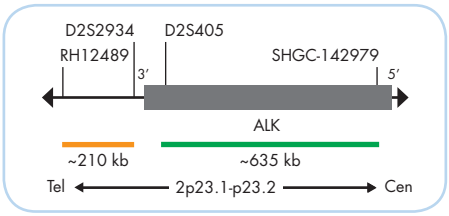
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 2p23.1-p23.2** (chr2:29,460,144-30,095,822) proximal to the ALK breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 2p23.2** (chr2:29,174,204-29,383,335) distal to the ALK breakpoint region.
- ZyBlue (excitation 418 nm/emission 467 nm) labeled polynucleotides (~37.0 ng/µl), which target sequences mapping in 2p21** (chr2:41,573,525-43,349,624) harboring the EML4 gene region.
- Formamide based hybridization buffer

Results

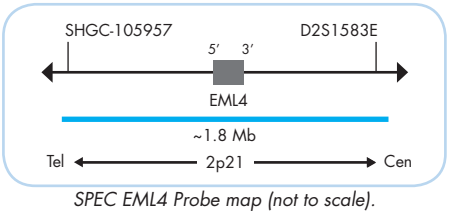
In an interphase nucleus without rearrangement of the EML4-ALK locus, two orange/green fusion signals and two blue signals are expected.
An EML4-ALK inversion is indicated by one separate green signal, one separate orange signal, and an additional blue signal.
An ALK translocation is indicated by separated orange and green signals without an additional blue signal.
EML4-ALK inversion with deletion of 5'-ALK sequences is indicated by loss of one green signal and co-localization of the isolated orange signal with a blue signal.



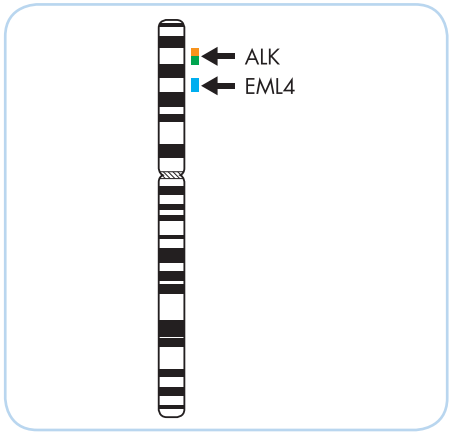
SPEC ALK/EML4 TriCheck™ Probe on normal interphase cells with non-rearranged ALK loci (two orange/green fusion signals), and non-rearranged EML4 loci (two blue signals).



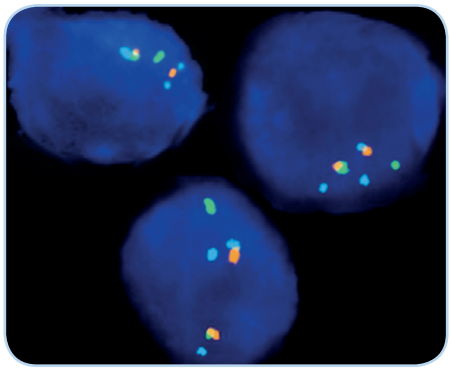
SPEC ALK Probe map (not to scale).



SPEC EML4 Probe map (not to scale).



Ideogram of chromosome 2 indicating the hybridization locations.



NSCLC tissue section with an EML4-ALK inversion as indicated by one green, one separated orange, and one additional blue signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2117-50	ZytoLight SPEC ALK/EML4 TriCheck Probe CE IVD	●/●/●	5 (50 µl)
Z-2117-200	ZytoLight SPEC ALK/EML4 TriCheck Probe CE IVD	●/●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC ALK Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC ALK Dual Color Break Apart Probe (PL81) is intended to be used for the qualitative detection of translocations involving the human ALK gene at 2p23.1-p23.2 in formalin-fixed, paraffin-embedded specimens, such as non-small cell lung cancer (NSCLC), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

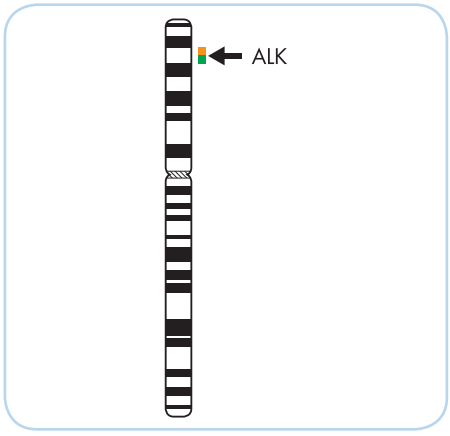
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of NSCLC and therapeutic measures should not be initiated based on the test result alone.

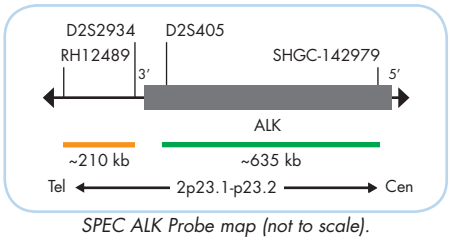
Probe Description

The ZytoLight® SPEC ALK Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 2p23.1-p23.2** (chr2:29,460,144-30,095,822) proximal to the ALK breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 2p23.2** (chr2:29,174,204-29,383,335) distal to the ALK breakpoint region.
- Formamide based hybridization buffer



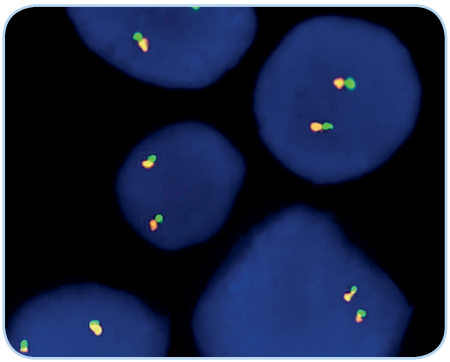
Ideogram of chromosome 2 indicating the hybridization locations.



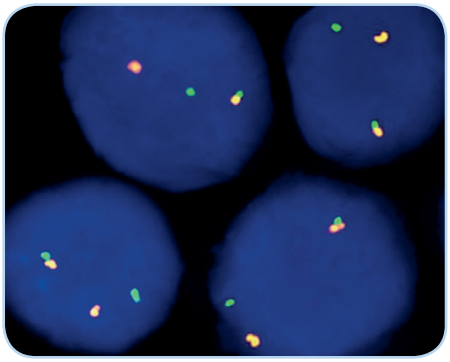
SPEC ALK Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 2p23.1-p23.2 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 2p23.1-p23.2 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 2p23.1-p23.2 locus and one 2p23.1-p23.2 locus affected by a translocation or inversion. EML4-ALK inversion with deletion of 5'-ALK sequences is indicated by one or multiple isolated orange signals.



SPEC ALK Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



NSCLC tissue section with translocation affecting the 2p23 locus as indicated by one orange/green fusion (non-rearranged) signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2124-50	ZytoLight SPEC ALK Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2124-200	ZytoLight SPEC ALK Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC ALK/2q11 Dual Color Probe

CE IVD

Background

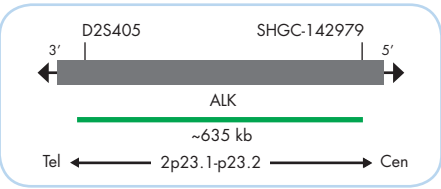
The ZytoLight® SPEC ALK/2q11 Dual Color Probe (PL117) is intended to be used for the qualitative detection of amplifications involving the human ALK gene as well as the detection of chromosome 2q11 specific sequences in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

Probe Description

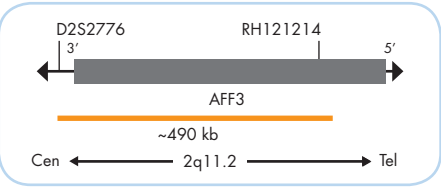
The ZytoLight® SPEC ALK/2q11 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 2p23.1-p23.2** (chr2:29,460,144-30,095,822) harboring the ALK gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 2q11.2** (chr2:100,132,806-100,621,725).
- Formamide based hybridization buffer

Ideogram of chromosome 2 indicating the hybridization locations.



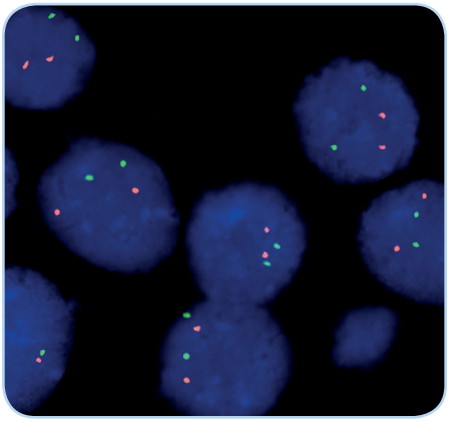
SPEC ALK Probe map (not to scale).



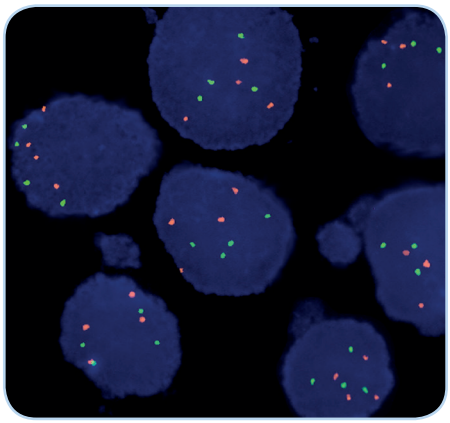
SPEC 2q11 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the ALK gene locus, multiple copies of the green signal or green signal clusters will be observed.



SPEC ALK/2q11 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Example of an aberrant signal pattern: Neuroblastoma tissue section with tetrasomy of chromosome 2 as indicated by four orange (2q11) and four green (ALK) signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2161-200	ZytoLight SPEC ALK/2q11 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC EML4 Dual Color Break Apart Probe

RUO

Background

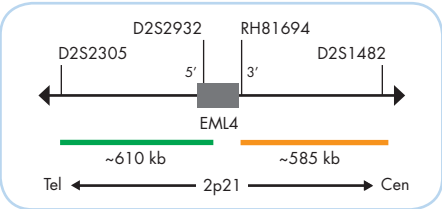
The ZytoLight® SPEC EML4 Dual Color Break Apart Probe (PL93) is intended to be used for the qualitative detection of translocations involving the EML4 gene at 2p21 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

Probe Description

The ZytoLight® SPEC EML4 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 2p21** (chr2:41,856,860-42,464,761) distal to the EML4 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 2p21** (chr2:42,576,262-43,163,545) proximal to the EML4 breakpoint region.
- Formamide based hybridization buffer

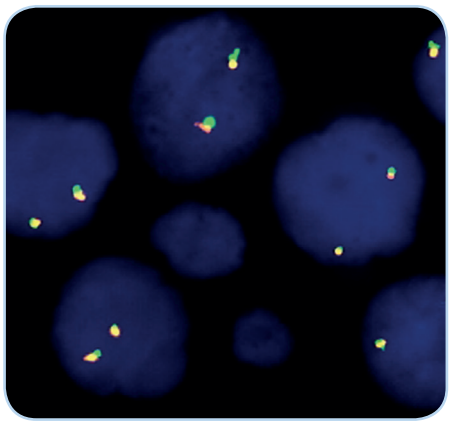
Ideogram of chromosome 2 indicating the hybridization locations.



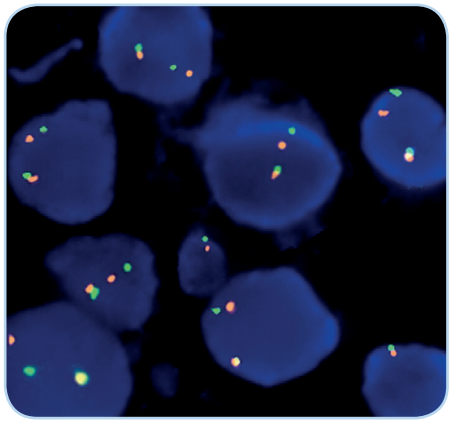
SPEC EML4 Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking an inversion involving the 2p21 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 2p21 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 2p21 locus and one 2p21 locus affected by an inversion or translocation.



SPEC EML4 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: NSCLC tissue section with inversion affecting the EML4 locus at 2p21 as indicated by one orange/green fusion (non-rearranged) signal, one green signal, and one separate orange signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2136-50	ZytoLight SPEC EML4 Dual Color Break Apart Probe RUO	●/●	5 (50 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoLight® SPEC IGK Dual Color Break Apart Probe

CE IVD

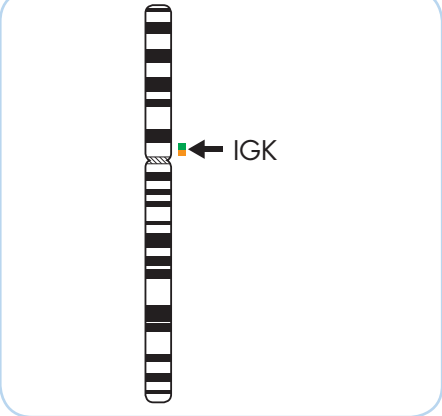
Background

The ZytoLight® SPEC IGK Dual Color Break Apart Probe (PL243) is intended to be used for the qualitative detection of translocations involving the human IGK locus at 2p11.2 in cytologic or formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with ZytoLight® FISH Implementation Kits (Prod. No. Z-2028-5/-20, or Z-2099-20). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

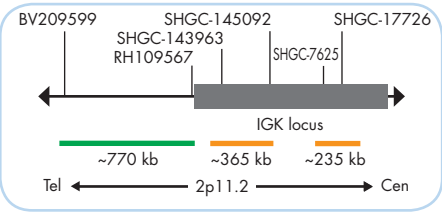
Probe Description

The ZytoLight® SPEC IGK Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 2p11.2** (chr2:88,382,616-89,153,517) distal to the IGK breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 2p11.2** (chr2:89,246,977-89,609,390 and chr2:89,853,315-90,089,156) proximal to the IGK breakpoint region. Due to homologous sequence segments proximal to the IGK breakpoint region, the orange probe has two hybridization regions in close proximity.
- Formamide based hybridization buffer



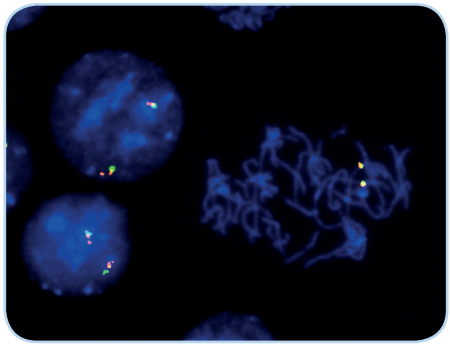
Ideogram of chromosome 2 indicating the hybridization locations.



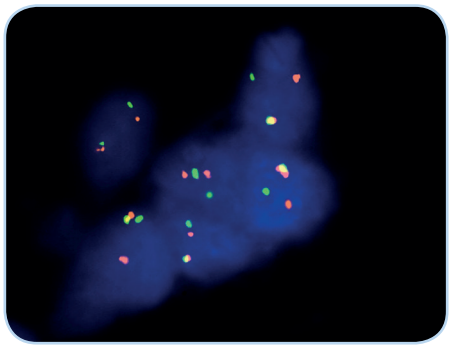
SPEC IGK Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the IGK locus at 2p11.2, two orange/green fusion signals are expected. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal IGK locus and one IGK locus affected by a translocation. Due to the two hybridization regions of the orange probe, orange signals may appear as paired signal dots.



SPEC IGK Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals in each nucleus and to metaphase chromosomes of a normal cell. Orange signals may appear as paired signal dots.



Example of an aberrant signal pattern: Burkitt lymphoma with an IGK translocation affecting the 2p11.2 locus as indicated by one non-rearranged orange/green fusion signal, one orange signal (may appear as paired signal dots), and one separate green signal.

Specimen kindly provided by Dr. Brändle, Vienna, Austria.

Prod. No.	Product	Label	Tests* (Volume)
Z-2288-50	ZytoLight SPEC IGK Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC ERBB4/2q11 Dual Color Probe

RUO

Background

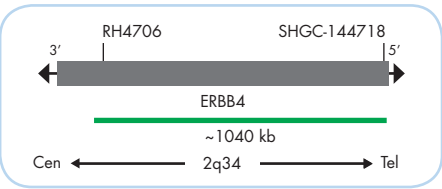
The ZytoLight® SPEC ERBB4/2q11 Dual Color Probe (PL32) is intended to be used for the qualitative detection of human ERBB4 gene amplifications as well as the detection of chromosome 2q11 specific sequences in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

Probe Description

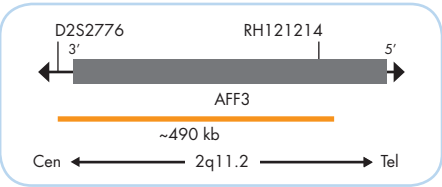
The ZytoLight® SPEC ERBB4/2q11 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 2q34** (chr2:212,356,657-213,394,224) harboring the ERBB4 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 2q11.2** (chr2:100,132,806-100,621,725) harboring the AFF3 gene region.
- Formamide based hybridization buffer

Ideogram of chromosome 2 indicating the hybridization locations.



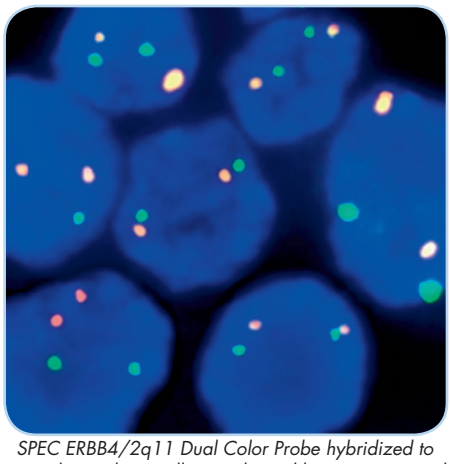
SPEC ERBB4 Probe map (not to scale).



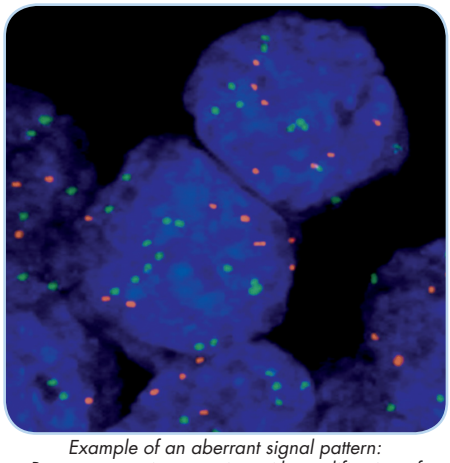
SPEC 2q11 Probe map (not to scale).

Results

Using the SPEC ERBB4/2q11 Dual Color Probe in a normal interphase nucleus, two green and two orange signals are expected. In a cell with amplification of the ERBB4 gene locus, multiple copies of the green signal or green signal clusters will be observed.



SPEC ERBB4/2q11 Dual Color Probe hybridized to normal interphase cells as indicated by two green and two orange signals in each nucleus.



Example of an aberrant signal pattern: Breast cancer tissue section with amplification of the ERBB4 gene (green), SPEC 2q11 (orange).

Image kindly provided by Prof. Brockhoff, Regensburg, Germany.

Prod. No.	Product	Label	Tests* (Volume)
Z-2057-200	ZytoLight SPEC ERBB4/2q11 Dual Color Probe RUO	●/●	20 (200 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoLight® SPEC VHL/CEN 3 Dual Color Probe

CE IVD

Background

The ZytoLight® SPEC VHL/CEN 3 Dual Color Probe (PL43) is intended to be used for the qualitative detection of deletions involving the human VHL gene and the detection of chromosome 3 alpha satellites in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

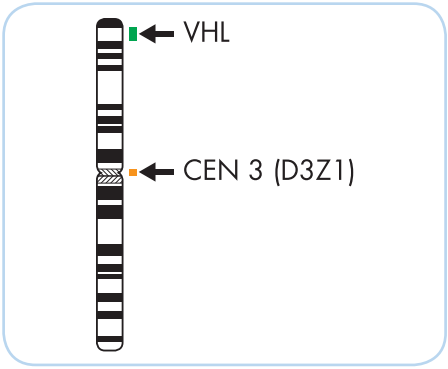
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

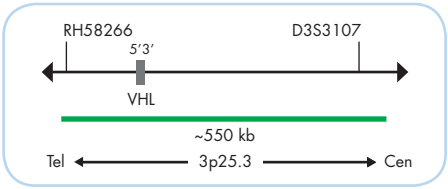
Probe Description

The ZytoLight® SPEC VHL/CEN 3 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 3p25.3** (chr3:10,051,220-10,598,496) harboring the VHL gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 3p11.1-q11.1 specific for the alpha satellite centromeric region D3Z1 of chromosome 3.
- Formamide based hybridization buffer



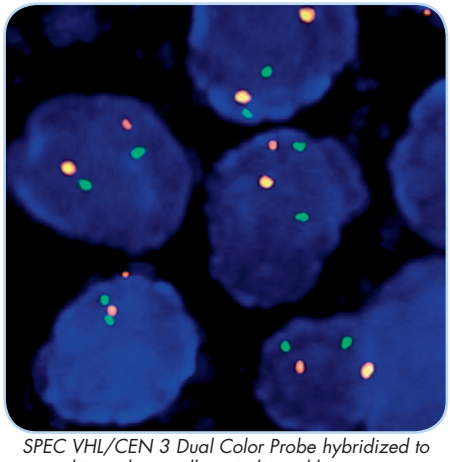
Ideogram of chromosome 3 indicating the hybridization locations.



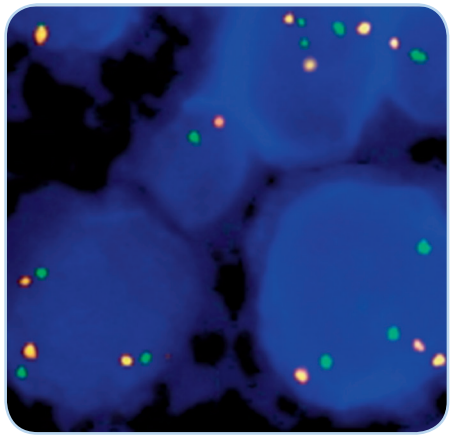
SPEC VHL Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletions affecting the VHL gene, one or no copy of the green signal will be observed.



SPEC VHL/CEN 3 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Example of an aberrant signal pattern: Trisomy of chromosome 3 as indicated by three orange (CEN 3) and three green (VHL) signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2084-200	ZytoLight SPEC VHL/CEN 3 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC VHL/1p12/CEN 7/17 Quadruple Color Probe

CE IVD

Background

The ZytoLight® SPEC VHL/1p12/CEN 7/17 Quadruple Color Probe (PL60) is intended to be used for the qualitative detection of deletions involving the human VHL gene as well as chromosome 1p12 specific sequences, and chromosome 7 and 17 alpha satellites in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

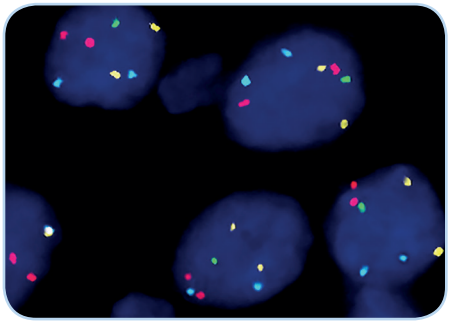
Probe Description

The ZytoLight® SPEC VHL/1p12/CEN 7/17 Quadruple Color Probe is composed of:

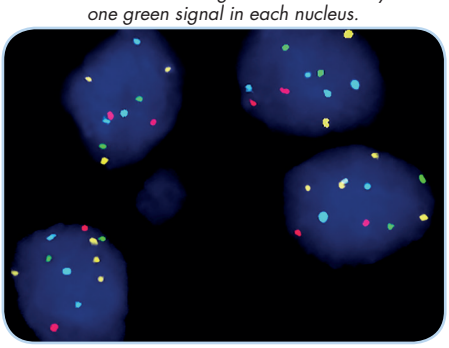
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 3p25.3** (chr3:10,051,220-10,598,496) harboring the VHL gene region.
- ZyRed (excitation 580 nm/emission 599 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 1p12** (chr1:119,537,102-119,823,147)
- ZyGold (excitation 532 nm and emission 553 nm) labeled polynucleotides (~7 ng/µl), which target sequences mapping in 7p11.1-q11.1 (D7Z1) specific for the alpha satellite centromeric region of chromosome 7.
- ZyBlue (excitation at 418 nm/emission 467 nm) labeled polynucleotides (~12 ng/µl), which target sequences mapping in 17p11.1-q11.1 (D17Z1) specific for the alpha satellite centromeric region of chromosome 17.
- Formamide based hybridization buffer

Results

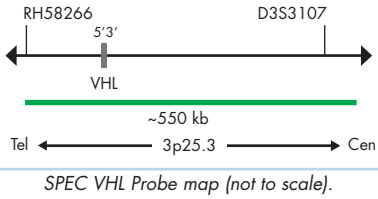
In a normal interphase nucleus, two green, two red, two gold, and two blue signals are expected. In a cell with deletion affecting the VHL gene, a reduced number of green signals will be observed. In cells with aneusomy of chromosome 1, 7, or 17, more or less signals of the respective color will be visible.



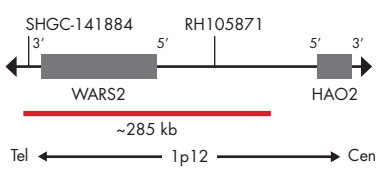
Example of an aberrant signal pattern: Renal cell carcinoma tissue section with deletion of the VHL gene as indicated by one green signal in each nucleus.



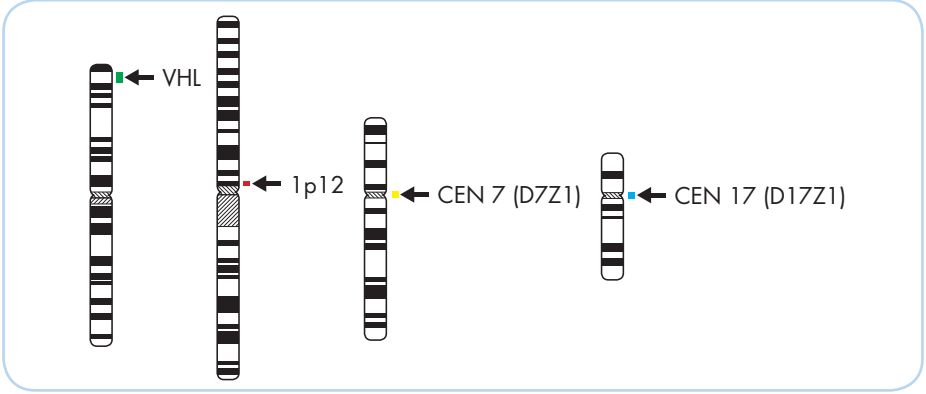
Example of an aberrant signal pattern: Renal cell carcinoma tissue section with polysomy of the chromosome 7 and 17 as indicated by multiple gold and/or blue signals in each nucleus.



SPEC VHL Probe map (not to scale).



SPEC 1p12 Probe map (not to scale).



Ideograms of chromosomes 3, 1, 7, and 17 indicating the hybridization locations.

Prod. No.	Product	Label	Tests* (Volume)
Z-2102-200	ZytoLight SPEC VHL/1p12/CEN 7/17 Quadruple Color Probe CE IVD	●/●/●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC CCND1 Break Apart/2q11/CEN 6 Quadruple Color Probe CE IVD

Background

The ZytoLight® SPEC CCND1 Break Apart/2q11/CEN 6 Quadruple Color Probe (PL75) is intended to be used for the qualitative detection of translocations involving the human CCND1 gene at 11q13.3 as well as for the detection of human chromosome 2q11 specific sequences as well as chromosome 6 alpha satellites in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

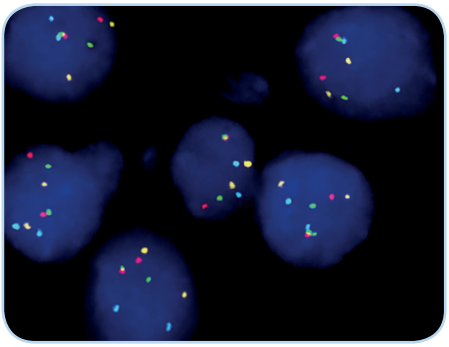
Probe Description

The ZytoLight® SPEC CCND1 Break Apart/2q11/CEN 6 Quadruple Color Probe is composed of:

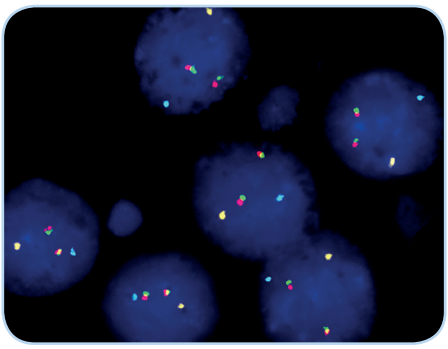
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 11q13.2-q13.3** (chr11:68,249,010-68,705,283) proximal to CCND1 breakpoint region.
- ZyRed (excitation at 580 nm/emission 599 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 11q13.3** (chr11:69,453,301-70,031,240) distal to the CCND1 breakpoint region.
- ZyBlue (excitation at 418 nm/emission 467 nm) labeled polynucleotides (~37 ng/µl), which target sequences mapping in 2q11.2** (chr2:100,132,806-100,621,725).
- ZyGold (excitation at 532 nm/emission 553 nm) labeled polynucleotides (~7 ng/µl), which target sequences mapping in 6p11.1-q11 specific for the alpha satellite centromeric region D6Z1 of chromosome 6.
- Formamide based hybridization buffer

Results

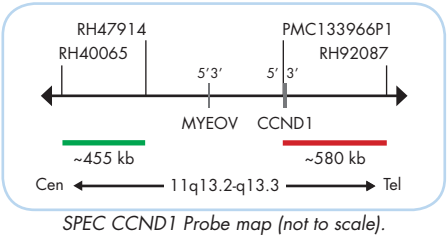
In a normal interphase nucleus, two red/green fusion signals, two blue, and two gold signals are expected. In a cell with translocation of the CCND1 gene locus, a signal pattern consisting of one red/green fusion signal, one red, and a separate green signal indicates one normal CCND1 locus and one CCND1 locus affected by an 11q13.3 translocation. In cells with aneusomy of chromosome 2 or 6, more or less signals of the respective color will be visible.



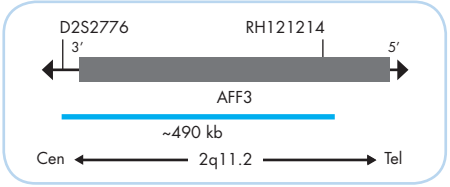
Example of an aberrant signal pattern: Renal cell carcinoma tissue section with translocation affecting the 11q13.3 locus as indicated by one non-rearranged red/green fusion signal, one red signal, and one separate green signal.



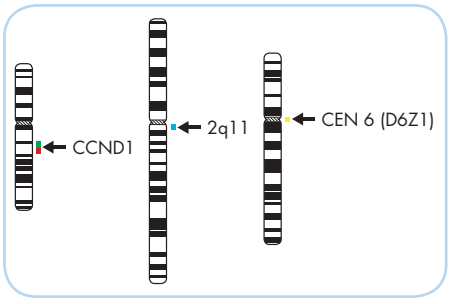
Example of an aberrant signal pattern: Renal cell carcinoma tissue section with monosomy of chromosome 2 and 6 as indicated by one blue and one gold signal in each nucleus.



SPEC CCND1 Probe map (not to scale).



SPEC 2q11 Probe map (not to scale).



Ideograms of chromosomes 11, 2, and 6 indicating the hybridization locations.

Prod. No.	Product	Label	Tests* (Volume)
Z-2118-200	ZytoLight SPEC CCND1 Break Apart/2q11/CEN 6 Quadruple Color Probe CE IVD	●/●/●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC FHIT/CEN 3 Dual Color Probe

RUO

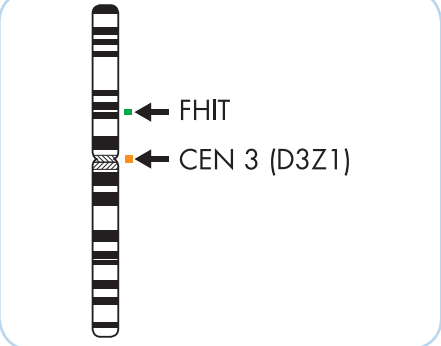
Background

The ZytoLight® SPEC FHIT/CEN 3 Dual Color Probe (PL21) is intended to be used for the qualitative detection of deletions involving the human FHIT gene as well as the detection of chromosome 3 alpha-satellites in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

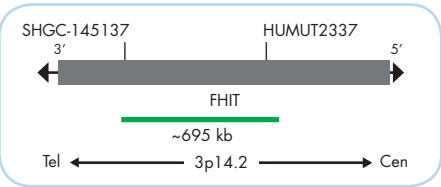
Probe Description

The ZytoLight® SPEC FHIT/CEN 3 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 3p14.2** (chr3:60,035,946-60,732,795) harboring the FHIT gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 3p11.1-q11.1 specific for the alpha satellite centromeric region D3Z1 of chromosome 3.
- Formamide based hybridization buffer



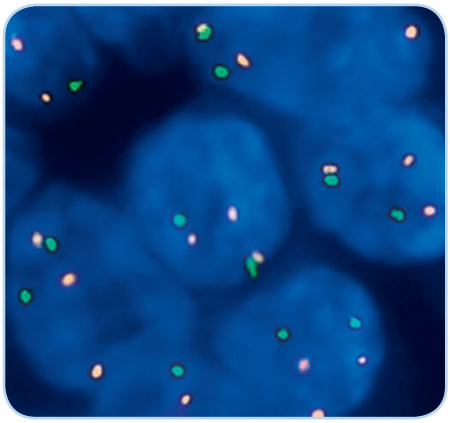
Ideogram of chromosome 3 indicating the hybridization locations.



SPEC FHIT Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletion of the FHIT gene locus, a reduced number of green signals will be observed. Deletions affecting only parts of introns 4 and/or 5 of the FHIT gene might result in a normal signal pattern with green signals of reduced size.



SPEC FHIT/CEN 3 Dual Color Probe hybridized to interphase cells each showing three orange and two green signals.

Prod. No.	Product	Label	Tests* (Volume)
Z-2062-200	ZytoLight SPEC FHIT/CEN 3 Dual Color Probe RUO	●/●	20 (200 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoLight® Bladder Cancer Quadruple Color Probe

CE IVD

Background

The ZytoLight® Bladder Cancer Quadruple Color Probe is designed to detect CDKN2A (a.k.a. p16) deletions and aneuploidy of chromosomes 3, 7, and 17 in cytology specimens of tumors, e.g., in urine samples from patients with hematuria suspected of having bladder cancer (BC). Moreover, it has been shown that the detection of CDKN2A deletions and/or aneusomies of chromosomes 3, 7, and/or 17 may be used for the surveillance of patients with a history of bladder cancer to early detect possible tumor recurrence.
BC represents the ninth most common cancer worldwide. About 430,000 new BC cases and 165,000 BC deaths occurred in 2012. Most of these tumors are non-invasive, well-differentiated, papillary tumors (pTa, low grade) and can be cured by endoscopic transurethral resection. However, up to 70% of pTa and superficially invasive (pT1) tumors recur and of these, 15-30% are characterized by tumor progression. Therefore, a long-term follow-up of patients with BC is necessary. The two standard methods used in the follow-up are either invasive (cystoscopy) or have a low sensitivity (cytology).
BC cells are characterized by typical cytogenetic changes. Homozygous deletion of the CDKN2A gene at 9p21.3 and polysomy of chromosomes 3, 7, and/or 17 are common abnormalities observed in urothelial cell carcinoma, all of which can be detected by FISH.
FISH on cells from urine has been shown to be highly sensitive and specific for detection of tumor cells in urine.

References
Antoni S, et al. (2017) Eur Urol 71: 96-108.
Dimashkieh H, et al. (2013) Cancer Cytopathol 121: 591-7.
Junker K, et al. (2006) Cytogenet Genome Res 114: 279-83.
Placer J, et al. (2002) Eur Urol 42: 547-52.

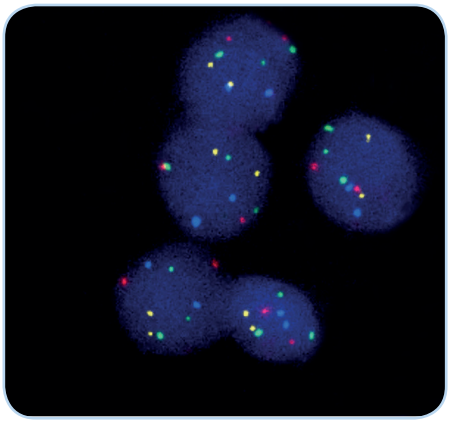
Probe Description

The ZytoLight® Bladder Cancer Quadruple Color Probe is composed of:

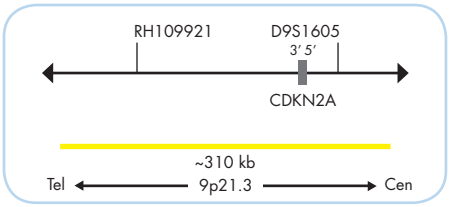
- ZyGold (excitation 532 nm and emission 553 nm) labeled polynucleotides (~5.5 ng/µl), which target sequences mapping in 9p21.3** (chr9:21,742,619-22,056,863) harboring the CDKN2A gene region.
- ZyRed (excitation 580 nm/emission 599 nm) labeled polynucleotides (~0.5 ng/µl), which target sequences mapping in 3p11.1-q11.1 specific for the alpha satellite centromeric region D3Z1 of chromosome 3.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 7p11.1-q11.1 specific for the alpha satellite centromeric region D7Z1 of chromosome 7.
- ZyBlue (excitation 418 nm/emission 467 nm) labeled polynucleotides (~12 ng/µl), which target sequences mapping in 17p11.1-q11.1 specific for the alpha satellite centromeric region D17Z1 of chromosome 17.
- Formamide based hybridization buffer

Results

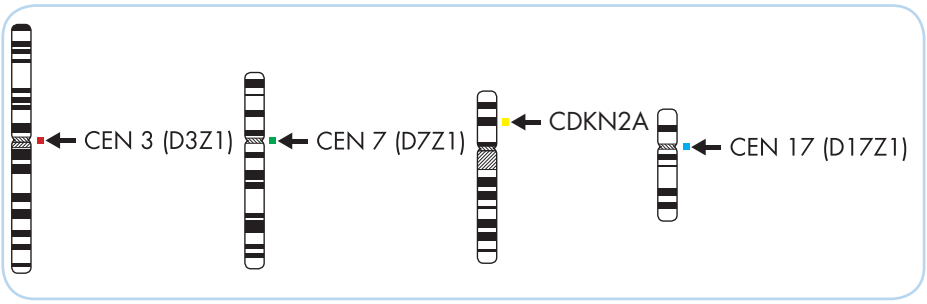
In a normal interphase nucleus, two gold, two red, two green, and two blue signals are expected. In a cell with deletion of the CDKN2A gene locus, a reduced number of gold signals will be observed. In cells with aneusomy of chromosomes 3, 7, or 17 more or less signals of the respective color will be visible.



Interphase tumor cells with trisomy of chromosome 7 as indicated by three green signals in each nucleus.



SPEC CDKN2A Probe map (not to scale).



Ideograms of chromosomes 3, 7, 9, and 17 indicating the hybridization locations.

Prod. No.	Product	Label	Tests* (Volume)
Z-2305-50	ZytoLight Bladder Cancer Quadruple Color Probe CE IVD	●/●/●/●	5 (50 µl)
Z-2305-200	ZytoLight Bladder Cancer Quadruple Color Probe CE IVD	●/●/●/●	20 (200 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC GATA2/MECOM Dual Color Dual Fusion Probe

CE IVD

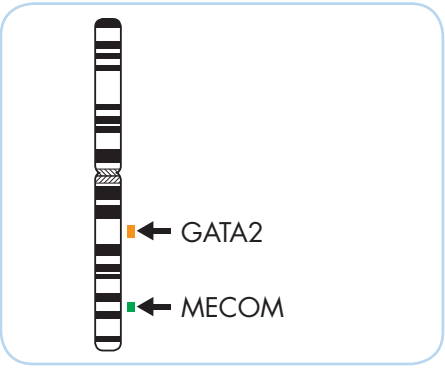
Background

The ZytoLight® SPEC GATA2/MECOM Dual Color Dual Fusion Probe (PL242) is intended to be used for the qualitative detection of the translocation t(3;3)(q21.3;q26.2) as well as the inversion inv(3)(q21.3q26.2) involving the human GATA2 and MECOM genes in cytologic specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

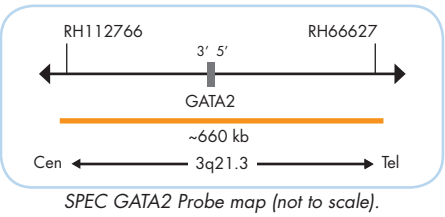
Probe Description

The ZytoLight® SPEC GATA2/MECOM Dual Color Dual Fusion Probe is composed of:

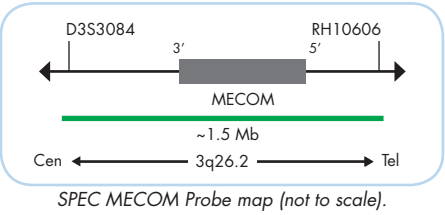
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~6 ng/µl), which target sequences mapping in 3q21.3** (chr3:127,902,316-128,564,215) harboring the GATA2 gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~12 ng/µl), which target sequences mapping in 3q26.2** (chr3:168,249,484-169,743,447) harboring the MECOM gene region.
- Formamid based hybridization buffer



Ideogram of chromosome 3 indicating the hybridization locations.



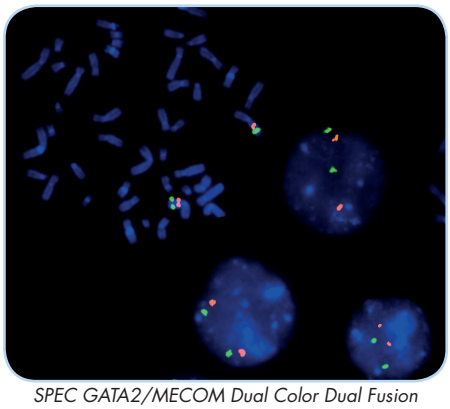
SPEC GATA2 Probe map (not to scale).



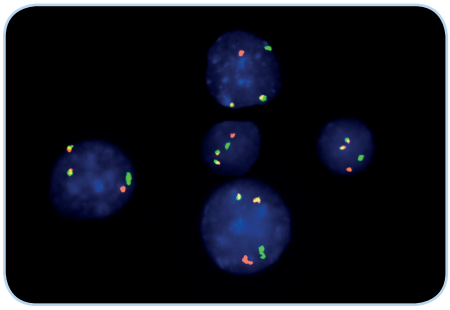
SPEC MECOM Probe map (not to scale).

Results

In a normal interphase nucleus, two green and two orange signals are expected. An aberration involving the chromosomal regions of GATA2 and MECOM generates a fusion signal on each of the chromosomes involved in case of a t(3;3) or two fusion signals on the involved chromosome in case of an inv(3). The chromosomal regions that are not translocated are indicated by the single green and orange signal, respectively. Other relevant signal patterns may also be observed as a result of ins(3;3) or 3q26.2 rearrangements without the involvement of the GATA2 locus.



SPEC GATA2/MECOM Dual Color Dual Fusion Probe hybridized to normal interphase cells as indicated by two orange and two green signals and to metaphase chromosomes of a normal cell.



Example of an aberrant signal pattern: Bone marrow smear with rearrangement affecting the GATA2/MECOM loci as indicated by one separate orange signal, one separate green signal, and two orange/green fusion signals.

Prod. No.	Product	Label	Tests* (Volume)
Z-2287-50	ZytoLight SPEC GATA2/MECOM Dual Color Dual Fusion Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC WWTR1 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC WWTR1 Dual Color Break Apart Probe is designed for the detection of translocations involving the chromosomal region 3q25.1 harboring the WWTR1 (WW domain containing transcription regulator 1, a.k.a. TAZ) gene. Epithelioid vascular tumors encompass a spectrum of diseases that includes epithelioid hemangioma (EH), a benign neoplasm, epithelioid hemangioendothelioma (EHE), a low to intermediate grade malignancy, and epithelioid angiosarcoma (EAS), a high grade malignancy. Although certain morphologic features allow to distinguish EHE from EH and EAS, the diagnosis can be challenging due to considerable morphologic overlap, particularly on small biopsies or when EAS lacks vasoformative properties. Clinical behavior and, consequently, treatment and prognosis vary significantly among vascular tumors. Therefore, it is paramount to effectively distinguish them from each other.

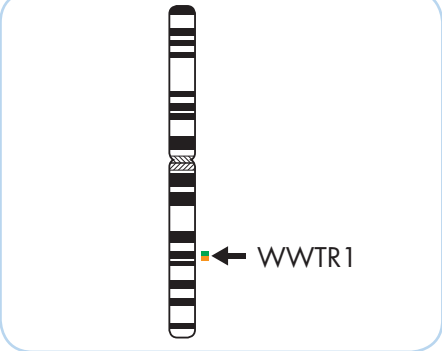
The recurrent translocation t(1;3)(p36.3;q25.1) was identified in approximately 90% of EHE cases, but not in other vascular tumors. t(1;3) results in the WWTR1-CAMTA1 fusion gene which encodes a putative chimeric transcription factor which is under the transcriptional control of the WWTR1 promoter. A recurrent YAP1-TFE3 gene fusion has been identified in WWTR1-CAMTA1 negative EHEs. Thus, FISH analysis for the presence of WWTR1 translocation may serve as a useful molecular tool in the differential diagnosis of challenging cases.

References
Anderson T, et al. (2015) Am J Surg Pathol 39: 132-9.
Errani C, et al. (2011) Genes Chromosomes Cancer 50: 644-53.
Mendlick MR, et al. (2001) Am J Surg Pathol 25: 684-7.
Puls F, et al. (2015) Virchows Arch 466: 473-8.
Tanas MR, et al. (2011) Sci Transl Med 3: 98ra82.

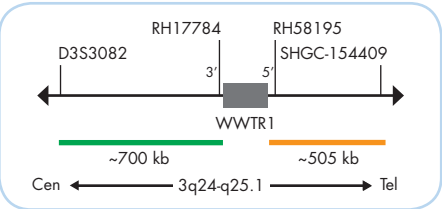
Probe Description

The ZytoLight® SPEC WWTR1 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 3q24-q25.1** (chr3:148,533,200-149,234,601) proximal to the WWTR1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 3q25** (chr3:149,430,325-149,933,565) distal to the WWTR1 breakpoint region.
- Formamide based hybridization buffer



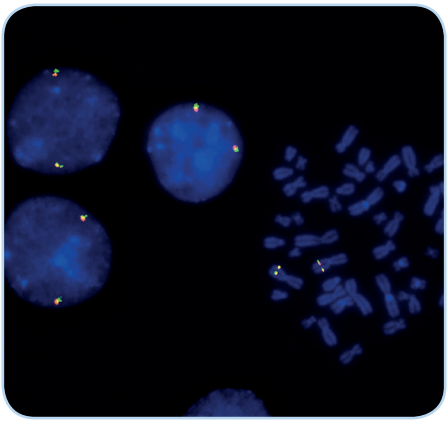
Ideogram of chromosome 3 indicating the hybridization locations.



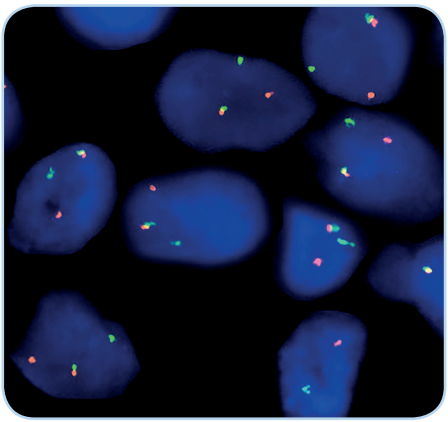
SPEC WWTR1 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 3q24-3q25.1 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 3q24-3q25.1 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 3q24-3q25.1 locus and one 3q24-3q25.1 locus affected by a translocation.



SPEC WWTR1 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus and to metaphase chromosomes of a normal cell.



Epitheloid hemangioendothelioma interphase cells showing translocation of the WWTR1 gene as indicated by one non-rearranged orange/green fusion signal, one orange signal and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2212-50	ZytoLight SPEC WWTR1 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC TERC/CEN 3 Dual Color Probe

RUO

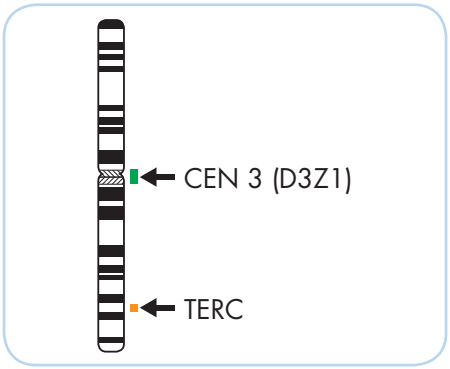
Background

The ZytoLight® SPEC TERC/CEN 3 Dual Color Probe (PL239) is intended to be used for the qualitative detection of amplifications involving the TERC gene at 3q26.2 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

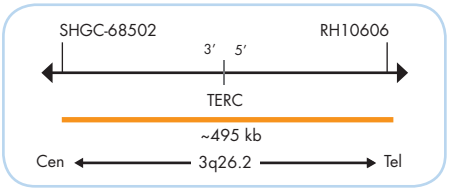
Probe Description

The ZytoLight® SPEC TERC/CEN 3 Dual Color Probe is composed of:

- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 3q26.2** (chr3:169,246,595-169,743,447) harboring the TERC gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 3p11.1-q11.1 specific for the alpha satellite centromeric region D3Z1 of chromosome 3.
- Formamide based hybridization buffer



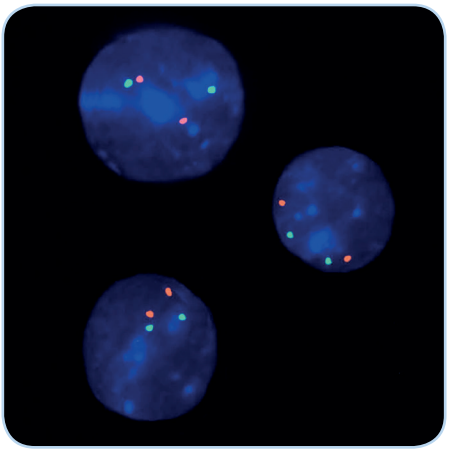
Ideogram of chromosome 3 indicating the hybridization locations.



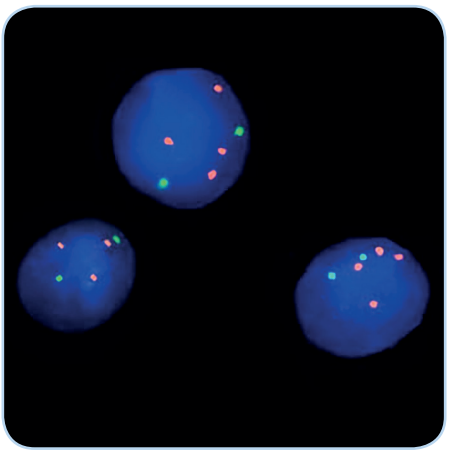
SPEC TERC Probe map (not to scale).

Results

Using the SPEC TERC/CEN 3 Dual Color Probe in a normal interphase nucleus, two orange and two green signals are expected. In a cell with gain of the TERC gene locus, multiple copies of the orange signal or orange signal clusters will be observed.



SPEC TERC/CEN 3 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals per nucleus.



Example of an aberrant signal pattern: SPEC TERC/CEN 3 Dual Color Probe hybridized to CaSki cells with TERC amplification as indicated by three or four orange signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2284-200	ZytoLight SPEC TERC/CEN 3 Dual Color Probe RUO	●/●	20 (200 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoLight® SPEC PIK3CA/CEN 3 Dual Color Probe

CE IVD

Background

The ZytoLight® SPEC PIK3CA/CEN 3 Dual Color Probe (PL97) is intended to be used for the qualitative detection of PIK3CA gene amplifications as well as the detection of chromosome 3 alpha satellites in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

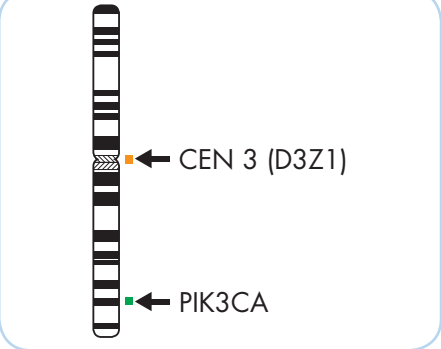
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

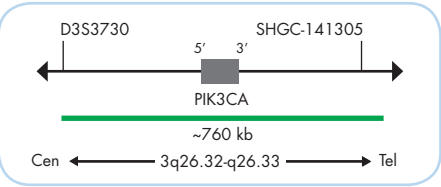
Probe Description

The ZytoLight® SPEC PIK3CA/CEN 3 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 3q26.32-q26.33** (chr3:178,535,986-179,293,464) harboring the PIK3CA gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 3p11.1-q11.1 specific for the alpha satellite centromeric region D3Z1 of chromosome 3.
- Formamide based hybridization buffer



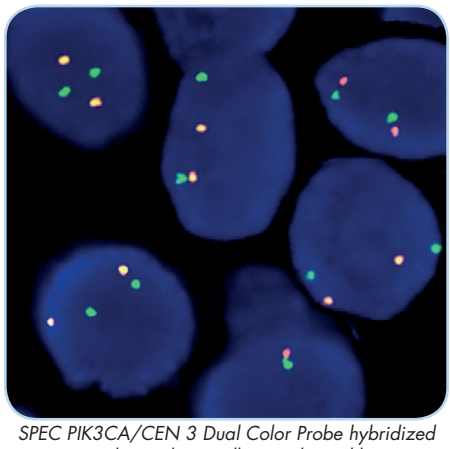
Ideogram of chromosome 3 indicating the hybridization locations.



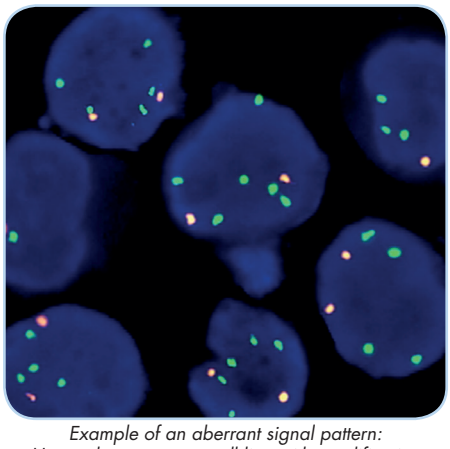
SPEC PIK3CA Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. Nuclei with amplification of the PIK3CA gene locus 3q26.32-q26.33 or aneuploidy of chromosome 3 will show multiple copies of the green signal or large green signal clusters.



SPEC PIK3CA/CEN 3 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Example of an aberrant signal pattern: Human breast cancer cell line with amplification of the PIK3CA gene as indicated by multiple green signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2140-200	ZytoLight SPEC PIK3CA/CEN 3 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC SOX2/CEN 3 Dual Color Probe

RUO

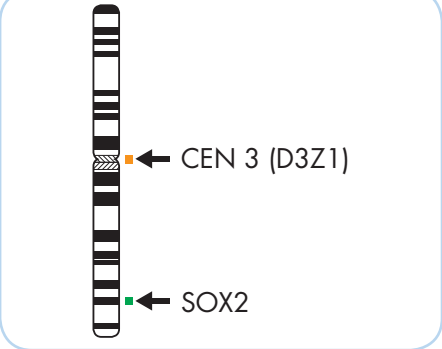
Background

The ZytoLight® SPEC SOX2/CEN 3 Dual Color Probe (PL84) is intended to be used for the qualitative detection of human SOX2 gene amplifications as well as the detection of chromosome 3 alpha satellites in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

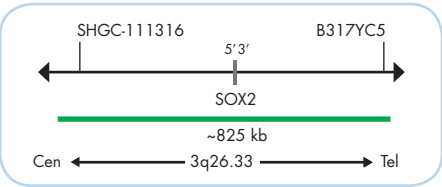
Probe Description

The ZytoLight® SPEC SOX2/CEN 3 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 3q26.33** (chr3:181,021,629-181,848,399) harboring the SOX2 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 3p11.1-q11.1 specific for the alpha satellite centromeric region D3Z1 of chromosome 3.
- Formamide based hybridization buffer



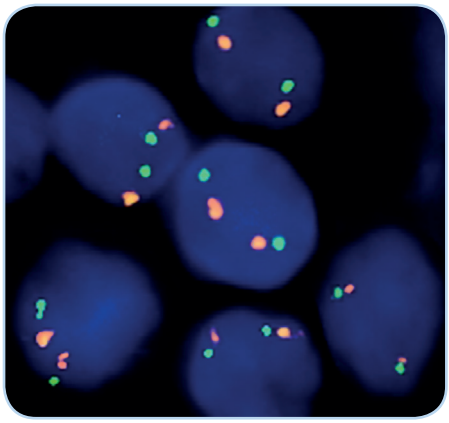
Ideogram of chromosome 3 indicating the hybridization locations.



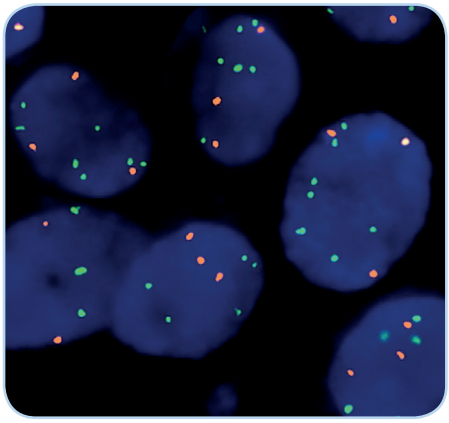
SPEC SOX2 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. Nuclei with amplification of the SOX2 gene locus 3q26.33 or aneuploidy of chromosome 3 will show multiple copies of the green signal or large green signal clusters.



SPEC SOX2/CEN 3 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Example of an aberrant signal pattern: Lung cancer tissue section with amplification of the SOX2 gene (green) and trisomy of chromosome 3 (orange).

Prod. No.	Product	Label	Tests* (Volume)
Z-2127-200	ZytoLight SPEC SOX2/CEN 3 Dual Color Probe RUO	●/●	20 (200 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoLight® SPEC TP63/TBL1XR1 TriCheck™ Probe

CE IVD

Background

The ZytoLight® SPEC TP63/TBL1XR1 TriCheck™ Probe (PL274) is intended to be used for the qualitative detection of rearrangements involving the human TP63 gene at 3q28 and the human TBL1XR1 gene at 3q26.32 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20). Interpretation of the results must be made within the context of the patient´s clinical history with respect to further clinical and pathologic data of the patient by a qualified pathologist.

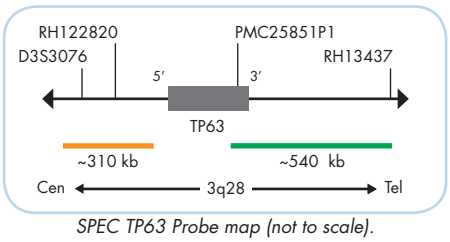
Probe Description

The ZytoLight® SPEC TP63/TBL1XR1 TriCheck™ Probe is composed of:

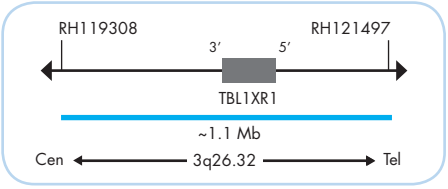
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 3q28** (chr3:189,559,557-190,097,196) distal to the TP63 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 3q28** (chr3:188,995,562-189,305,431) proximal to the TP63 breakpoint region.
- ZyBlue (excitation 418 nm/emission 467 nm) labeled polynucleotides (~37.0 ng/µl), which target sequences mapping in 3q26.32** (chr3:176,217,831-177,284,492) harboring the TBL1XR1 gene region.
- Formamide based hybridization buffer

Results

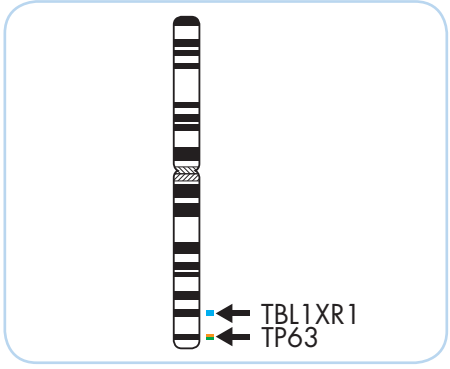
In an interphase nucleus without rearrangements of the TP63/TBL1XR1 loci, two green/orange fusion signals and two blue signals are expected. A TBL1XR1-TP63 inversion is indicated by one separate green signal, one separate orange signal, and an additional blue signal. The separate green and orange signal each co-localize with a blue signal. A TP63 translocation not affecting TBL1XR1 is indicated by separated orange and green signals without an additional blue signal.



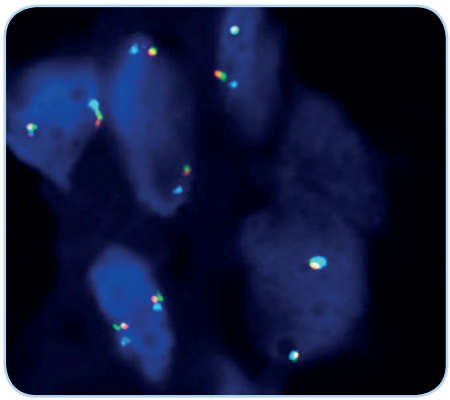
SPEC TP63 Probe map (not to scale).



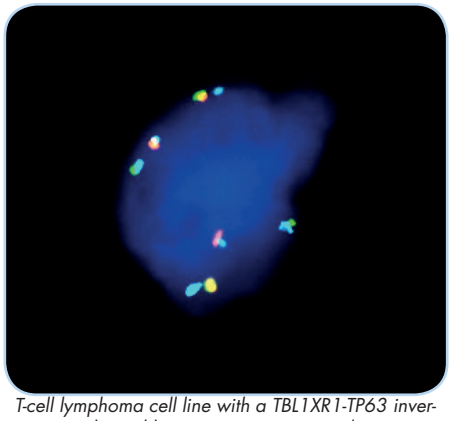
SPEC TBL1XR1 Probe map (not to scale).



Ideogram of chromosome 3 indicating the hybridization locations.



SPEC TP63/TBL1XR1 TriCheck™ Probe hybridized to normal interphase cells with non-rearranged TP63 loci (two orange/green fusion signals), and non-rearranged TBL1XR1 loci (two blue signals).



T-cell lymphoma cell line with a TBL1XR1-TP63 inversion as indicated by separate green signals, separate orange signals, each co-localizing with a blue signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2320-50	ZytoLight SPEC TP63/TBL1XR1 TriCheck™ Probe CE IVD	●/●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC BCL6 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC BCL6 Dual Color Break Apart Probe (PL136) is intended to be used for the qualitative detection of translocations involving the human BCL6 gene at 3q27.3 in formalin-fixed, paraffin-embedded specimens, such as B-cell lymphoma, by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

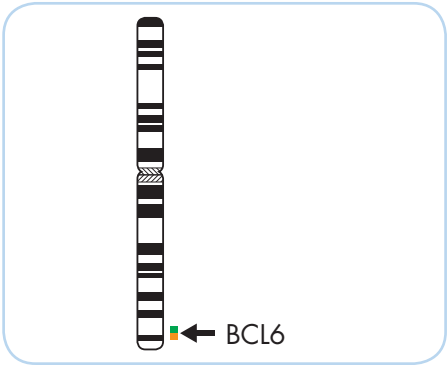
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of B-cell lymphoma and therapeutic measures should not be initiated based on the test result alone.

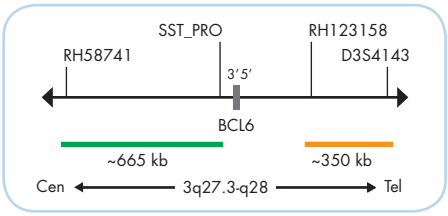
Probe Description

The ZytoLight® SPEC BCL6 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 3q27.3** (chr3:186,737,897-187,403,834) proximal to the BCL6 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 3q27.3-q28** (chr3:187,744,962-188,097,195) distal to the BCL6 breakpoint region.
- Formamide based hybridization buffer



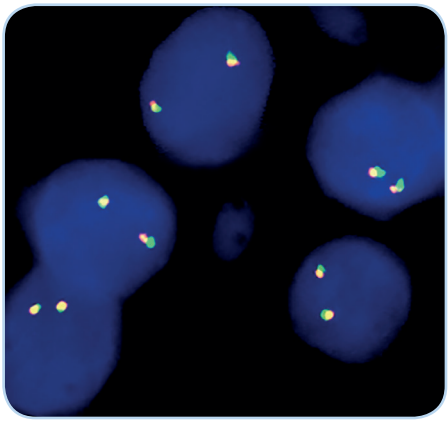
Ideogram of chromosome 3 indicating the hybridization locations.



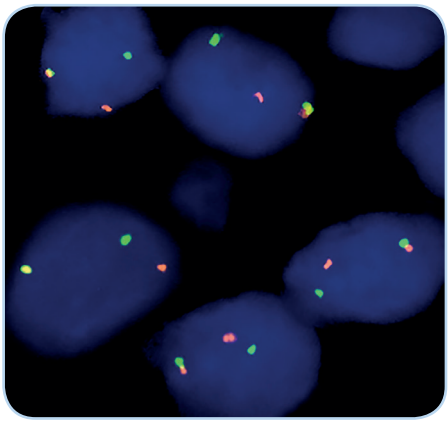
SPEC BCL6 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 3q27.3-q28 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 3q27.3-q28 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 3q27.3-q28 locus and one 3q27.3-q28 locus affected by a translocation.



SPEC BCL6 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



DLBCL tissue section with translocation of the BCL6 gene as indicated by one non-rearranged orange/green fusion signal, one orange, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2177-50	ZytoLight SPEC BCL6 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2177-200	ZytoLight SPEC BCL6 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC FGFR3 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC FGFR3 Dual Color Break Apart Probe (PL126) is intended to be used for the qualitative detection of translocations involving the human FGFR3 gene at 4p16.3 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

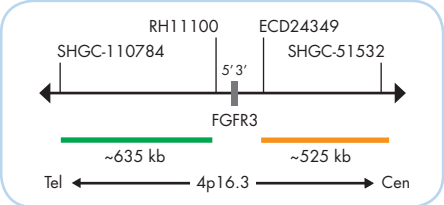
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

Probe Description

The ZytoLight® SPEC FGFR3 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 4p16.3** (chr4:1,093,149-1,729,455) distal to the FGFR3 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 4p16.3** (chr4:1,922,997-2,446,931) proximal to the FGFR3 breakpoint region.
- Formamide based hybridization buffer

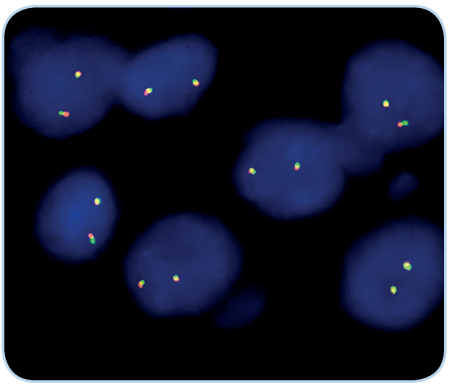
Ideogram of chromosome 4 indicating the hybridization locations.



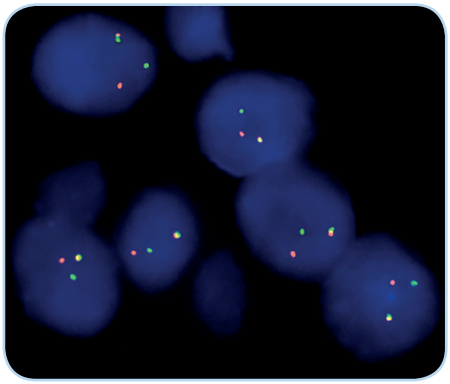
SPEC FGFR3 Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 4p16.3 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 4p16.3 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 4p16.3 locus and one 4p16.3 locus affected by a translocation.



SPEC FGFR3 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: Breast cancer tissue section with translocation affecting the FGFR3 gene as indicated by one non-rearranged orange/green fusion signal, one orange, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2170-50	ZytoLight SPEC FGFR3 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2170-200	ZytoLight SPEC FGFR3 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC FGFR3/4p11 Dual Color Probe

CE IVD

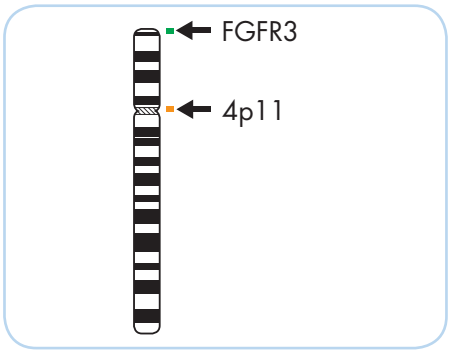
Background

The ZytoLight® SPEC FGFR3/4p11 Dual Color Probe (PL41) is intended to be used for the qualitative detection of amplifications involving the human FGFR3 gene as well as the detection of chromosome 4p11 specific sequences in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

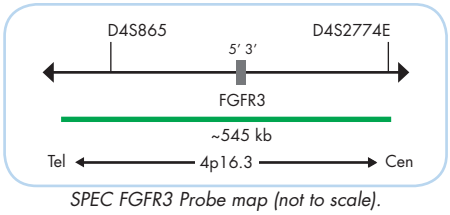
Probe Description

The ZytoLight® SPEC FGFR3/4p11 Dual Color Probe is composed of:

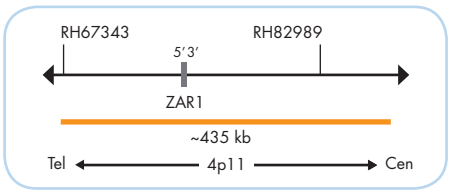
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 4p16.3** (chr4:1,531,083-2,073,649) harboring the FGFR3 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 4p11** (chr4:48,329,914-48,762,386).
- Formamide based hybridization buffer



Ideogram of chromosome 4 indicating the hybridization locations.



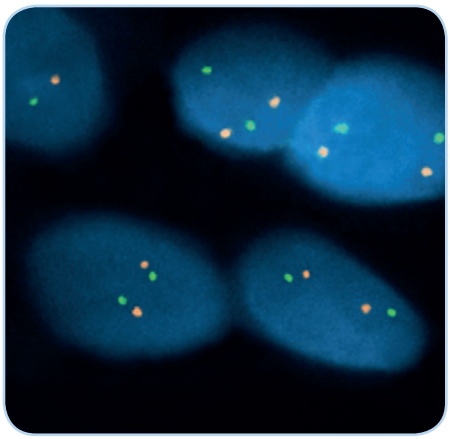
SPEC FGFR3 Probe map (not to scale).



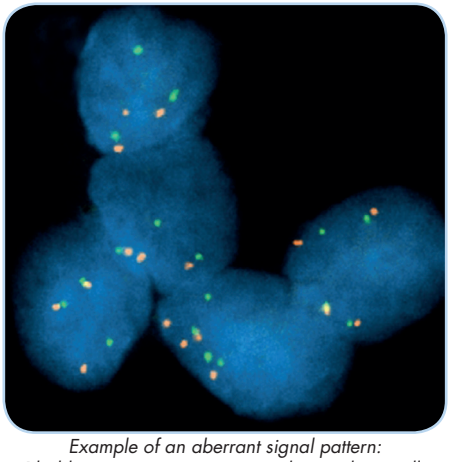
SPEC 4p11 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the FGFR3 gene locus, multiple copies of the green signal or large green signal clusters will be observed.



SPEC FGFR3/4p11 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Example of an aberrant signal pattern: Bladder cancer tissue section with interphase cells showing polysomy of chromosome 4 as indicated by multiple green and orange signals in the nuclei.

Prod. No.	Product	Label	Tests* (Volume)
Z-2082-200	ZytoLight SPEC FGFR3/4p11 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC FGFR3/IGH Dual Color Dual Fusion Probe

CE IVD

Background

The ZytoLight® SPEC FGFR3/IGH Dual Color Dual Fusion Probe is designed to detect the translocation t(4;14)(p16.3;q32.3) affecting the FGFR3 (fibroblast growth factor receptor 3, a.k.a. JTK4) gene in the chromosomal region 4p16.3 and the IGH (immunoglobulin heavy locus, a.k.a. IGH@) locus in 14q32.33.

FGFR3 encodes for a receptor tyrosine kinase, which regulates downstream signaling cascades after ligand binding. Fusion to several partner genes (including the IGH locus) can lead to a ligand-independent activation of the tyrosine kinase of the resulting FGFR3 fusion protein, frequently found in multiple myeloma (MM).

FGFR3/IGH translocations are observed in approximately 15–20% of patients with MM. The breaking points for the 4p16.3 locus are found between the FGFR3 gene and the 5′ end of the NSD2 gene. The t(4;14)(p16.3;q32.3) translocation is associated with upregulation of the FGFR3 and the myeloma NSD2 (a.k.a. MMSET) domain protein. Patients with FGFR3/IGH translocation demonstrate an overall poor prognosis that is only partially mitigated by the use of the novel agents bortezomib and lenalidomide.

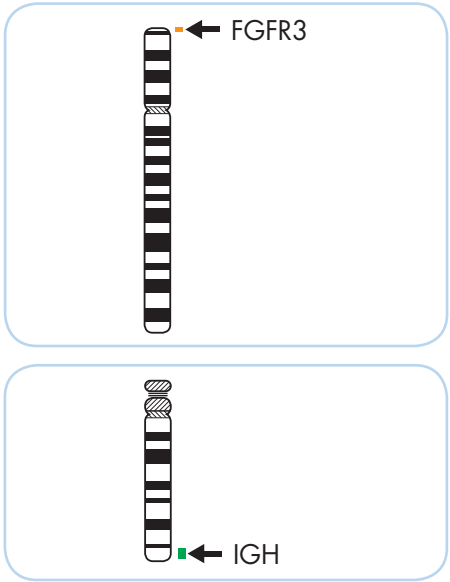
With conventional cytogenetics, the t(4;14)(p16.3;q32.3) translocation is difficult to identify. Thus, the detection of FGFR3/IGH translocations by fluorescence *in situ* hybridization may be of diagnostic and prognostic relevance.

References
Bergsagel PL & Kuehl WM (2001) Oncogene 20: 5611-22.
Chesi M, et al. (1998) Blood 92: 3025-34.
Fabris S, et al. (2005) Genes Chromosomes Cancer 42: 117-27.
Fenton JA, et al. (2003) Oncogene 22: 1103-13.
Kalff A & Spencer A (2012) Blood Cancer J 7: e89.
Sonneveld P, et al. (2016) Blood 127: 2955-62.
Walker BA, et al. (2013) Blood 121: 3413-19.

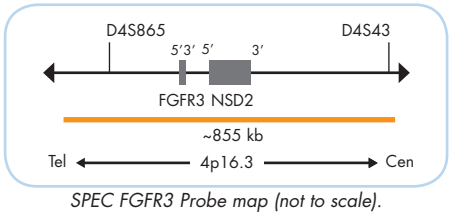
Probe Description

The ZytoLight® SPEC FGFR3/IGH Dual Color Dual Fusion Probe is composed of:

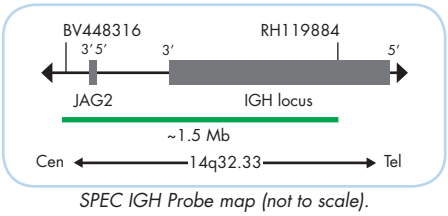
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~6.0 ng/µl), which target sequences mapping in 4p16.3** (chr4:1,496,938-2,351,657) harboring the FGFR3 gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~12.0 ng/µl), which target sequences mapping in 14q32.33** (chr14:105,462,169-106,995,000) harboring the IGH locus.
- Formamide based hybridization buffer



Ideograms of chromosomes 4 (above) and 14 (below) indicating the hybridization locations.



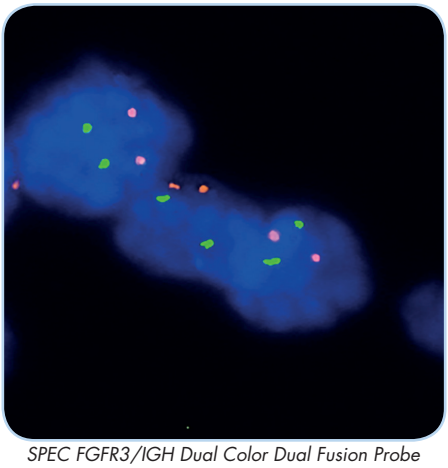
SPEC FGFR3 Probe map (not to scale).



SPEC IGH Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. A reciprocal translocation involving two breakpoints splits the two signals and generates a fusion signal on each of the chromosomes involved. The chromosomal regions which are not translocated are indicated by the single orange and green signal, respectively.



SPEC FGFR3/IGH Dual Color Dual Fusion Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2282-50	ZytoLight SPEC FGFR3/IGH Dual Color Dual Fusion Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC 4p11/CEN 10/17 Triple Color Probe

CE IVD

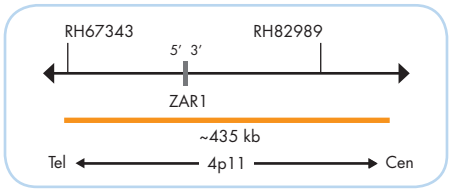
Background

The ZytoLight® SPEC 4p11/CEN 10/17 Triple Color Probe (PL261) is intended to be used for the qualitative detection of human chromosome 4p11 specific sequences as well as alpha satellites of chromosomes 10 and 17 in cytologic specimens by fluorescence *in situ* hybridization (FISH).
The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

Probe Description

The ZytoLight® SPEC 4p11/CEN 10/17 Triple Color Probe is composed of:

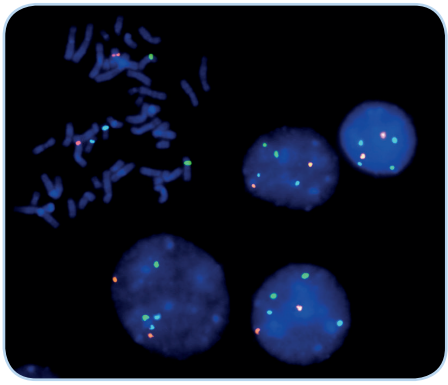
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 4p11** (chr4:48,329,914-48,762,386).
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 10p11.1-q11.1 specific for the alpha satellite centromeric region D10Z1 of chromosome 10.
- ZyBlue (excitation 418 nm/emission 467 nm) labeled polynucleotides (~12 ng/µl), which target sequences mapping in 17p11.1-q11.1 specific for the alpha satellite centromeric region D17Z1 of chromosome 17.
- Formamide based hybridization buffer



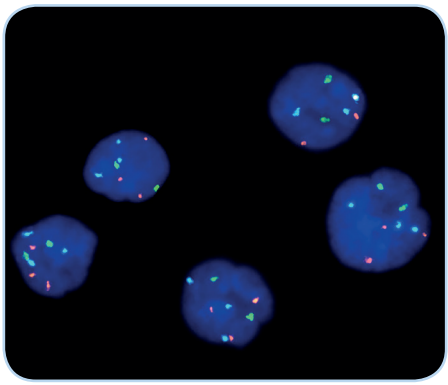
SPEC 4p11 Probe map (not to scale).

Results

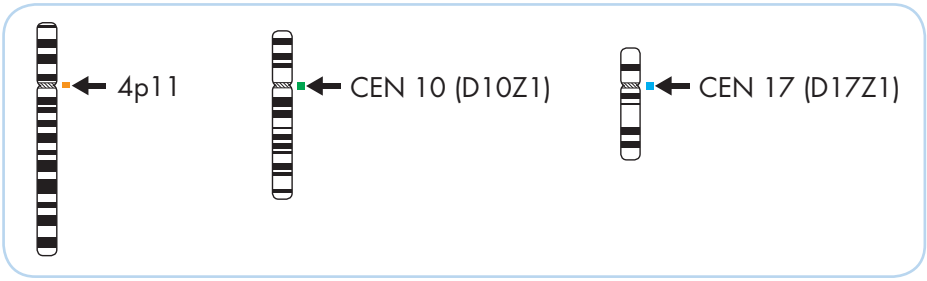
In a normal interphase nucleus, two orange, two green, and two blue signals are expected. In a cell with gain or loss of the chromosomes 4, 10 and/or 17, an increased or a reduced number of signals of the respective color will be observed.



SPEC 4p11/CEN 10/17 Triple Color Probe hybridized to normal interphase cells as indicated by two orange, two green, and two blue signals in each nucleus and to metaphase chromosomes of a normal cell.



Example of an aberrant signal pattern: Bone marrow smear with trisomy of chromosome 4 and 17 as indicated by three orange and blue signals in each nucleus.



Ideograms of chromosomes 4, 10, and 17 indicating the hybridization locations.

Prod. No.	Product	Label	Tests* (Volume)
Z-2307-50	ZytoLight SPEC 4p11/CEN 10/17 Triple Color Probe CE IVD	●/●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC PDGFRA/FIP1L1 TriCheck™ Probe

CE
IVD

Background

The ZytoLight® SPEC PDGFRA/FIP1L1 TriCheck™ Probe (PL167) is intended to be used for the qualitative detection of rearrangements involving the human PDGFRA gene with and without participation of the human FIP1L1 gene in cytological specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20).

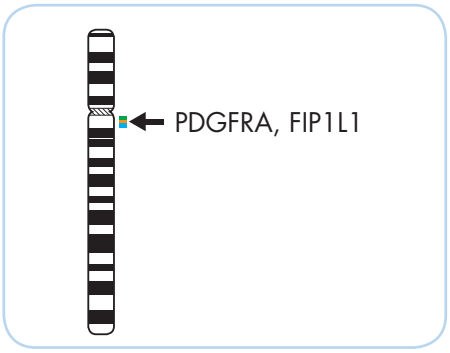
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

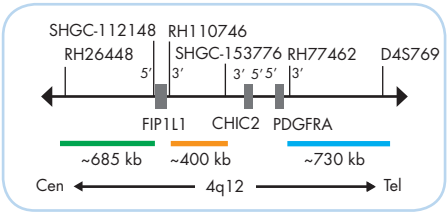
Probe Description

The ZytoLight® SPEC PDGFRA/FIP1L1 TriCheck™ Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 4q12** (chr4:53,552,536-54,238,252) proximal to the FIP1L1 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 4q12** (chr4:54,351,156-54,749,671) proximal to the PDGFRA gene region.
- ZyBlue (excitation 418 nm/emission 467 nm) labeled polynucleotides (~37.0 ng/µl), which target sequences mapping in 4q12** (chr4:55,185,968-55,915,442) distal to the PDGFRA gene region.
- Formamid based hybridization buffer



Ideogram of chromosome 4 indicating the hybridization locations.



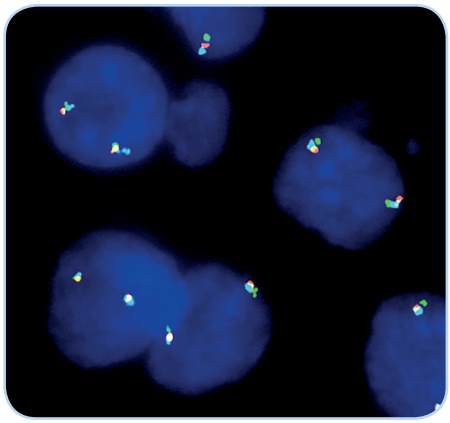
SPEC PDGFRA/FIP1L1 Probe map (not to scale).

Results

In an interphase nucleus lacking a deletion or translocation involving the 4q12 band, two tricolor orange/green/blue fusion signals are expected representing two normal 4q12 loci.

A PDGFRA-FIP1L1 fusion resulting from an interstitial DNA deletion is indicated by the loss of the orange signal leading to a separate green signal co-localizing with a blue signal.

A PDGFRA translocation without involvement of FIP1L1 is indicated by one orange/green fusion signal and one separate blue signal.



SPEC PDGFRA/FIP1L1 TriCheck™ Probe hybridized to normal interphase cells as indicated by two tricolor orange/green/blue fusion signals per nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2209-50	ZytoLight SPEC PDGFRA/FIP1L1 TriCheck Probe CE IVD	●/●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC TERT Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC TERT Dual Color Break Apart Probe (PL229) is intended to be used for the qualitative detection of translocations involving the human TERT gene in 5p15.33 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

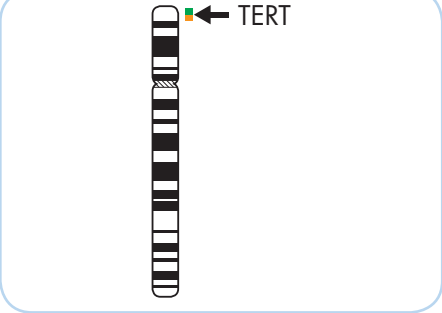
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

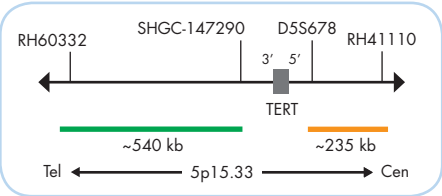
Probe Description

The ZytoLight® SPEC TERT Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 5p15.33** (chr5:620,184-1,161,456) distal to the TERT breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 5p15.33** (chr5:1,353,007-1,588,209) proximal to the TERT breakpoint region.
- Formamide based hybridization buffer



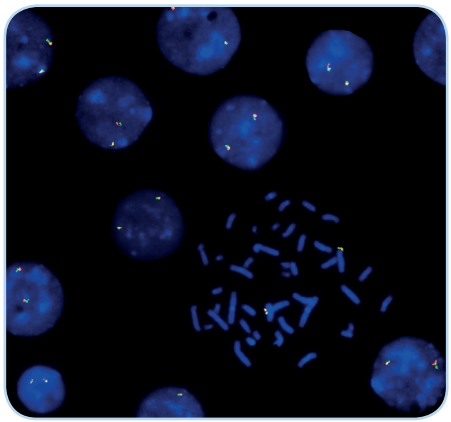
Ideogram of chromosome 5 indicating the hybridization locations.



SPEC TERT Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 5p15.33 band, two orange/green fusion signals are expected, representing two normal (non-rearranged) 5p15.33 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 5p15.33 locus and one 5p15.33 locus affected by a TERT translocation.



SPEC TERT Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals in each nucleus and to metaphase chromosomes of a normal cell.

Prod. No.	Product	Label	Tests* (Volume)
Z-2273-50	ZytoLight SPEC TERT Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC TERT/5q31 Dual Color Probe

CE IVD

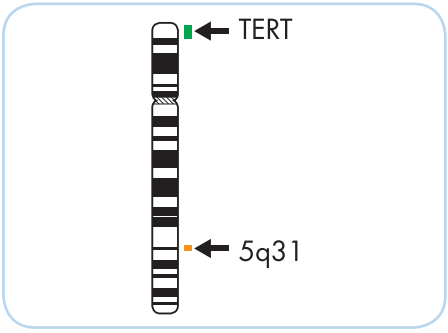
Background

The ZytoLight® SPEC TERT/5q31 Dual Color Probe (PL50) is intended to be used for the qualitative detection of amplifications involving the human TERT gene as well as the detection of chromosome 5q31 specific sequences in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

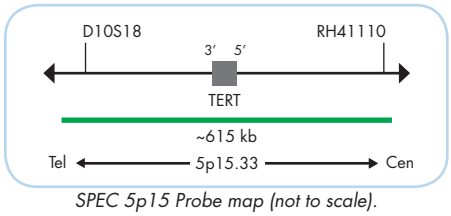
Probe Description

The ZytoLight® SPEC TERT/5q31 Dual Color Probe is composed of:

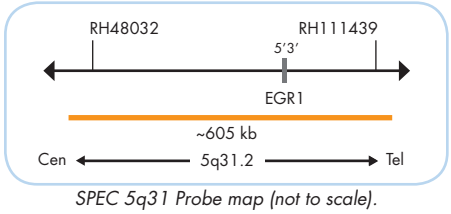
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 5p15.33** (chr5:974,089-1,588,209) harboring the TERT gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 5q31.2** (chr5:137,394,637-137,999,163).
- Formamide based hybridization buffer



Ideogram of chromosome 5 indicating the hybridization locations.



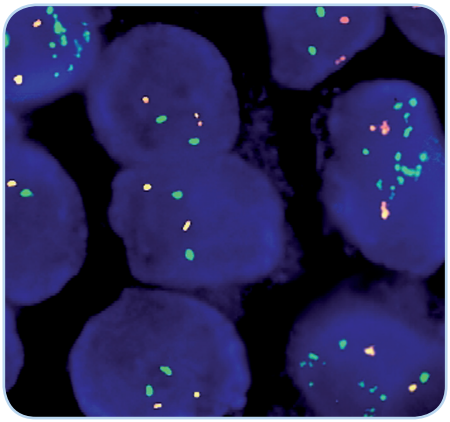
SPEC 5p15 Probe map (not to scale).



SPEC 5q31 Probe map (not to scale).

Results

In a normal interphase nucleus two orange and two green signals are expected.
In a cell with amplification of the TERT gene locus or aneuploidy of chromosome 5, multiple copies of the green signal or green signal clusters will be observed.



Example of an aberrant signal pattern: SPEC TERT/5q31 Dual Color Probe hybridized to melanoma tissue section showing normal cells as indicated by two green and two orange signals in each nucleus and cells with TERT gene amplification as indicated by multiple green signals per nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2091-50	ZytoLight SPEC TERT/5q31 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2091-200	ZytoLight SPEC TERT/5q31 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC RICTOR/5q31.1 Dual Color Probe

RUO

Background

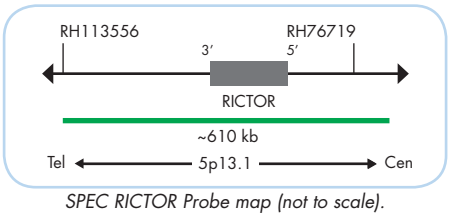
The ZytoLight® SPEC RICTOR/5q31.1 Dual Color Probe (PL234) is intended to be used for the qualitative detection of amplifications involving the RICTOR gene at 5p13.1 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

Probe Description

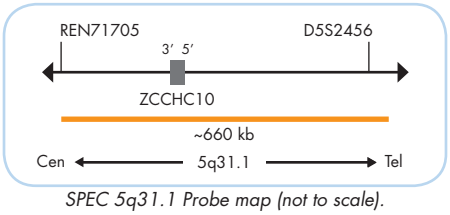
The ZytoLight® SPEC RICTOR/5q31.1 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 5p13.1** (chr5:38,666,539-39,275,424) harboring the RICTOR gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 5q31.1** (chr5:132,126,018-132,785,764).
- Formamide based hybridization buffer

Ideogram of chromosome 5 indicating the hybridization locations.



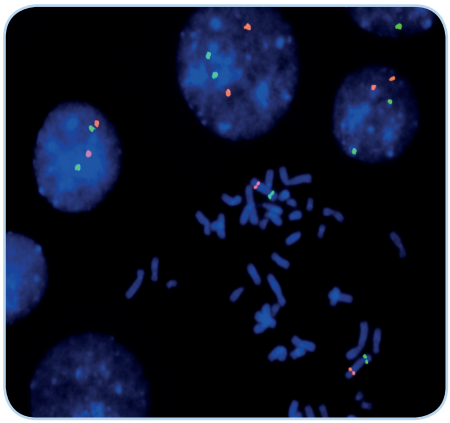
SPEC RICTOR Probe map (not to scale).



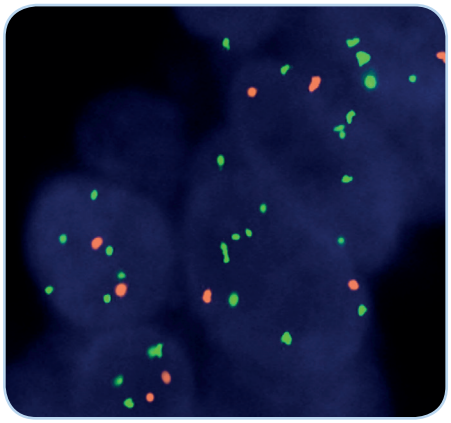
SPEC 5q31.1 Probe map (not to scale).

Results

Using the SPEC RICTOR/5q31.1 Dual Color Probe in a normal interphase nucleus, two orange and two green signals are expected. In a cell with gain of the RICTOR gene locus, multiple copies of the green signal or green signal clusters will be observed.



SPEC RICTOR/5q31.1 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus and to metaphase chromosomes of a normal cell.



Example of an aberrant signal pattern: Squamous cell carcinoma section with RICTOR amplification as indicated by multiple green signals in each nucleus.

Kindly provided by Prof. Dr. Schildhaus, Essen, Germany.

Prod. No.	Product	Label	Tests* (Volume)
Z-2278-200	ZytoLight SPEC RICTOR/5q31.1 Dual Color Probe RUO	●/●	20 (200 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoLight® SPEC EGR1/D5S23,D5S721 Dual Color Probe

CE IVD

Background

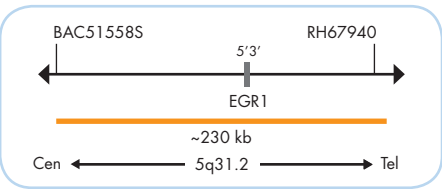
The ZytoLight® SPEC EGR1/D5S23, D5S721 Dual Color Probe (PL169) is intended to be used for the qualitative detection of deletions involving the human EGR1 gene as well as the detection of the human D5S23,D5S721 control region at 5p15.2-p15.31 in cytologic specimens by fluorescence *in situ* hybridization (FISH).
The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

Probe Description

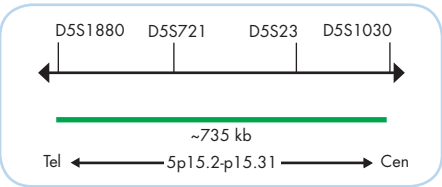
The ZytoLight® SPEC EGR1/D5S23,D5S721 Dual Color Probe is composed of:

- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 5q31.2** (chr5:137,667,079-137,897,109) harboring the EGR1 gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 5p15.2-p15.31** (chr5:9,233,775-9,967,465) harboring the D5S23,D5S721 locus.
- Formamide based hybridization buffer

Ideogram of chromosome 5 indicating the hybridization locations.



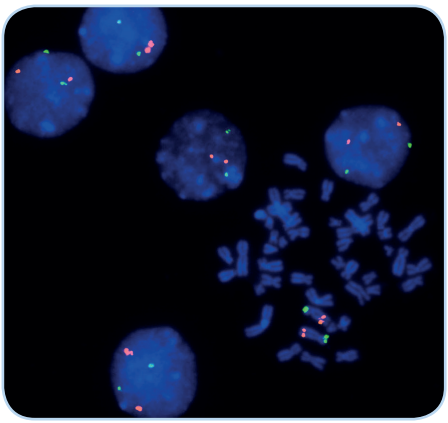
SPEC EGR1 Probe map (not to scale).



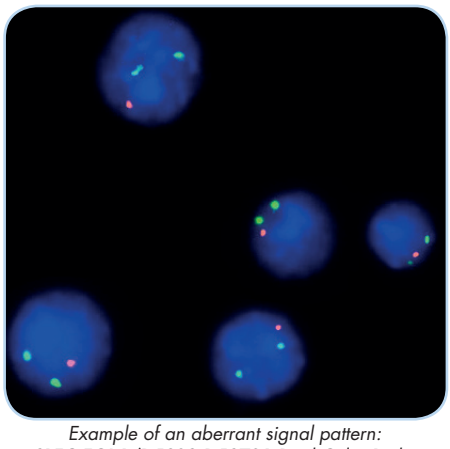
SPEC D5S23,D5S721 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletion of the EGR1 gene locus, one or no copy of the orange signal will be observed.



SPEC EGR1/D5S23,D5S721 Dual Color Probe hybridized to normal interphase calls as indicated by two orange and two green signals and to metaphase chromosomes of a normal cell.



Example of an aberrant signal pattern: SPEC EGR1/D5S23,D5S721 Dual Color Probe hybridized to an AML specimen with deletion of the EGR1 gene as indicated by one orange and two green signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2211-50	ZytoLight SPEC EGR1/D5S23,D5S721 Dual Color Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC CSF1R Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC CSF1R Dual Color Break Apart Probe is designed to detect rearrangements involving the chromosomal region 5q32 harboring the CSF1R (colony stimulating factor 1 receptor, a.k.a. FMS) gene.

The CSF1 receptor is activated by dimerization upon binding of its ligand CSF1 and is involved in macrophage development.

Rearrangement of the CSF1R gene was first detected in an acute megakaryoblastic leukemia (AMKL) cell line generating the RBM6-CSF1R fusion gene. A MEF2D-CSF1R fusion gene was described in a patient with primary pre-B cell acute lymphoblastic leukemia (pre-B ALL). Both fusion proteins contain the intact kinase domain of CSF1R.

Philadelphia chromosome-like ALL (Ph-like ALL) is a subgroup of B-cell precursor ALL and is associated with a high risk of treatment failure. SSBP2-CSF1R fusions were detected in some patients with Ph-like ALL. They result from either the balanced translocation t(5;5)(q14;q32) or the duplication dup(5)(q14q32). Expression of this fusion gene results in cytokine-independent growth and enhanced STAT5 activation which are inhibited by dasatinib *in vitro*. CSF1R signaling was also shown to be suppressed by the ABL1 kinase inhibitor imatinib.

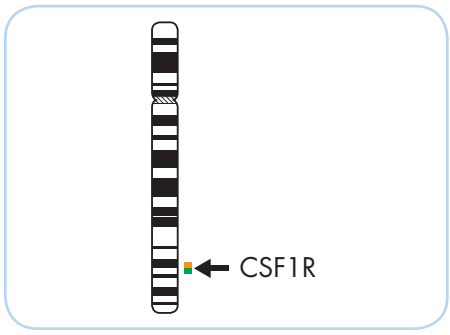
Hence, the detection of CSF1R rearrangements by FISH may help in selecting ALL patients eligible for treatment with CSF1R inhibitors.

References
Dewar AL, et al. (2005) Blood 105: 3127-32.
Gu TL, et al. (2007) Blood 110: 323-33.
Lilljebjörn H, et al. (2014) Leukemia 28: 977-9.
Roberts KG, et al. (2014) N Engl J Med 371: 1005-15.
Schwab C, et al. (2014) Blood 124: 3773.

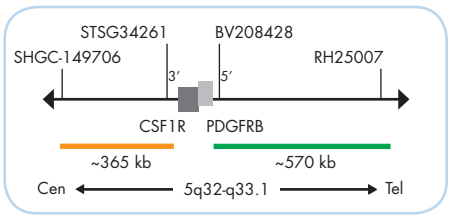
Probe Description

The ZytoLight® SPEC CSF1R Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 5q32-q33.1** (chr5:149,548,518-150,118,449) distal to the CSF1R breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 5q32** (chr5:149,058,515-149,421,081) proximal to the CSF1R breakpoint region.
- Formamide based hybridization buffer



Ideogram of chromosome 5 indicating the hybridization locations.

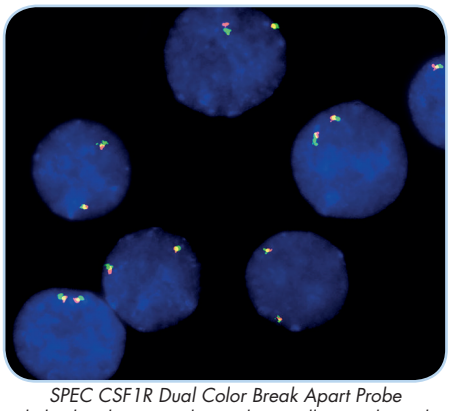


SPEC CSF1R Probe map (not to scale).

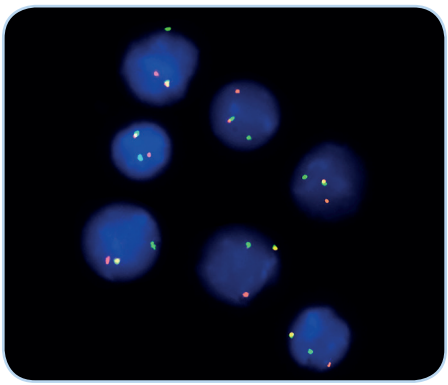
Results

In an interphase nucleus of a normal cell lacking a translocation involving the 5q32-q33.1 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 5q32-q33.1 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 5q32-q33.1 locus and one 5q32-q33.1 locus affected by a translocation.

Duplication of the 5q32 locus will result in additional orange signals.



SPEC CSF1R Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Blood smear with translocation of the CSF1R gene as indicated by one non-rearranged orange/green fusion signal, one orange and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2202-50	ZytoLight SPEC CSF1R Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC CSF1R/D5S23,D5S721 Dual Color Probe

CE IVD

Background

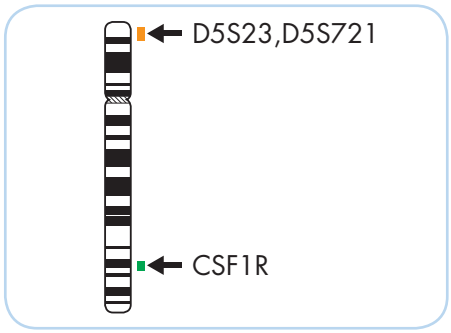
The ZytoLight® SPEC CSF1R/D5S23,D5S721 Dual Color Probe is designed for the detection of 5q deletions.
The CSF1R (colony stimulating factor 1 receptor, a.k.a. C-FMS) gene is located in the chromosomal region 5q32.
The interstitial deletion of chromosome 5q is a characteristic hallmark of the myelodysplastic syndrome (MDS) with isolated del(5q). The size of the deletion as well as the breakpoints are variable but a commonly deleted region (CDR) has been narrowed to the approximately 1.5 Mb interval at 5q32-q33.1 flanked by the DNA marker D5S413 and the GLRA1 gene.
One candidate gene for the development of MDS in patients with 5q- syndrome is RPS14 (ribosomal protein 14), a tumor suppressor gene located in the chromosomal region 5q33.1. Haploinsufficiency (caused by hemizygous deletion) of RPS14 is the probable cause of the erythroid defect that characterizes the 5q- syndrome. Lenalidomide has been reported to overcome the pathogenic effect of 5q deletion in MDS.
Despite the severe phenotype of the 5q- syndrome, it has a relatively low (10%) transformation risk to acute myeloid leukemia (AML). Therefore, FISH may be a helpful tool for diagnosis and therapy decision.

References
Boultwood J, et al. (1991) Proc Natl Acad Sci U S A 88: 6176-80.
Boultwood J, et al. (2010) Blood 116: 5803-11.
Giagounidis AA, et al. (2004) Clin Cancer Res 12: 5-10.
Van den Berghe H & Michaux JL (1974) Nature 251: 437-8.
Swerdlow SH, et al. (ed.) (2008) WHO classification of tumours of haematopoietic and lymphoid tissues.

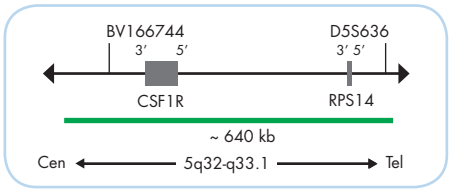
Probe Description

The ZytoLight® SPEC CSF1R/D5S23,D5S721 Dual Color Probe is composed of:

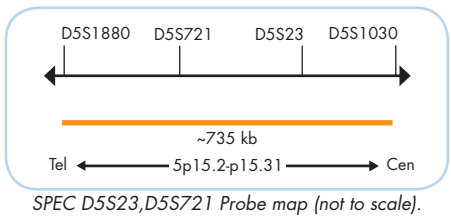
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 5q32-q33.1** (chr5:149,274,320-149,913,159) harboring the CSF1R gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 5p15.2-p15.31** (chr5:9,233,775-9,967,465) harboring the D5S23,D5S721 locus.
- Formamide based hybridization buffer



Ideogram of chromosome 5 indicating the hybridization locations.



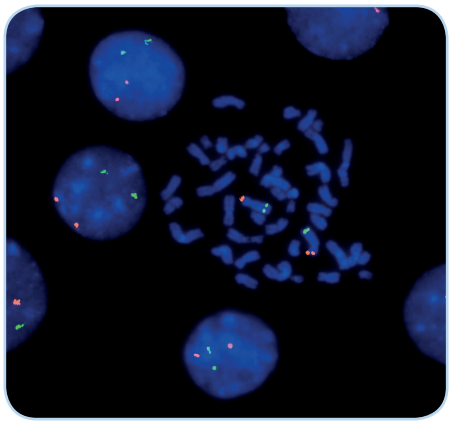
SPEC CSF1R Probe map (not to scale).



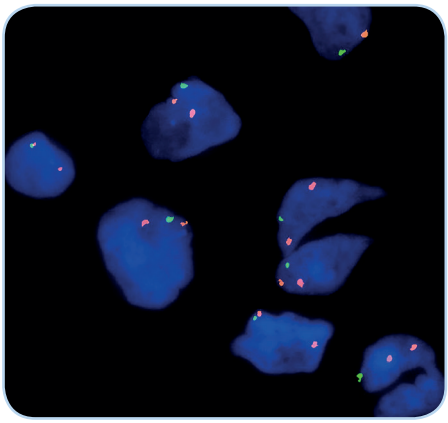
SPEC D5S23,D5S721 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletion of the CSF1R gene locus, one or no copy of the green signal will be observed.



SPEC CSF1R/D5S23,D5S721 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus and to metaphase chromosomes of a normal cell.



Bone marrow biopsy tissue section of an ALL case showing hemizygous deletion of the CSF1R gene as indicated by the loss of one green signal in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2268-50	ZytoLight SPEC CSF1R/D5S23,D5S721 Dual Color Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC PDGFRB Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC PDGFRB Dual Color Break Apart Probe (PL155) is intended to be used for the qualitative detection of translocations involving the human PDGFRB gene at 5q32 in cytologic specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20).

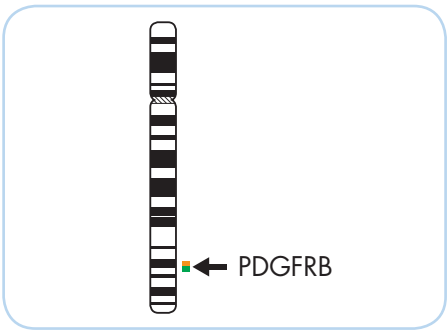
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

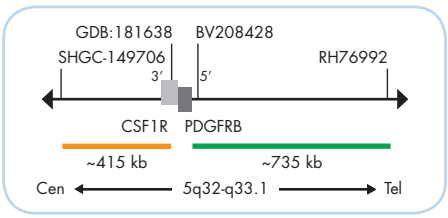
Probe Description

The ZytoLight® SPEC PDGFRB Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 5q32-q33.1** (chr5:149,548,518-150,285,722) distal to the PDGFRB breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 5q32** (chr5:149,058,515-149,471,369) proximal to the PDGFRB breakpoint region.
- Formamide based hybridization buffer



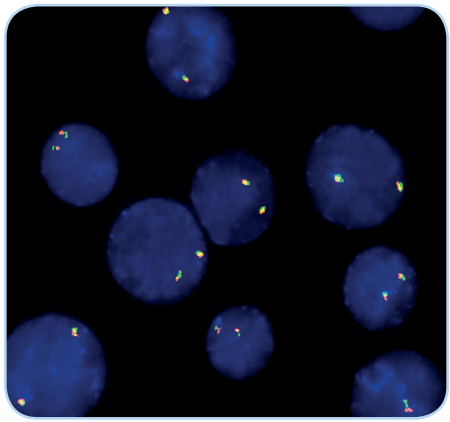
Ideogram of chromosome 5 indicating the hybridization locations.



SPEC PDGFRB Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 5q32-q33.1 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 5q32-q33.1 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 5q32-q33.1 locus and one 5q32-q33.1 locus affected by a translocation.



SPEC PDGFRB Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2197-50	ZytoLight SPEC PDGFRB Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC IRF4,DUSP22 Dual Color Break Apart Probe

CE IVD

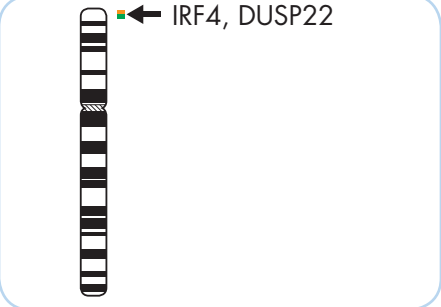
Background

The ZytoLight® SPEC IRF4,DUSP22 Dual Color Break Apart Probe (PL168) is intended to be used for the qualitative detection of translocations involving the human IRF4,DUSP22 gene region at 6p25.3 in formalin-fixed, paraffin-embedded specimens, by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

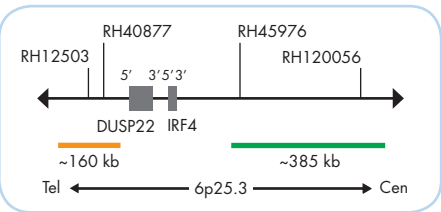
Probe Description

The ZytoLight® SPEC IRF4,DUSP22 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 6p25.3** (chr6:557,233-940,968) proximal to the IRF4,DUSP22 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 6p25.3** (chr6:114,722-273,908) distal to the IRF4,DUSP22 breakpoint region.
- Formamide based hybridization buffer



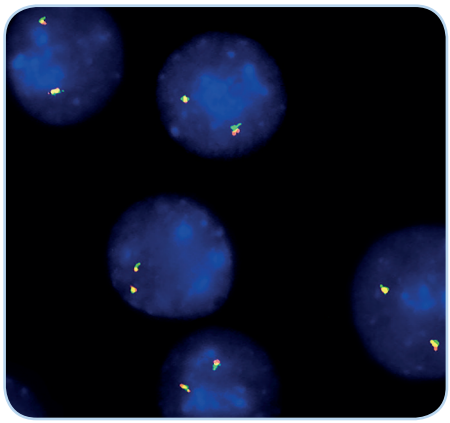
Ideogram of chromosome 6 indicating the hybridization locations.



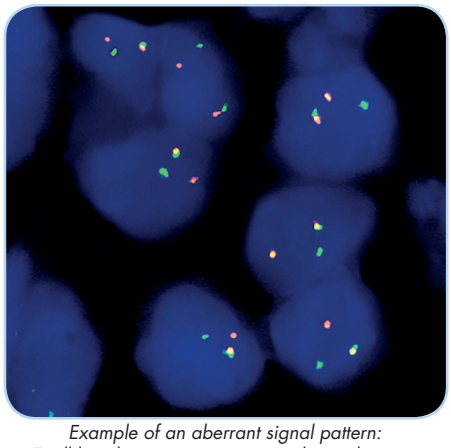
SPEC IRF4, DUSP22 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 6p25.3 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 6p25.3 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 6p25.3 locus and one 6p25.3 locus affected by a translocation.



SPEC IRF4, DUSP22 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: T-cell lymphoma tissue section with translocation affecting the 6p25.3 locus as indicated by one non-rearranged orange/green fusion signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2210-50	ZytoLight SPEC IRF4,DUSP22 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC RREB1/MYB/CEN 6 Triple Color Probe

CE IVD

Background

The ZytoLight® SPEC RREB1/MYB/CEN 6 Triple Color Probe (PL108) is intended to be used for the qualitative detection of amplifications involving the human RREB1 gene as well as the human MYB gene and the detection of chromosome 6 alpha satellites in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

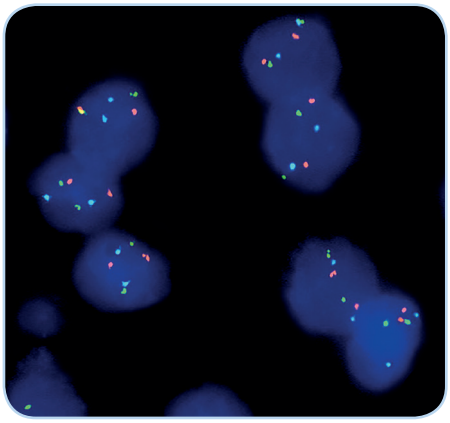
Probe Description

The ZytoLight® SPEC RREB1/MYB/CEN 6 Triple Color Probe is composed of:

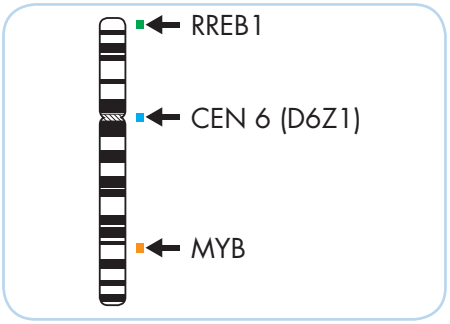
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 6p24.3-p25.1** (chr6:6,913,938-7,406,653) harboring the RREB1 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 6q23.2-q23.3** (chr6:135,141,227-135,715,246) harboring the MYB gene region.
- ZyBlue (excitation 418 nm/emission 467 nm) labeled polynucleotides (~12 ng/µl), which target sequences mapping in 6p11.1-q11 specific for the alpha satellite centromeric region D6Z1 of chromosome 6.
- Formamide based hybridization buffer

Results

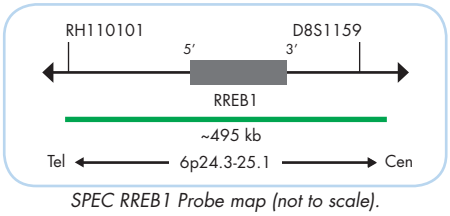
In a normal interphase nucleus, two green, two orange, and two blue signals are expected. In a cell with amplification of the RREB1 or the MYB gene locus, multiple copies of the green or orange signal will be observed, respectively. In a cell with deletion of the RREB1 or the MYB gene locus, a reduced number of green or orange signals will be observed, respectively.



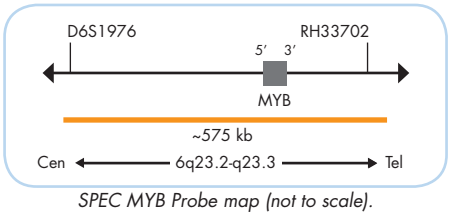
SPEC RREB1/MYB/CEN 6 Triple Color Probe hybridized to normal interphase cells as indicated by two green, two orange, and two blue signals in each nucleus.



Ideogram of chromosome 6 indicating the hybridization locations.



SPEC RREB1 Probe map (not to scale).



SPEC MYB Probe map (not to scale).

Prod. No.	Product	Label	Tests* (Volume)
Z-2152-50	ZytoLight SPEC RREB1/MYB/CEN 6 Triple Color Probe CE IVD	●/●/●	5 (50 µl)
Z-2152-200	ZytoLight SPEC RREB1/MYB/CEN 6 Triple Color Probe CE IVD	●/●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC PHF1 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC PHF1 Dual Color Break Apart Probe (PL173) is intended to be used for the qualitative detection of translocations involving the human PHF1 gene at 6p21.32 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

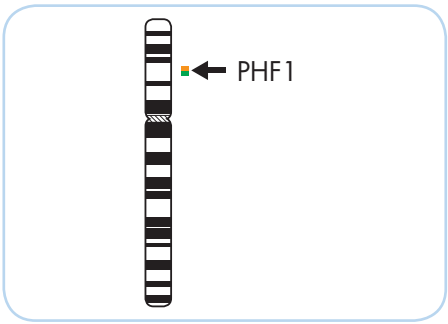
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

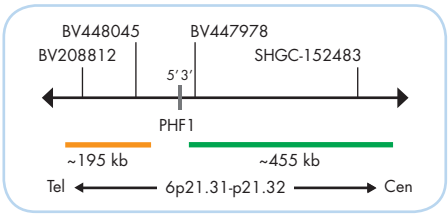
Probe Description

The ZytoLight® SPEC PHF1 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 6p21.31-p21.32** (chr6:33,406,580-33,863,564) proximal to the PHF1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 6p21.32** (chr6:33,121,529-33,317,357) distal to the PHF1 breakpoint region.
- Formamide based hybridization buffer



Ideogram of chromosome 6 indicating the hybridization locations.

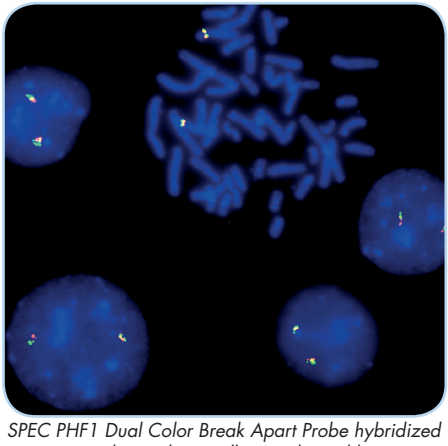


SPEC PHF1 Probe map (not to scale).

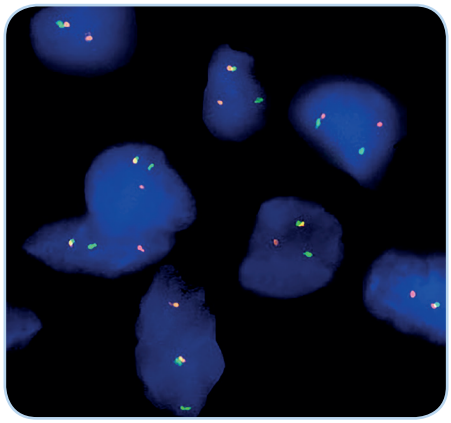
Results

In an interphase nucleus lacking a translocation involving the 6p21.31-p21.32 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 6p21.31-p21.32 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 6p21.31-p21.32 locus and one 6p21.31-p21.32 locus affected by a translocation.

Deletion of 5'-PHF1 sequences is indicated by one or multiple isolated green signals.



SPEC PHF1 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus and to metaphase chromosomes of a normal cell.



Example of an aberrant signal pattern: Sarcoma tissue section with translocation of the PHF1 gene as indicated by one non-rearranged orange/green fusion signal, one orange, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2215-50	ZytoLight SPEC PHF1 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC VEGFA/CEN 6 Dual Color Probe

CE IVD

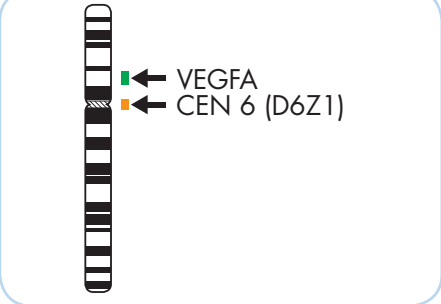
Background

The ZytoLight® SPEC VEGFA/CEN 6 Dual Color Probe (PL153) is intended to be used for the qualitative detection of amplifications involving the human VEGFA gene as well as the detection of chromosome 6 alpha satellites in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

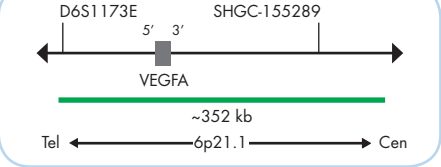
Probe Description

The ZytoLight® SPEC VEGFA/CEN 6 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 6p21.1** (chr6:43,633,271-43,985,142) harboring the VEGFA gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 6p11.1-q11 specific for the alpha satellite centromeric region D6Z1 of chromosome 6.
- Formamide based hybridization buffer



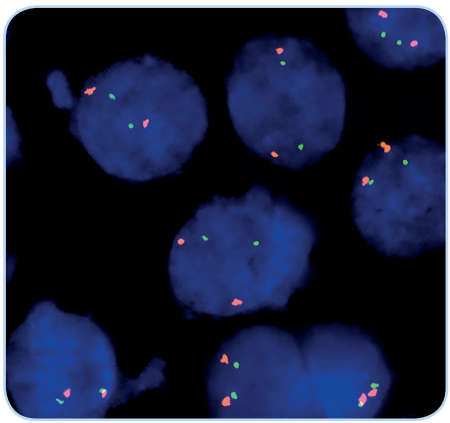
Ideogram of chromosome 6 indicating the hybridization locations.



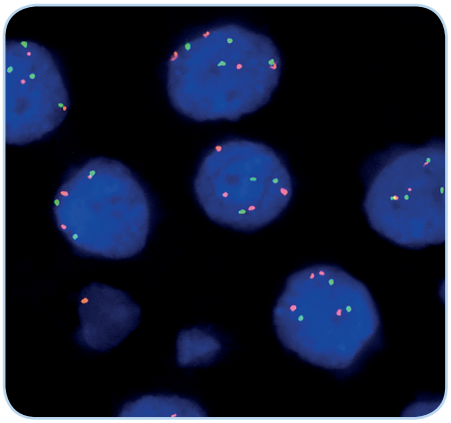
SPEC VEGFA Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the VEGFA gene locus, multiple copies of the green signal or large green signal clusters will be observed.



SPEC VEGFA/CEN 6 Dual Color Probe hybridized to normal interphase calls as indicated by two orange and two green signals in each nucleus.



Example of an aberrant signal pattern: HCC tissue section with interphase cells showing a polysomy of chromosome 6 as indicated by multiple green (VEGFA) and orange (CEN 6) signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2195-200	ZytoLight SPEC VEGFA/CEN 6 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC ROS1 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC ROS1 Dual Color Break Apart Probe (PL101) is intended to be used for the qualitative detection of translocations involving the human ROS1 gene at 6q22.1 in formalin-fixed, paraffin-embedded specimens, such as non-small cell lung cancer (NSCLC), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

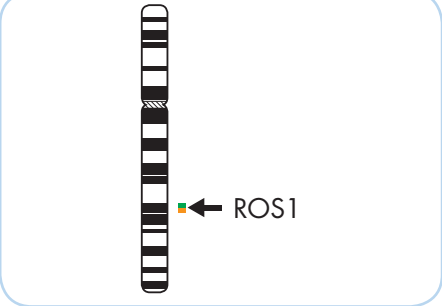
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of NSCLC and therapeutic measures should not be initiated based on the test result alone.

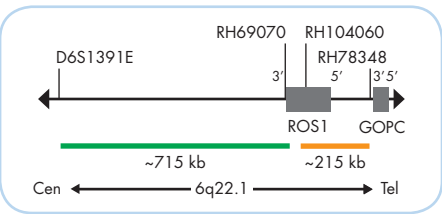
Probe Description

The ZytoLight® SPEC ROS1 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 6q22.1** (chr6:116,912,298-117,627,255) proximal to the ROS1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 6q22.1** (chr6:117,659,135-117,871,701) distal to the ROS1 breakpoint region.
- Formamide based hybridization buffer



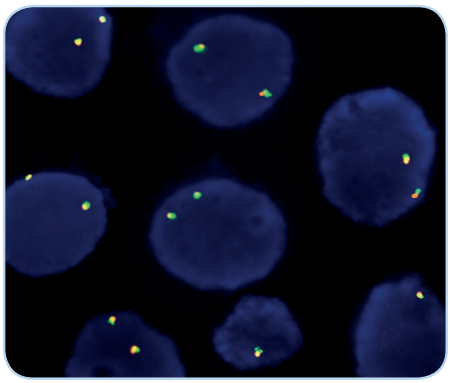
Ideogram of chromosome 6 indicating the hybridization locations.



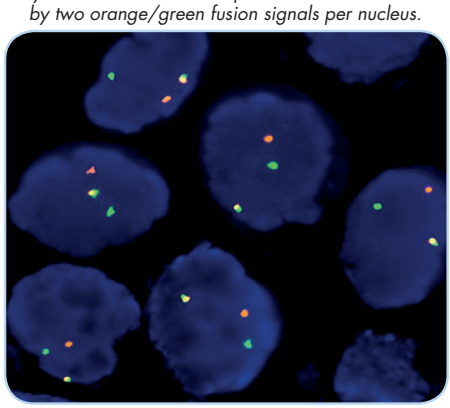
SPEC ROS1 Probe map (not to scale).

Results

In an interphase nucleus lacking an aberration involving the 6q22.1 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 6q22.1 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 6q22.1 locus and one 6q22.1 locus affected by a translocation. Isolated green signals are the result of deletions distal to the ROS1 breakpoint region or are due to unbalanced translocations affecting this chromosomal region.



SPEC ROS1 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Section of paraffin-embedded NSCLC cell line with translocation affecting the 6q22.1 locus harboring ROS1 as indicated by one orange/green fusion signal (non-rearranged), one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2144-50	ZytoLight SPEC ROS1 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2144-200	ZytoLight SPEC ROS1 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC ROS1/CEN 6 Dual Color Probe

CE IVD

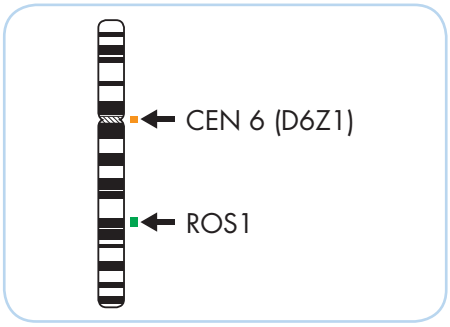
Background

The ZytoLight® SPEC ROS1/CEN 6 Dual Color Probe (PL118) is intended to be used for the qualitative detection of amplifications involving the human ROS1 gene as well as the detection of chromosome 6 alpha satellites in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

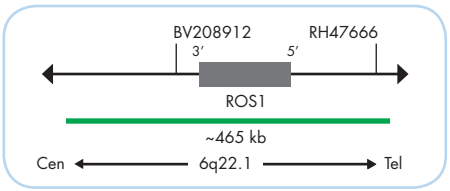
Probe Description

The ZytoLight® SPEC ROS1/CEN 6 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 6q22.1** (chr6:117,431,278-117,894,830) harboring the ROS1 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 6p11.1-q11 specific for the alpha satellite centromeric region D6Z1 of chromosome 6.
- Formamide based hybridization buffer



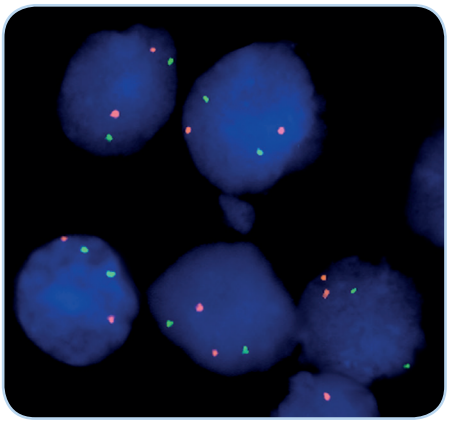
Ideogram of chromosome 6 indicating the hybridization locations.



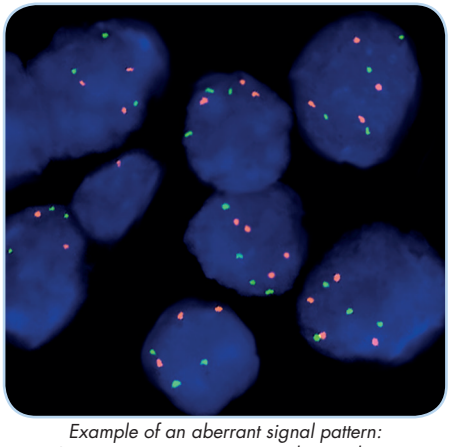
SPEC ROS1 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the ROS1 gene locus, multiple copies of the green signal or green signal clusters will be observed.



SPEC ROS1/CEN 6 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Example of an aberrant signal pattern: Lung cancer tissue section with interphase cells showing a polysomy of chromosome 6 as indicated by multiple orange (CEN 6) and green (ROS1) signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2162-200	ZytoLight SPEC ROS1/CEN 6 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC MYB Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC MYB Dual Color Break Apart Probe (PL100) is intended to be used for the qualitative detection of translocations involving the human MYB gene at 6q23.3 in cytologic or formalin-fixed, paraffin-embedded specimens, such as adenoid cystic carcinoma (ACC), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with ZytoLight® FISH Implementation Kits (Prod. No. Z-2028-5/-20, or Z-2099-20).

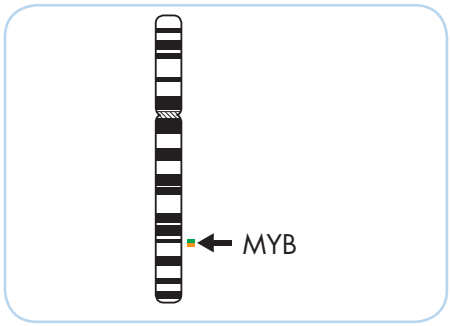
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of ACC and therapeutic measures should not be initiated based on the test result alone.

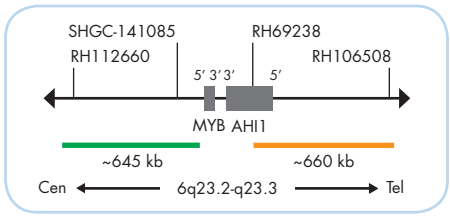
Probe Description

The ZytoLight® SPEC MYB Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 6q23.2-q23.3** (chr6:134,840,690-135,483,752) proximal to the MYB breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 6q23.3** (chr6:135,728,667-136,390,142) distal to the MYB breakpoint region.
- Formamide based hybridization buffer



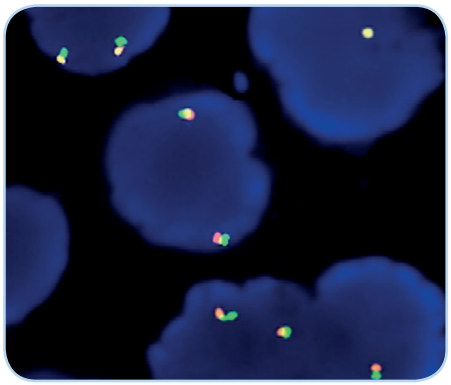
Ideogram of chromosome 6 indicating the hybridization locations.



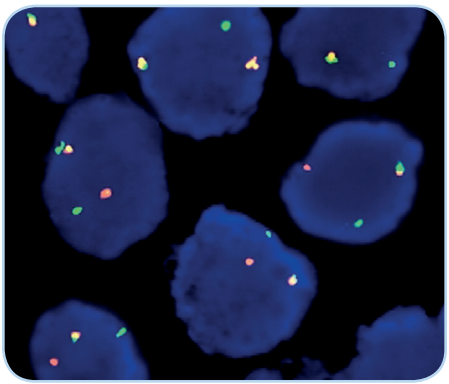
SPEC MYB Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 6q23.2-q23.3 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 6q23.2-q23.3 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 6q23.2-q23.3 locus and one 6q23.2-q23.3 locus affected by a translocation.



SPEC MYB Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Adenoid cystic carcinoma tissue section with translocation affecting the 6q23.3 locus as indicated by one orange/green fusion (non-rearranged) signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2143-50	ZytoLight SPEC MYB Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2143-200	ZytoLight SPEC MYB Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC MYB/CEN 6 Dual Color Probe

CE IVD

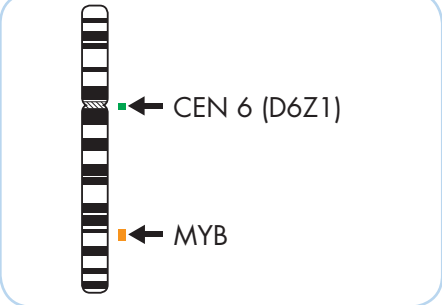
Background

The ZytoLight® SPEC MYB/CEN 6 Dual Color Probe (PL236) is intended to be used for the qualitative detection of deletions involving the human MYB gene and the detection of chromosome 6 alpha satellites in cytologic specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

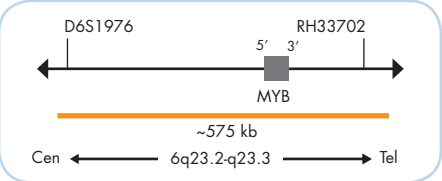
Probe Description

The ZytoLight® SPEC MYB/CEN 6 Dual Color Probe is composed of:

- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 6q23.2-q23.3** (chr6:135,141,227-135,715,246) harboring the MYB gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 6p11.1-q11 specific for the alpha satellite centromeric region D6Z1 of chromosome 6.
- Formamide based hybridization buffer



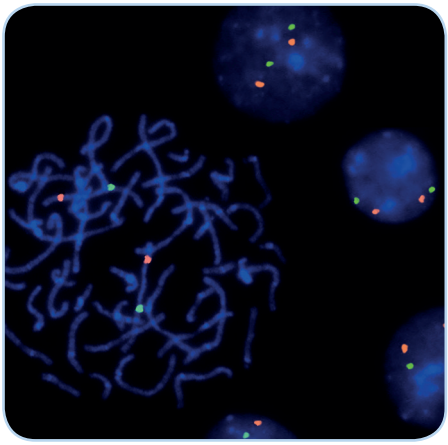
Ideogram of chromosome 6 indicating the hybridization locations.



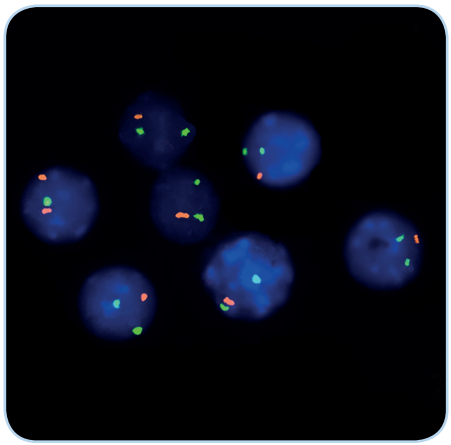
SPEC MYB Probe map (not to scale).

Results

In a normal interphase nucleus, two green and two orange signals are expected.
In a cell with deletion affecting the 6q23.3 locus, one or no copy of the orange signal will be observed.



SPEC MYB/CEN 6 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus and to metaphase chromosomes of a normal cell.



Example of an aberrant signal pattern: Blood smear with deletion of the MYB gene as indicated by one orange signal in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2281-50	ZytoLight SPEC MYB/CEN 6 Dual Color Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC ESR1/CEN 6 Dual Color Probe

CE IVD

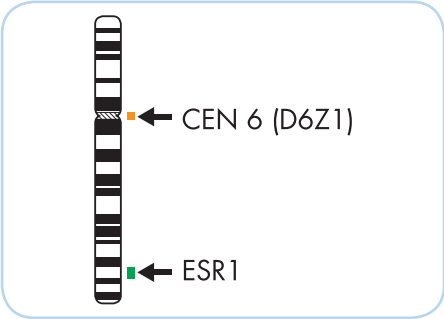
Background

The ZytoLight® SPEC ESR1/CEN 6 Dual Color Probe (PL27) is intended to be used for the qualitative detection of amplifications involving the human ESR1 gene as well as the detection of chromosome 6 alpha satellites in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

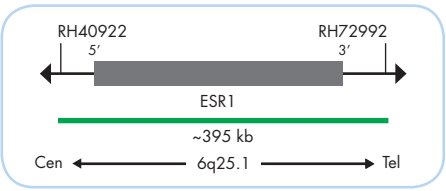
Probe Description

The ZytoLight® SPEC ESR1/CEN 6 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 6q25.1** (chr6:152,083,365-152,478,947) harboring the ESR1 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 6p11.1-q11 specific for the alpha satellite centromeric region D6Z1 of chromosome 6.
- Formamide based hybridization buffer



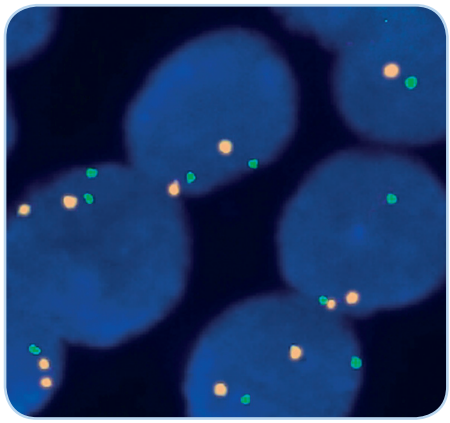
Ideogram of chromosome 6 indicating the hybridization locations.



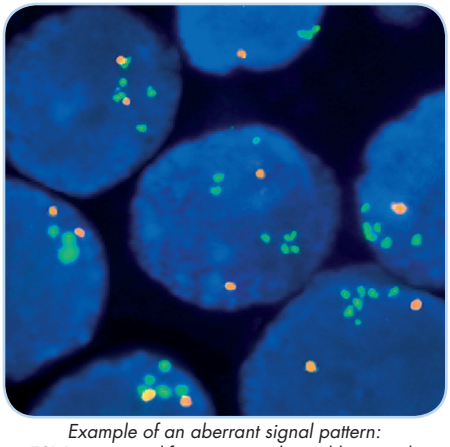
SPEC ESR1 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the ESR1 gene locus, multiple copies of the green signal or green signal clusters will be observed.



SPEC ESR1/CEN 6 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Example of an aberrant signal pattern: ESR1 gene amplification as indicated by mutiple green ESR1 specific signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2069-50	ZytoLight SPEC ESR1/CEN 6 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2069-200	ZytoLight SPEC ESR1/CEN 6 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC JAZF1 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC JAZF1 Dual Color Break Apart Probe (PL89) is intended to be used for the qualitative detection of translocations involving the human JAZF1 gene at 7p15.1-p15.2 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

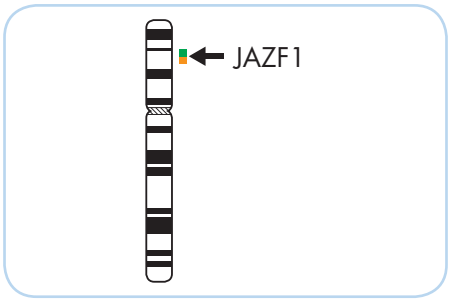
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

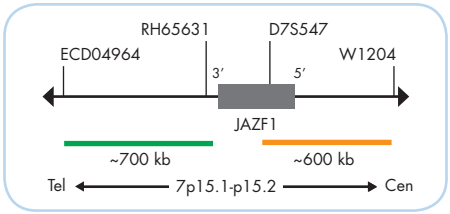
Probe Description

The ZytoLight® SPEC JAZF1 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 7p15.2** (chr7:27,146,601-27,846,497) distal to the JAZF1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 7p15.1** (chr7:28,059,911-28,661,819) proximal to the JAZF1 breakpoint region.
- Formamide based hybridization buffer



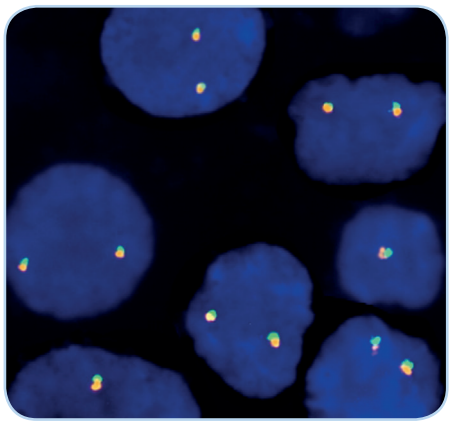
Ideogram of chromosome 7 indicating the hybridization locations.



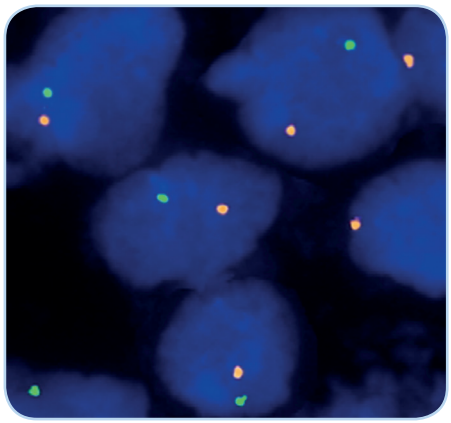
SPEC JAZF1 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 7p15.1-p15.2 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 7p15.1-p15.2 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 7p15.1-p15.2 locus and one 7p15.1-p15.2 locus affected by a translocation.



SPEC JAZF1 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: Endometrial stromal sarcoma with translocation affecting JAZF1 at 7p15.1-p15.2 as well as monosomy of chromosome 7 as indicated by one orange and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2132-50	ZytoLight SPEC JAZF1 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC IKZF1/CEN 7 Dual Color Probe

CE IVD

Background

The ZytoLight® SPEC IKZF1/CEN 7 Dual Color Probe is designed for the detection of deletions affecting the IKZF1 (IKAROS family zinc finger 1, a.k.a. ZNFN1A1, IKAROS) gene.

The IKZF1 gene is located on 7p12.2 and encodes a zinc finger transcription factor, which is required for normal hematopoietic differentiation and proliferation, particularly in lymphoid lineages.

Genomic deletions affecting the IKZF1 gene are found in approximately 15% of pediatric and ~40% of adult B-cell precursor acute lymphoblastic leukemia (B-ALL) cases. The frequency is remarkably high in BCR-ABL1-positive (~70%) and BCR-ABL1-like (~40%) pediatric B-ALL. IKZF1 deletions were also identified in the progression of chronic myeloid leukemia to lymphoid blast crisis.

The most frequent deletions in B-ALL affect the whole gene or exons 4 to 7. Deletions affecting other exons (i.e., exons 2 to 7, exons 2 to 8, and exons 4 to 8) were also observed.

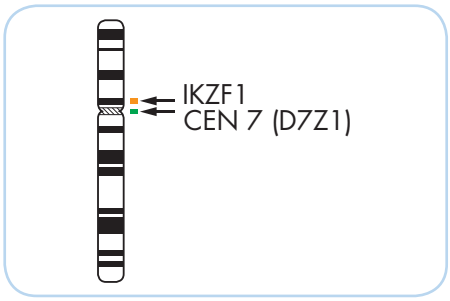
IKZF1 deletions are associated with poor prognosis and high risk of relapse in cases of B-ALL. Hence, the detection of IKZF1 deletions by FISH may help in predicting the clinical outcome in patients with B-ALL.

References
Boer JM, et al. (2016) Leukemia 30: 32-8.
Hashiguchi J, et al. (2018) J Mol Diagn 20: 446-54.
Iacobucci I, et al. (2009) Blood 114: 2159-67.
Meyer C, et al. (2013) Am J Blood Res 3: 165-73.
Mullighan CG, et al. (2008) Nature 453: 110-4.

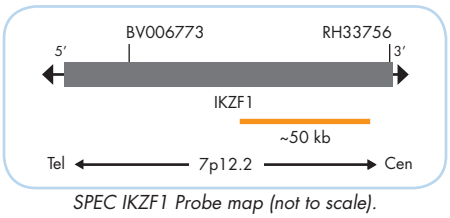
Probe Description

The ZytoLight® SPEC IKZF1/CEN 7 Dual Color Probe is composed of:

- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 7p12.2** (chr7:50,412,912-50,463,612) harboring the IKZF1 gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 7p11.1-q11.1 specific for the alpha satellite centromeric region D7Z1 of chromosome 7.
- Formamide based hybridization buffer



Ideogram of chromosome 7 indicating the hybridization locations.



SPEC IKZF1 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with an IKZF1 deletion, one or no copy of the orange signal will be observed.

SPEC IKZF1/CEN 7 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2304-50	ZytoLight SPEC IKZF1/CEN 7 Dual Color Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC EGFR/CEN 7 Dual Color Probe

CE IVD

Background

The ZytoLight® SPEC EGFR/CEN 7 Dual Color Probe (PL15) is intended to be used for the qualitative detection of amplifications involving the human EGFR gene as well as the detection of chromosome 7 alpha satellites in formalin-fixed, paraffin-embedded specimens, such as non-small cell lung cancer (NSCLC) and glioma, by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

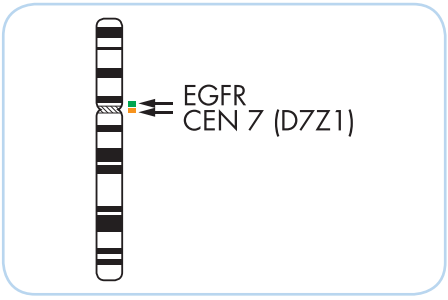
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of NSCLC and glioma and therapeutic measures should not be initiated based on the test result alone.

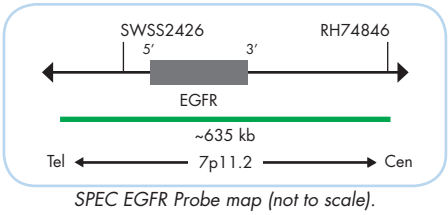
Probe Description

The ZytoLight® SPEC EGFR/CEN 7 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 7p11.2** (chr7:54,912,555-55,548,375) harboring the EGFR gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 7p11.1-q11.1 specific for the alpha satellite centromeric region D7Z1 of chromosome 7.
- Formamide based hybridization buffer



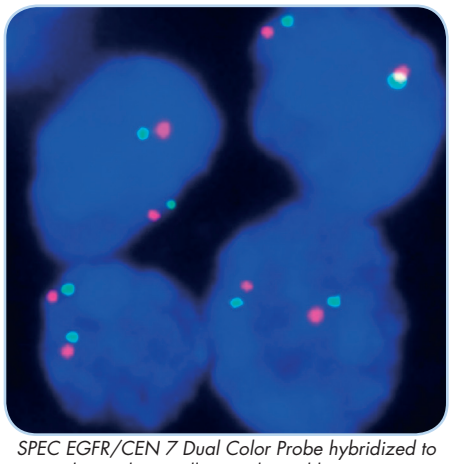
Ideogram of chromosome 7 indicating the hybridization locations.



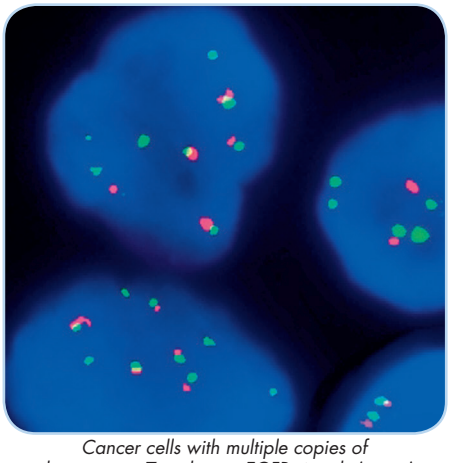
SPEC EGFR Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the EGFR gene locus, multiple copies of the green signal or green signal clusters will be observed.



SPEC EGFR/CEN 7 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Cancer cells with multiple copies of chromosome 7 and extra EGFR signals (green) in a sample from an NSCLC patient.

Prod. No.	Product	Label	Tests* (Volume)
Z-2033-50	ZytoLight SPEC EGFR/CEN 7 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2033-200	ZytoLight SPEC EGFR/CEN 7 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC Williams-Beuren Dual Color Probe

CE
IVD

Background

The ZytoLight® SPEC Williams-Beuren Dual Color Probe is designed to detect deletions affecting the chromosomal region 7q11.23 harboring the ELN (elastin, a.k.a. WBS) gene.

The Williams-Beuren syndrome (WBS) is a genetic disorder caused by a hemizygous contiguous gene deletion on chromosome 7q11.23. The estimated prevalence of the disease ranges between 1/7,500 and 1/20,000 newborns.

The WBS deletion region (~1.5-1.8 Mb) consists of a single copy gene region containing app. 28 genes, including the ELN gene that is flanked by repetitive sequences known as low-copy repeats (LCRs).

The deletions arise as a consequence of misalignment of these repetitive sequences during meiosis and a following unequal crossing over due to high similarity of LCRs. Usually, WBS occurs sporadically, but some parents of WBS patients were shown to carry a paracentric inversion of the WBS locus. Presence of this inversion predisposes to chromosomal mispairing in meiosis.

WBS patients clinically display a characteristic pattern of symptoms including vascular stenosis, weakness of connective tissue, a typical face, short stature, overfriendliness, and mental retardation.

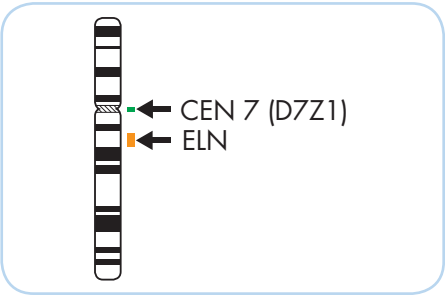
FISH analysis can be performed to confirm WBS diagnosis in patients with vascular stenosis together with mental retardation.

References
Bayés M, et al. (2003) Am J Hum Genet 73: 131-51.
Beuren AJ, et al. (1964) Am J Cardiol 13: 471-83.
Schubert C (2009) Cell Mol Life Sci 66: 1178-97.
Sugayama SM, et al. (2003) Arq Bras Cardiol 81: 462-73.
Williams JC, et al. (1961) Circulation 24: 1311-8.

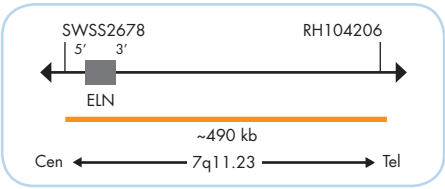
Probe Description

The ZytoLight® SPEC Williams-Beuren Dual Color Probe is composed of:

- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 7q11.23** (chr7:73,408,390-73,899,599) harboring the ELN gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 7p11.1-q11.1 specific for the alpha satellite centromeric region D7Z1 of chromosome 7.
- Formamide based hybridization buffer



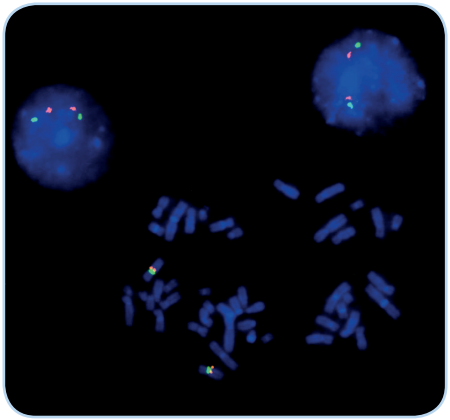
Ideogram of chromosome 7 indicating the hybridization locations.



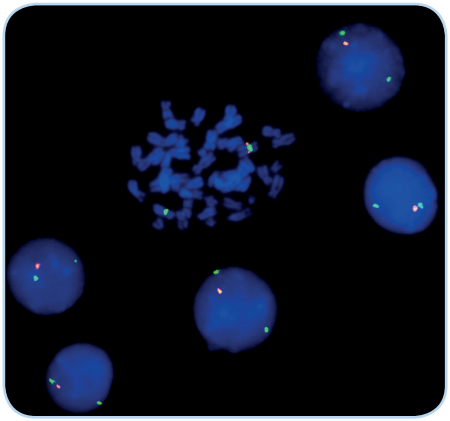
SPEC ELN Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletion of the ELN gene locus, a reduced number of orange signals will be observed.



SPEC Williams-Beuren Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus and to metaphase chromosomes of a normal cell.



Lymphocytes and metaphase chromosomes from a Williams-Beuren syndrome case showing an ELN deletion as indicated by the loss of one orange signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2302-50	ZytoLight SPEC Williams-Beuren Dual Color Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

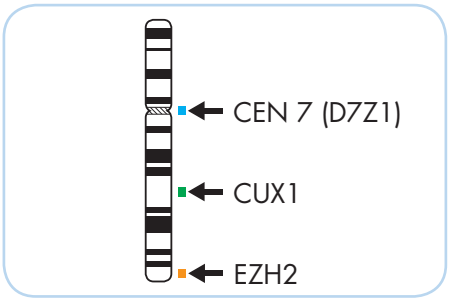
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC CUX1/EZH2/CEN 7 Triple Color Probe

CE IVD

Background

The ZytoLight® SPEC CUX1/EZH2/CEN 7 Triple Color Probe (PL172) is intended to be used for the qualitative detection of deletions involving the human CUX1 gene and the human EZH2 gene as well as the detection of chromosome 7 alpha satellites in cytological specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

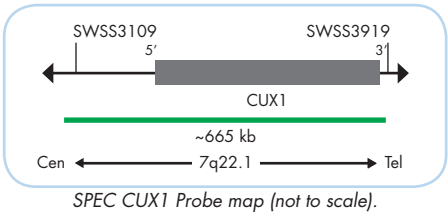


Ideogram of chromosome 7 indicating the hybridization locations.

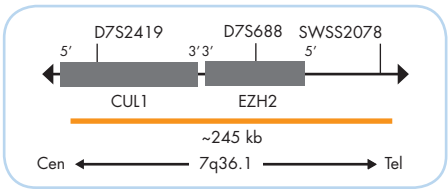
Probe Description

The ZytoLight® SPEC CUX1/EZH2/CEN 7 Triple Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 7q22.1** (chr7:101,270,255-101,934,924) harboring the CUX1 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 7q36.1** (chr7:148,402,839-148,647,927) harboring the EZH2 gene region.
- ZyBlue (excitation 418 nm/emission 467 nm) labeled polynucleotides (~12.0 ng/µl), which target sequences mapping in 7p11.1-q11.1 specific for the alpha satellite centromeric region D7Z1 of chromosome 7.
- Formamide based hybridization buffer



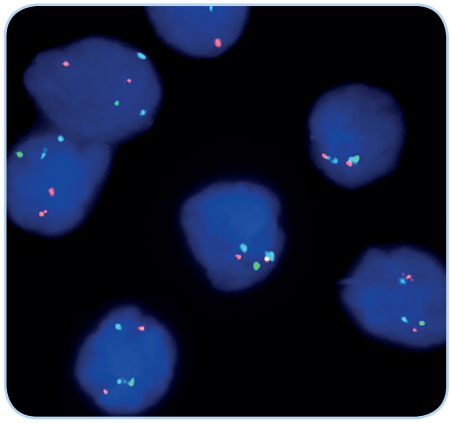
SPEC CUX1 Probe map (not to scale).



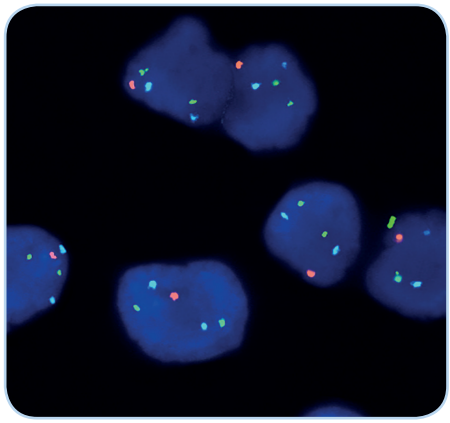
SPEC EZH2 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange, two green, and two blue signals are expected. In a cell with deletions affecting the 7q22.1 and/or 7q36.1 locus, one or no copy of the green and/or orange signal will be observed. Monosomy 7 will result in a loss of a green, orange, and blue signal.



Example of an aberrant signal pattern: Bone marrow smear with deletion of the CUX1 gene as indicated by one green signal in each nucleus.



Example of an aberrant signal pattern: Bone marrow smear with deletion of the EZH2 gene as indicated by one orange signal in each nucleus.

Specimens kindly provided by Paediatric Oncology/Haematology, Charité-Universitätsmedizin Berlin, Germany.

Prod. No.	Product	Label	Tests* (Volume)
Z-2214-50	ZytoLight SPEC CUX1/EZH2/CEN 7 Triple Color Probe CE IVD	●/●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC MET/CEN 7 Dual Color Probe

CE IVD

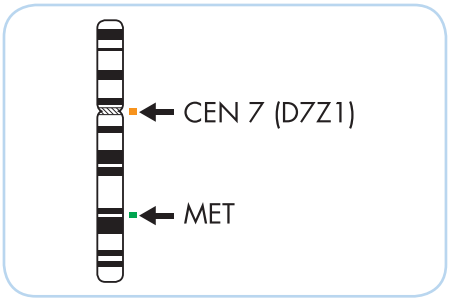
Background

The ZytoLight® SPEC MET/CEN 7 Dual Color Probe (PL46) is intended to be used for the qualitative detection of amplifications involving the human MET gene as well as the detection of chromosome 7 alpha satellites in formalin-fixed, paraffin-embedded specimens, such as non-small cell lung cancer (NSCLC), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of NSCLC and therapeutic measures should not be initiated based on the test result alone.

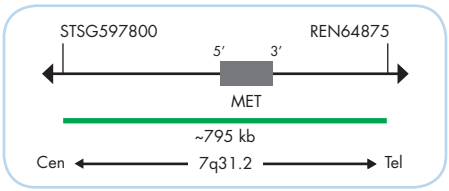
Probe Description

The ZytoLight® SPEC MET/CEN 7 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 7q31.2** (chr7:115,925,700-116,718,699) harboring the MET gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 7p11.1-q11.1 specific for the alpha satellite centromeric region D7Z1 of chromosome 7.
- Formamide based hybridization buffer



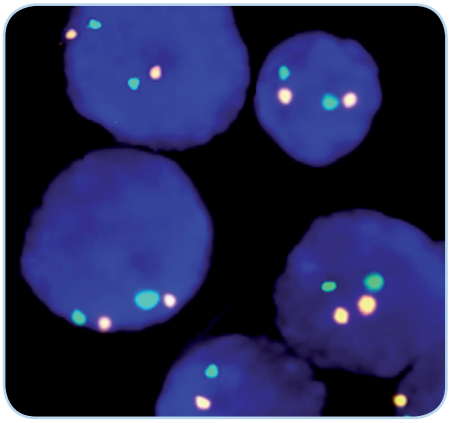
Ideogram of chromosome 7 indicating the hybridization locations.



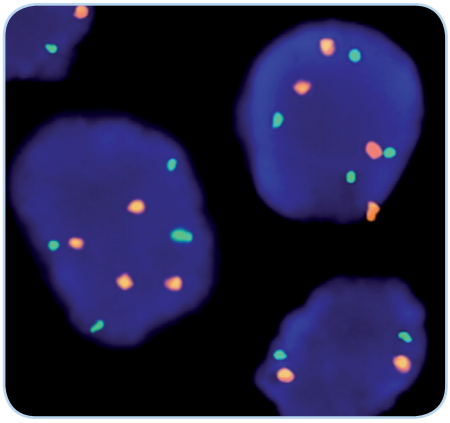
SPEC MET Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the MET gene locus, multiple copies of the green signal or green signal clusters will be observed.



SPEC MET/CEN 7 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



NSCLC specimen cells with polysomy of chromosome 7 as indicated by four orange (CEN 7) and four green (MET) signals in the nuclei.

Prod. No.	Product	Label	Tests* (Volume)
Z-2087-50	ZytoLight SPEC MET/CEN 7 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2087-200	ZytoLight SPEC MET/CEN 7 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC BRAF Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC BRAF Dual Color Break Apart Probe (PL147) is intended to be used for the qualitative detection of translocations involving the human BRAF gene at 7q34 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

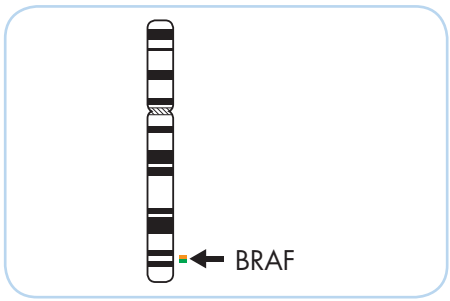
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

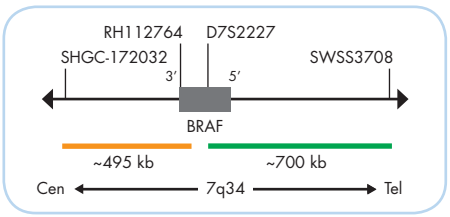
Probe Description

The ZytoLight® SPEC BRAF Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 7q34** (chr7:140,535,100-141,233,856) distal to the BRAF breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 7q34** (chr7:139,972,721-140,469,362) proximal to the BRAF breakpoint region.
- Formamide based hybridization buffer



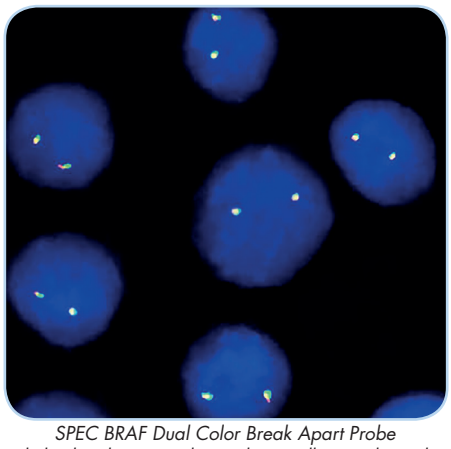
Ideogram of chromosome 7 indicating the hybridization locations.



SPEC BRAF Probe map (not to scale).

Results

In an interphase nucleus lacking a rearrangement involving the 7q34 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 7q34 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 7q34 locus and one 7q34 locus affected by a translocation or inversion. Isolated orange signals are the result of deletions distal to the BRAF breakpoint region.



SPEC BRAF Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2189-200	ZytoLight SPEC BRAF Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC BRAF/CEN 7 Dual Color Probe

CE IVD

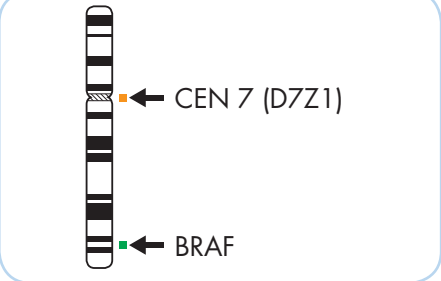
Background

The ZytoLight® SPEC BRAF/CEN 7 Dual Color Probe (PL149) is intended to be used for the qualitative detection of amplifications involving the human BRAF gene as well as the detection of chromosome 7 alpha satellites in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

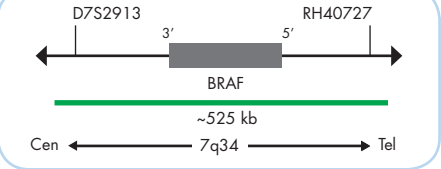
Probe Description

The ZytoLight® SPEC BRAF/CEN 7 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 7q34** (chr7:140,266,210-140,792,511) harboring the BRAF gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 7p11.1-q11.1 specific for the alpha satellite centromeric region D7Z1 of chromosome 7.
- Formamide based hybridization buffer



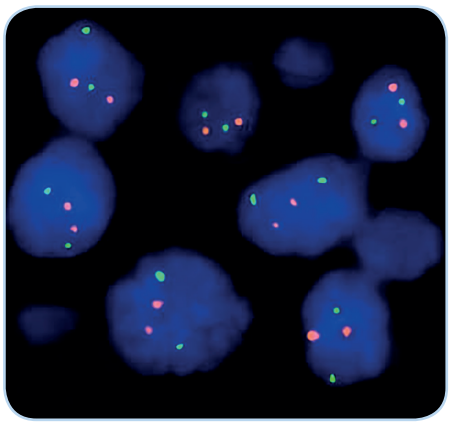
Ideogram of chromosome 7 indicating the hybridization locations.



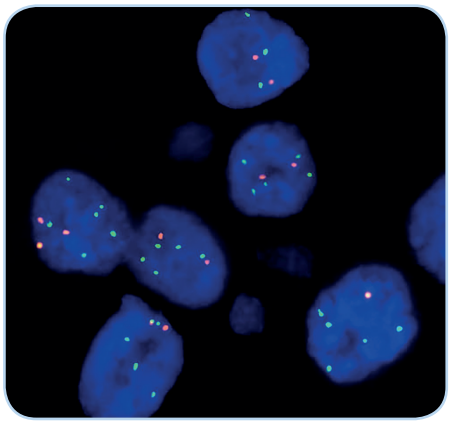
SPEC BRAF Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the BRAF gene locus or polysomy of chromosome 7, multiple copies of the green signal or large green signal clusters will be observed.



Normal interphase cells, BRAF (green), CEN 7 (orange).



Example of an aberrant signal pattern: NSCLC tissue section with amplification of the BRAF gene (green).

Prod. No.	Product	Label	Tests* (Volume)
Z-2191-200	ZytoLight SPEC BRAF/CEN 7 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC NRG1/CD74 TriCheck™ Probe

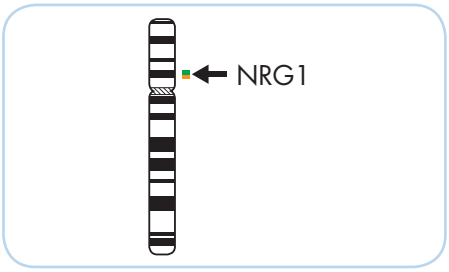
CE IVD

Background

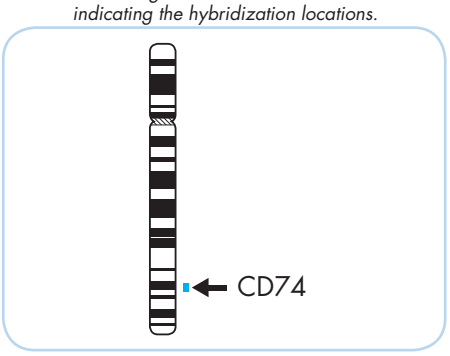
The ZytoLight® SPEC NRG1/CD74 TriCheck™ Probe (PL152) is intended to be used for the qualitative detection of human NRG1 rearrangements with and without participation of the human CD74 gene in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.



Ideogram of chromosome 8 indicating the hybridization locations.

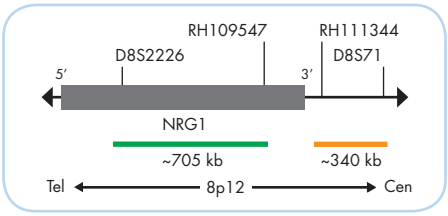


Ideogram of chromosome 5 indicating the hybridization locations.

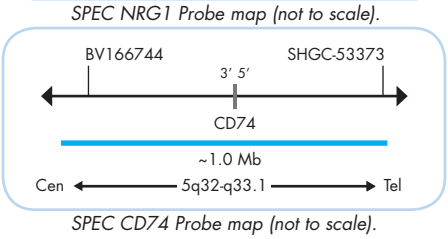
Probe Description

The ZytoLight® SPEC NRG1/CD74 TriCheck™ Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 8p12** (chr8:31,730,448-32,433,429) distal to the NRG1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 8p12** (chr8:32,644,505-32,985,279) proximal to the NRG1 breakpoint region.
- ZyBlue (excitation 418 nm/emission 467 nm) labeled polynucleotides (~37.0 ng/µl), which target sequences mapping in 5q32-q33.1** (chr5:149,274,320-150,285,722) harboring the CD74 gene.
- Formamide based hybridization buffer



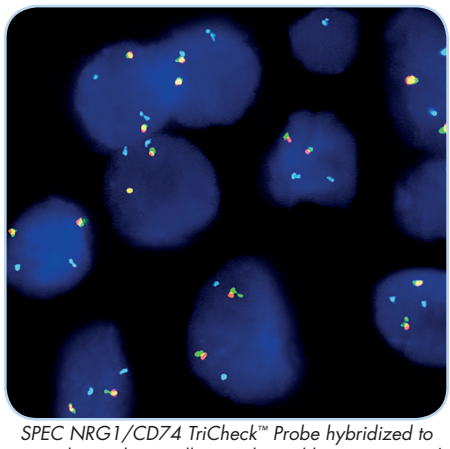
SPEC NRG1 Probe map (not to scale).



SPEC CD74 Probe map (not to scale).

Results

In an interphase nucleus lacking a rearrangement involving the 8p12 and 5q32-q33.1 bands, two orange/green fusion signals and two blue signals are expected. A CD74-NRG1 fusion is indicated by one separate green signal, one separate orange signal, and an additional blue signal which co-localizes with the separated orange signal. An NRG1 rearrangement not involving CD74 is indicated by separated orange and green signals without an additional blue signal.



SPEC NRG1/CD74 TriCheck™ Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals and two blue signals per nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2194-200	ZytoLight SPEC NRG1/CD74 TriCheck Probe CE IVD	●/●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC NRG1 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC NRG1 Dual Color Break Apart Probe (PL140) is intended to be used for the qualitative detection of translocations involving the human NRG1 gene at 8p12 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

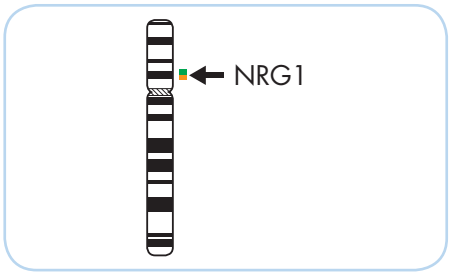
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

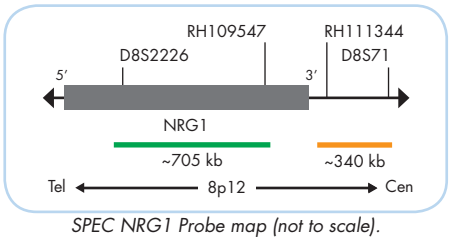
Probe Description

The ZytoLight® SPEC NRG1 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 8p12** (chr8:31,730,448-32,433,429) distal to the NRG1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 8p12** (chr8:32,644,505-32,985,279) proximal to the NRG1 breakpoint region.
- Formamide based hybridization buffer



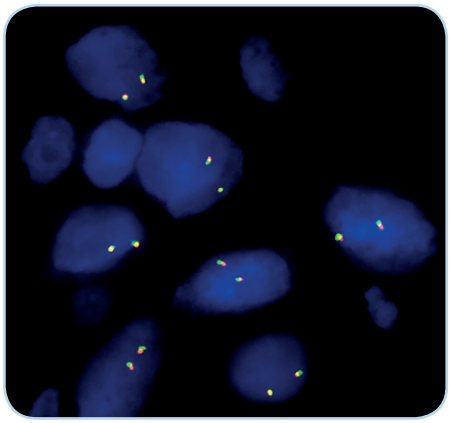
Ideogram of chromosome 8 indicating the hybridization locations.



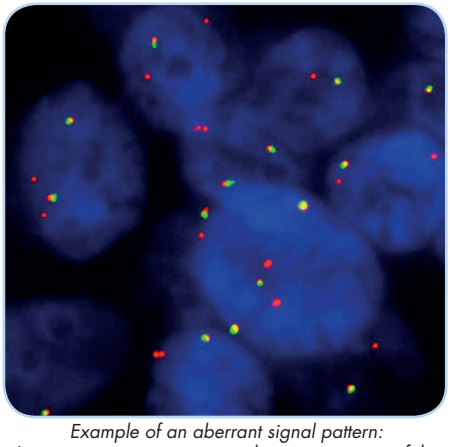
SPEC NRG1 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 8p12 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 8p12 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal in lung adenocarcinoma specimens indicates one normal 8p12 locus and one 8p12 locus affected by a translocation.



SPEC NRG1 Dual Color Break Apart Probe hybridized on normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: Lung cancer tissue section with rearrangement of the NRG1 gene as indicated by extra orange signals.

Image kindly provided by Mc Leer A, Duruisseaux M, Wislez M, and colleagues, Grenoble and Paris, France.

Prod. No.	Product	Label	Tests* (Volume)
Z-2181-200	ZytoLight SPEC NRG1 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC FGFR1 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC FGFR1 Dual Color Break Apart Probe (PL124) is intended to be used for the qualitative detection of translocations involving the human FGFR1 gene at 8p11.22-p11.23 in cytologic specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20).

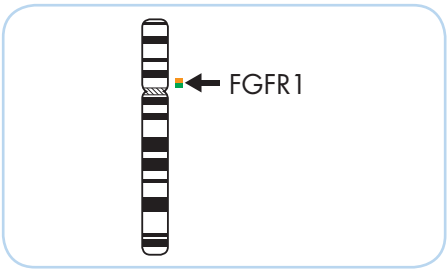
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

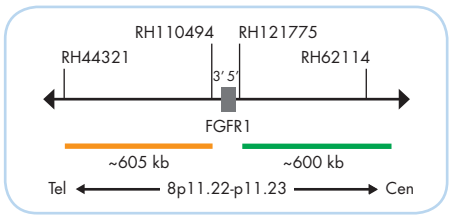
Probe Description

The ZytoLight® SPEC FGFR1 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 8p11.22** (chr8:38,352,117-38,951,783) proximal to the FGFR1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 8p11.23** (chr8:37,635,912-38,239,669) distal to the FGFR1 breakpoint region.
- Formamide based hybridization buffer



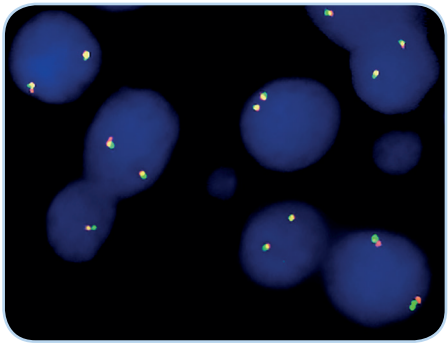
Ideogram of chromosome 8 indicating the hybridization locations.



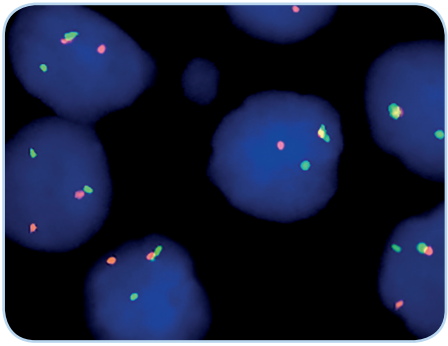
SPEC FGFR1 Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 8p11.23-p11.22 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 8p11.23-p11.22 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 8p11.23-p11.22 locus and one 8p11.23-p11.22 locus affected by a translocation.



SPEC FGFR1 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: 8p11 myeloproliferative syndrome (EMS) tissue section with translocation of the FGFR1 gene as indicated by one non-rearranged orange/green fusion signal, one orange, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2168-50	ZytoLight SPEC FGFR1 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2168-200	ZytoLight SPEC FGFR1 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC FGFR1/CEN 8 Dual Color Probe

CE IVD

Background

The ZytoLight® SPEC FGFR1/CEN 8 Dual Color Probe (PL29) is intended to be used for the qualitative detection of amplifications involving the human FGFR1 gene as well as the detection of chromosome 8 alpha satellites in formalin-fixed, paraffin-embedded specimens, such as breast cancer and squamous cell lung cancer, by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

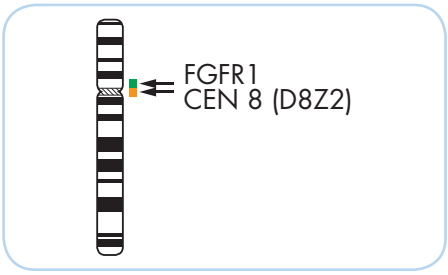
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of breast cancer and squamous cell lung cancer and therapeutic measures should not be initiated based on the test result alone.

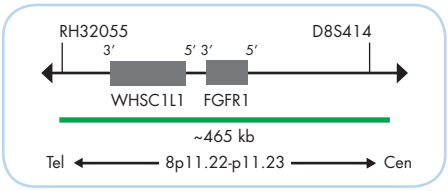
Probe Description

The ZytoLight® SPEC FGFR1/CEN 8 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 8p11.22-p11.23** (chr8:38,063,906-38,527,745) harboring the FGFR1 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 8p11.1-q11.1 specific for the alpha satellite centromeric region D8Z2 of chromosome 8.
- Formamide based hybridization buffer



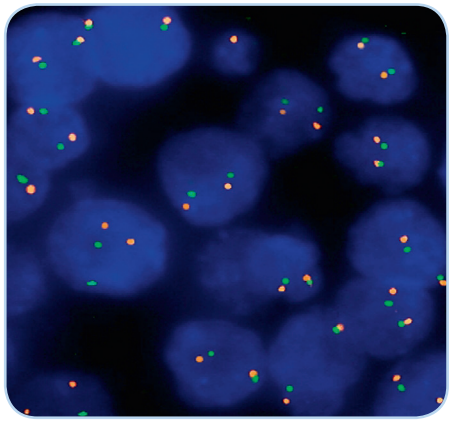
Ideogram of chromosome 8 indicating the hybridization locations.



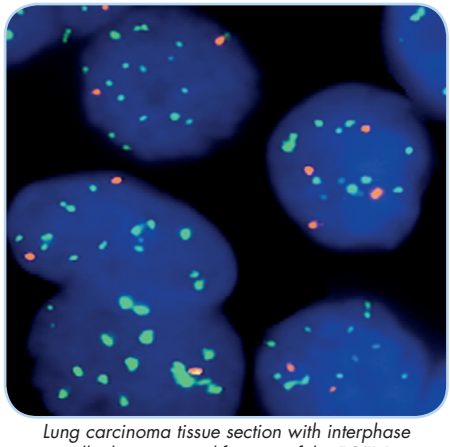
SPEC FGFR1 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the FGFR1 gene locus, multiple copies of the green signal or green signal clusters will be observed.



SPEC FGFR1/CEN 8 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Lung carcinoma tissue section with interphase cells showing amplification of the FGFR1 gene (green) and partly polysomy 8 (orange).

Prod. No.	Product	Label	Tests* (Volume)
Z-2072-50	ZytoLight SPEC FGFR1/CEN 8 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2072-200	ZytoLight SPEC FGFR1/CEN 8 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC RUNX1/RUNX1T1 Dual Color Dual Fusion Probe

CE IVD

Background

The ZytoLight® SPEC RUNX1/RUNX1T1 Dual Color Dual Fusion Probe is designed to detect the specific translocation involving the chromosomal region 21q22.12 harboring the RUNX1 (a.k.a. AML1) gene and the chromosomal region 8q21.3 harboring the RUNX1T1 (a.k.a. ETO, CBF2T1) gene.

The balanced chromosomal translocation t(8;21) is found in about 90% of acute myeloid leukemia (AML) patients. AML is a heterogeneous clonal disorder of hematopoietic progenitor cells and one of the most common malignant myeloid disorders in adults.

The runt related transcription factor 1 gene (RUNX1) and RUNX1 translocation partner 1 (RUNX1T1) gene are both involved in the transcriptional regulation of genes during normal hematopoiesis.

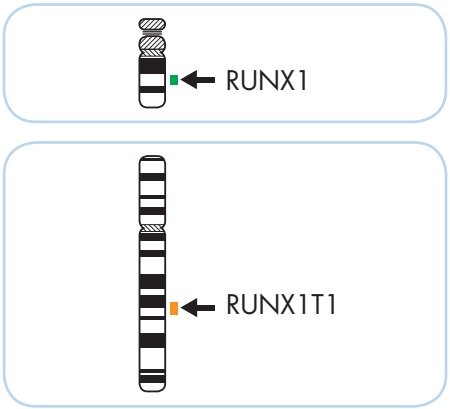
The non-random translocation t(8;21)(q21.3;q22.1) is strongly associated with the French-American-British (FAB) phenotype M2 (AML-M2) and produces a chimeric gene consisting of the 5′-region of the RUNX1 gene fused to the 3′-region of the RUNX1T1 gene. The chimeric protein is thought to be associated with the nuclear corepressor/histone deacetylase complex to block hematopoietic differentiation. fluorescence *in situ* hybridization (FISH) can provide important information for the management of patients with hematologic disorders.

References
Dayyani F, et al. (2008) Blood 111: 4338-47.
Estey E & Döhner H (2006) Lancet 368: 1894-907.
Gmidène A, et al. (2011) Med Oncol 28 Suppl 1: 509-12.
Licht D (2001) Oncogene 20: 5560-79.
Vangala RK, et al. (2003) Blood 101: 270-7.

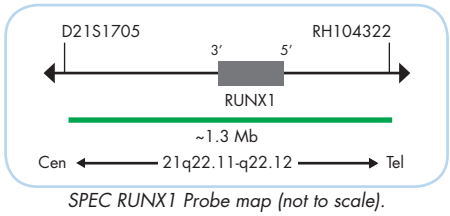
Probe Description

The ZytoLight® SPEC RUNX1/RUNX1T1 Dual Color Dual Fusion Probe is composed of:

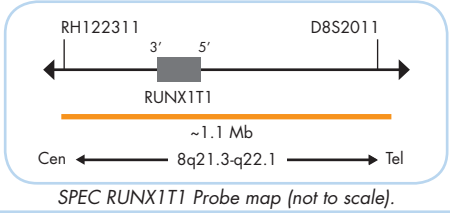
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~12 ng/µl), which target sequences mapping in 21q22.11-q22.12** (chr21:35,530,283-36,855,548) harboring the RUNX1 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~6 ng/µl), which target sequences mapping in 8q21.3-q22.1** (chr8:92,632,490-93,746,043) harboring the RUNX1T1 gene region.
- Formamide based hybridization buffer



Ideograms of chromosomes 21 (above) and 8 (below) indicating the hybridization locations.



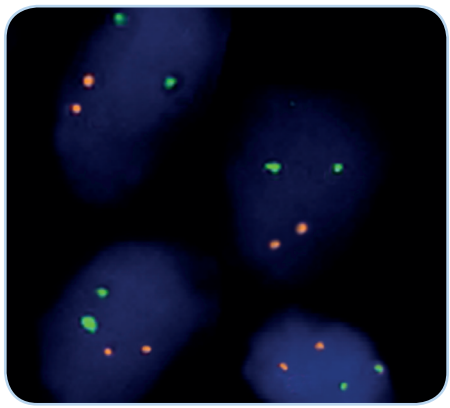
SPEC RUNX1 Probe map (not to scale).



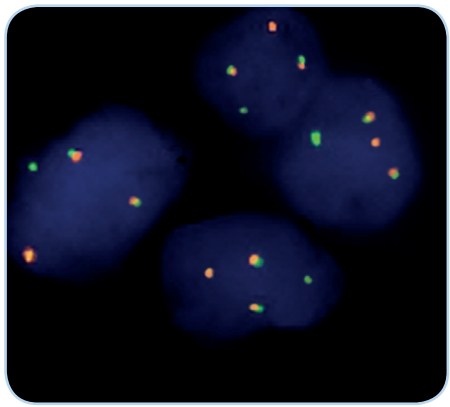
SPEC RUNX1T1 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. A reciprocal translocation involving two breakpoints splits the two signals and generates a fusion signal on each of the chromosomes involved. The chromosomal regions which are not translocated are indicated by the single orange and green signal, respectively.



SPEC RUNX1/RUNX1T1 Dual Color Dual Fusion Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Bone marrow biopsy section with translocation affecting the RUNX1/RUNX1T1 locus as indicated by one separate orange signal, one separate green signal, and two orange/green fusion signals.

Prod. No.	Product	Label	Tests* (Volume)
Z-2112-50	ZytoLight SPEC RUNX1/RUNX1T1 Dual Color Dual Fusion Probe CE IVD	●/●	5 (50 µl)
Z-2112-200	ZytoLight SPEC RUNX1/RUNX1T1 Dual Color Dual Fusion Probe CE IVD	●/●	20 (200µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC MYC Dual Color Break Apart Probe

CE IVD

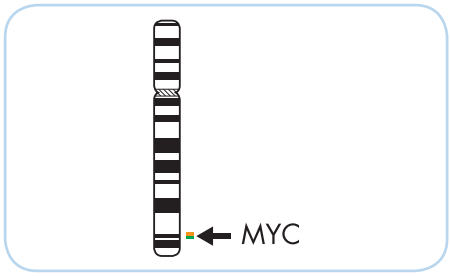
Background

The ZytoLight® SPEC MYC Dual Color Break Apart Probe (PL49) is intended to be used for the qualitative detection of translocations involving the human MYC gene at 8q24.21 in cytologic or formalin-fixed, paraffin-embedded specimens, such as diffuse large B-cell lymphoma (DLBCL) or Burkitt lymphoma (BL) , by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH Implementation Kits (Prod. No. Z-2028-5/-20, or Z-2099-20). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of DLBCL or BL and therapeutic measures should not be initiated based on the test result alone.

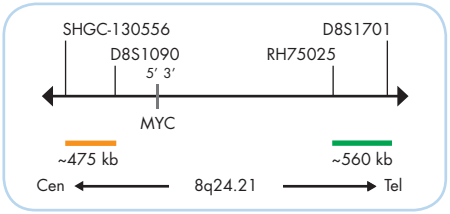
Probe Description

The ZytoLight® SPEC MYC Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 8q24.21** (chr8:130,373,051-130,930,673) distal to the MYC breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 8q24.21** (chr8:127,888,765-128,363,281) proximal to the MYC breakpoint region.
- Formamide based hybridization buffer



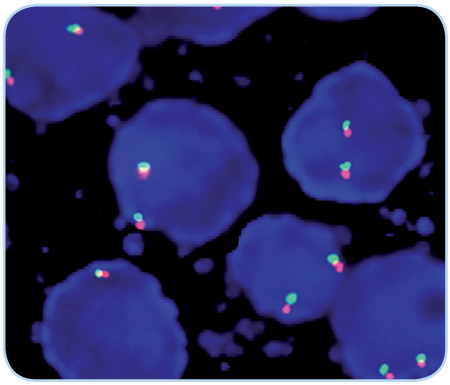
Ideogram of chromosome 8 indicating the hybridization locations.



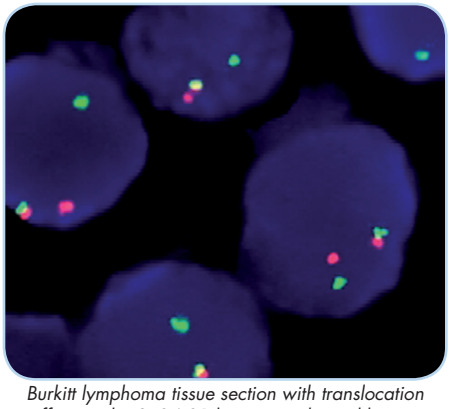
SPEC MYC Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 8q24.21 band two orange/green fusion signals are expected representing two normal (non-rearranged) 8q24.21 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 8q24.21 locus and one 8q24.21 locus affected by an 8q24.21 translocation.



SPEC MYC Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Burkitt lymphoma tissue section with translocation affecting the 8q24.21 locus as indicated by one non-rearranged orange/green fusion signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2090-50	ZytoLight SPEC MYC Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2090-200	ZytoLight SPEC MYC Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC MYC/CEN 8 Dual Color Probe

CE IVD

Background

The ZytoLight® SPEC MYC/CEN 8 Dual Color Probe (PL51) is intended to be used for the qualitative detection of amplifications involving the human MYC gene as well as the detection of chromosome 8 alpha satellites in formalin-fixed, paraffin-embedded specimens, such as breast cancer, by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

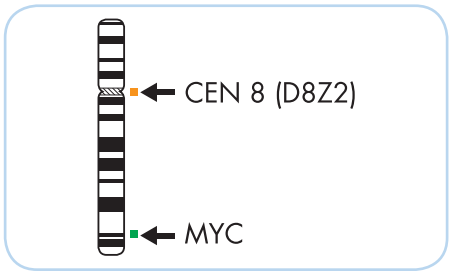
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of breast cancer and therapeutic measures should not be initiated based on the test result alone.

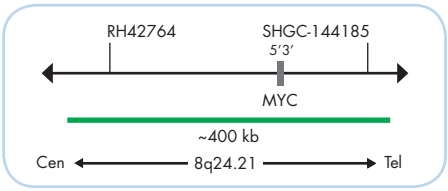
Probe Description

The ZytoLight® SPEC MYC/CEN 8 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 8q24.21** (chr8:128,487,995-128,887,929) harboring the MYC gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 8p11.1-q11.1 specific for the alpha satellite centromeric region D8Z2 of chromosome 8.
- Formamide based hybridization buffer



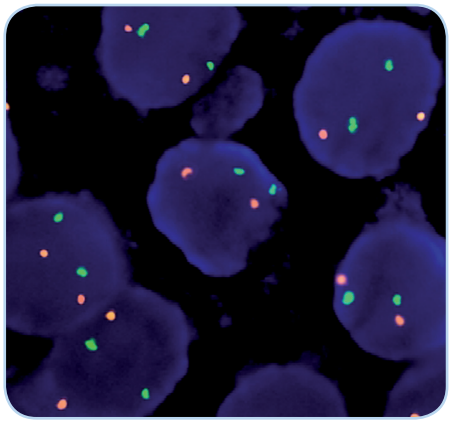
Ideogram of chromosome 8 indicating the hybridization locations.



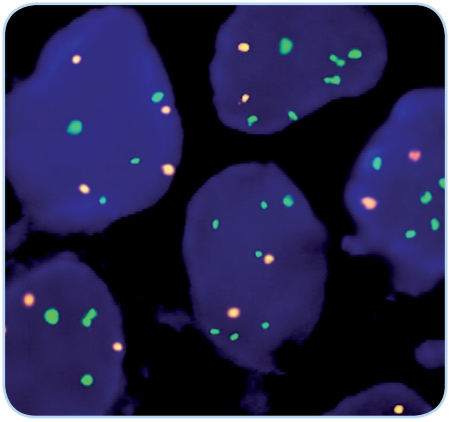
SPEC MYC Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the MYC gene locus, multiple copies of the green signal or green signal clusters will be observed.



SPEC MYC/CEN 8 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Breast cancer tissue section with interphase cells showing partly polysomy 8 and partly amplification of the MYC gene locus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2092-50	ZytoLight SPEC MYC/CEN 8 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2092-200	ZytoLight SPEC MYC/CEN 8 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC MYC/IGH Dual Color Dual Fusion Probe

CE IVD

Background

The ZytoLight® SPEC MYC/IGH Dual Color Dual Fusion Probe (PL62) is intended to be used for the qualitative detection of the translocation t(8;14)(q24.21;q32.3) involving the human IGH and MYC genes in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

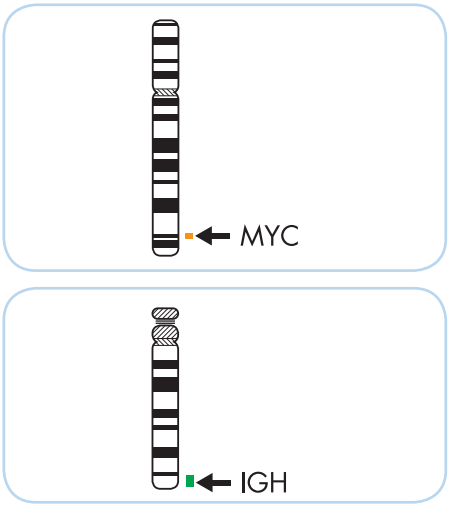
Probe Description

The ZytoLight SPEC MYC/IGH Dual Color Dual Fusion Probe is composed of:

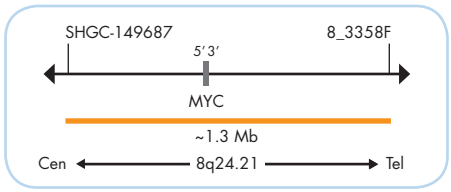
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~12 ng/µl), which target sequences mapping in 14q32.33** (chr14:105,462,169-106,995,000) harboring the IGH locus.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~6 ng/µl), which target sequences mapping in 8q24.21** (chr8:128,171,178-129,517,468) harboring the MYC gene region.
- Formamide based hybridization buffer

Results

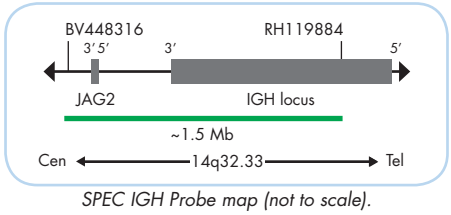
In a normal interphase nucleus, two orange and two green signals are expected. A reciprocal translocation involving two breakpoints splits the two signals and generates a fusion signal on each of the chromosomes involved. The chromosomal regions which are not translocated are indicated by the single orange respectively green signal.



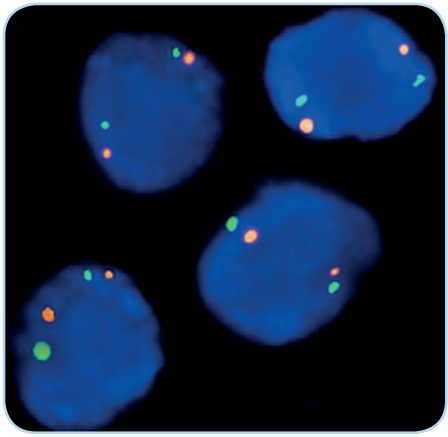
Ideograms of chromosomes 8 (above) and 14 (below) indicating the hybridization locations.



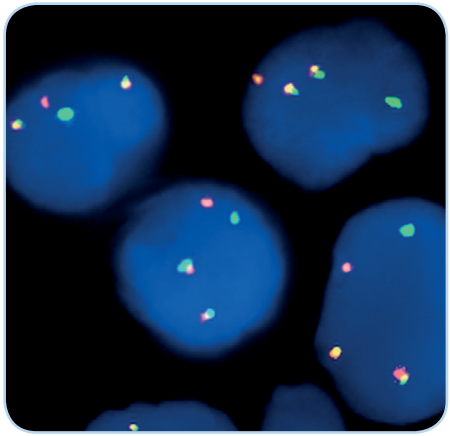
SPEC MYC Probe map (not to scale).



SPEC IGH Probe map (not to scale).



SPEC MYC/IGH Dual Color Dual Fusion Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Example of an aberrant signal pattern: Burkitt lymphoma tissue section with t(8;14) as indicated by one separate orange signal, one separate green signal and two orange/green fusion signals indicating the MYC/IGH translocation.

Prod. No.	Product	Label	Tests* (Volume)
Z-2105-50	ZytoLight SPEC MYC/IGH Dual Color Dual Fusion Probe CE IVD	●/●	5 (50 µl)
Z-2105-200	ZytoLight SPEC MYC/IGH Dual Color Dual Fusion Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC CD274,PDCD1LG2/CEN 9 Dual Color Probe

CE IVD

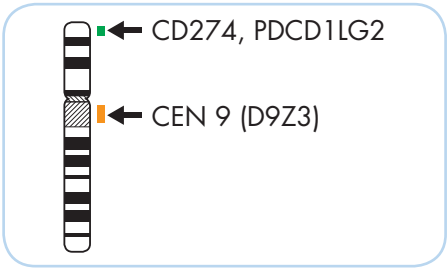
Background

The ZytoLight® SPEC CD274,PDCD1LG2/CEN 9 Dual Color Probe (PL138) is intended to be used for the qualitative detection of amplifications involving the human CD274,PDCD1LG2 gene cluster as well as the detection of the classical satellite III region of chromosome 9 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

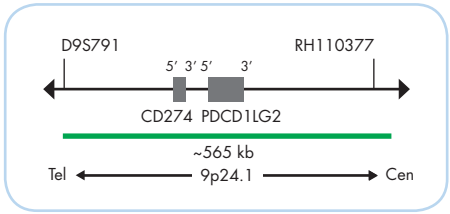
Probe Description

The ZytoLight® SPEC CD274,PDCD1LG2/CEN 9 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 9p24.1** (chr9:5,253,553-5,819,972) harboring the CD274, PDCD1LG2 gene cluster.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 9q12 specific for the classical satellite III centromeric region D9Z3 of chromosome 9.
- Formamide based hybridization buffer



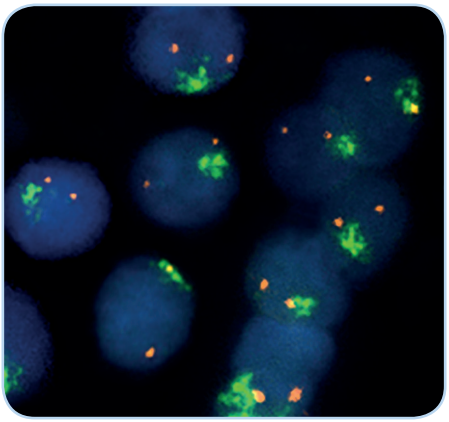
Ideogram of chromosome 9 indicating the hybridization locations.



SPEC CD274, PDCD1LG2 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the CD274,PDCD1LG2 gene cluster, multiple copies of the green signal or large green signal clusters will be observed.



Example of an aberrant signal pattern: Primary mediastinal large B-cell lymphoma tissue section with amplification of the CD274,PDCD1LG2 gene region as indicated by green signal clusters in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2179-50	ZytoLight SPEC CD274,PDCD1LG2/CEN 9 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2179-200	ZytoLight SPEC CD274,PDCD1LG2/CEN 9 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC JAK2 Dual Color Break Apart Probe

CE IVD

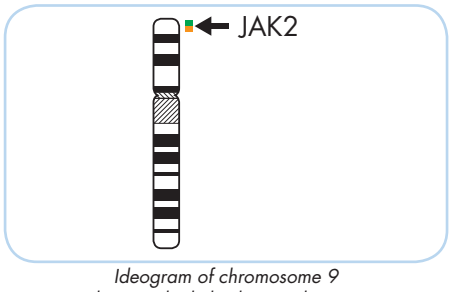
Background

The ZytoLight® SPEC JAK2 Dual Color Break Apart Probe (PL248) is intended to be used for the qualitative detection of translocations involving the human JAK2 gene at 9p24.1 in cytologic specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

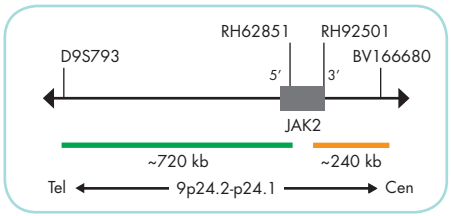
Probe Description

The ZytoLight SPEC JAK2 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 9p24.1-24.2** (chr9:4,311,843-5,031,620) distal to the JAK2 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 9p24.1** (chr9:5,088,700-5,328,239) proximal to the JAK2 breakpoint region.
- Formamide based hybridization buffer



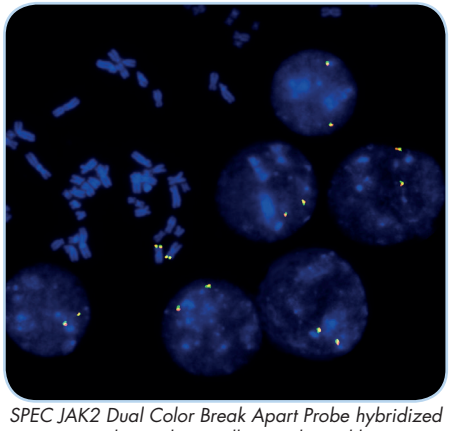
Ideogram of chromosome 9 indicating the hybridization locations.



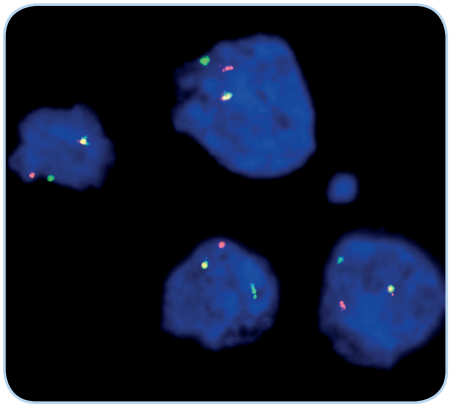
SPEC JAK2 Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 9p24.2-p24.1 bands, two orange/green fusion signals are expected representing two normal (non-rearranged) 9p24.2-p24.1 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 9p24.2-p24.1 locus and one 9p24.2-p24.1 locus affected by a translocation.



SPEC JAK2 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus and to metaphase chromosomes of a normal cell.



Example of an aberrant signal pattern: Bone marrow smear with translocation of the JAK2 gene as indicated by one non-rearranged orange/green fusion signal, one orange and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2294-50	ZytoLight SPEC JAK2 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC CDKN2A/CEN 9 Dual Color Probe

CE IVD

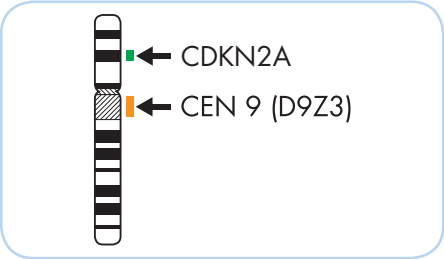
Background

The ZytoLight® SPEC CDKN2A/CEN 9 Dual Color Probe (PL22) is intended to be used for the qualitative detection of deletions involving the human CDKN2A gene as well as the detection of the classical satellite III region of chromosome 9 in cytologic or formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with ZytoLight® FISH Implementation Kits (Prod. No. Z-2028-5/-20, or Z-2099-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

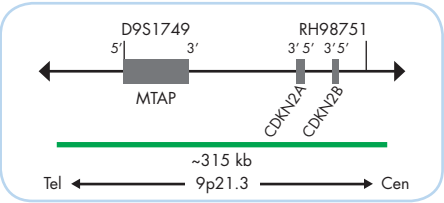
Probe Description

The ZytoLight® SPEC CDKN2A/CEN 9 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 9p21.3** (chr9:21,742,629-22,056,853) harboring the CDKN2A gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 9q12 specific for the classical satellite III region D9Z3 of chromosome 9.
- Formamide based hybridization buffer



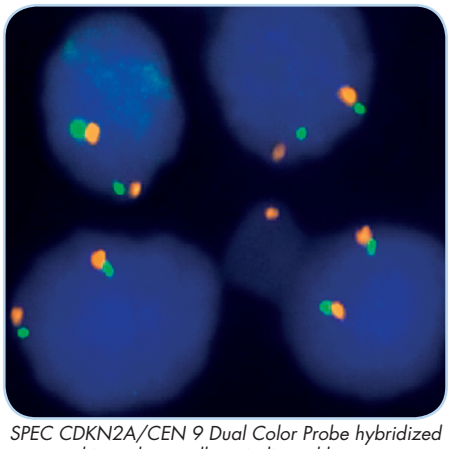
Ideogram of chromosome 9 indicating the hybridization locations.



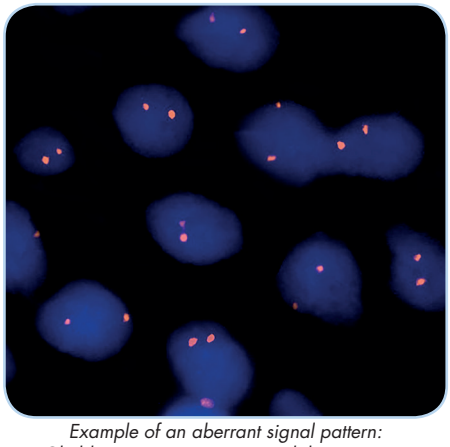
SPEC CDKN2A Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletion of the CDKN2A gene locus, a reduced number of green signals will be observed. Deletions affecting only parts of the CDKN2A gene might result in a normal signal pattern with green signals of reduced size.



SPEC CDKN2A/CEN 9 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Example of an aberrant signal pattern: Glioblastoma tissue section with homozygous deletion of the CDKN2A gene as indicated by the loss of both green signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2063-50	ZytoLight SPEC CDKN2A/CEN 9 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2063-200	ZytoLight SPEC CDKN2A/CEN 9 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

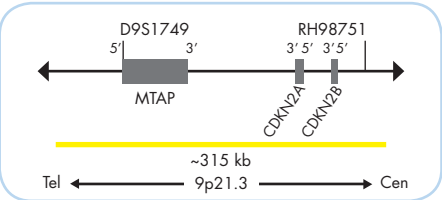
** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC CDKN2A/CEN 3/7/17 Quadruple Color Probe

CE IVD

Background

The ZytoLight® SPEC CDKN2A/CEN 3/7/17 Quadruple Color Probe (PL40) is intended to be used for the qualitative detection of the human CDKN2A gene as well as alpha-satellites of chromosomes 3, 7, and 17 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

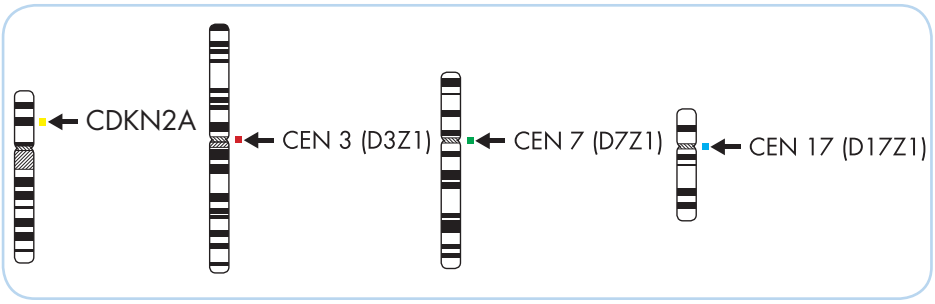


SPEC CDKN2A Probe map (not to scale).

Probe Description

The ZytoLight® SPEC CDKN2A/CEN 3/7/17 Quadruple Color Probe is composed of:

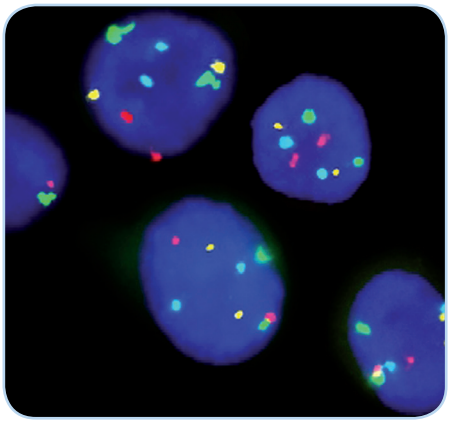
- ZyGold (excitation 532 nm and emission 553 nm) labeled polynucleotides (~5.5 ng/µl), which target sequences mapping in 9p21.3** (chr9:21,742,629-22,056,853) harboring the CDKN2A gene region.
- ZyRed (excitation 580 nm/emission 599 nm) labeled polynucleotides (~0.5 ng/µl), which target sequences mapping in 3p11.1-q11.1 specific for the alpha satellite centromeric region D3Z1 of chromosome 3.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 7p11.1-q11.1 specific for the alpha satellite centromeric region D7Z1 of chromosome 7.
- ZyBlue (excitation 418 nm/emission 467 nm) labeled polynucleotides (~12 ng/µl), which target sequences mapping in 17p11.1-q11.1 specific for the alpha satellite centromeric region D17Z1 of chromosome 17.
- Formamide based hybridization buffer



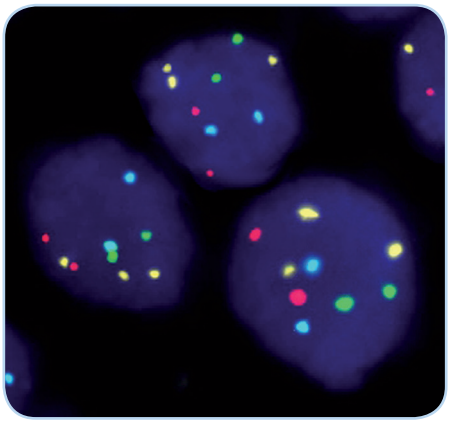
Ideograms of chromosomes 9, 3, 7, and 17 indicating the hybridization locations.

Results

In a normal interphase nucleus, two gold, two red, two green, and two blue signals are expected. In a cell with deletion of the CDKN2A gene locus, a reduced number of gold signals will be observed. In cells with aneusomy of chromosomes 3, 7, or 17 more or less signals of the respective color will be visible.



Normal cytological specimen hybridized with SPEC CDKN2A/CEN 3/7/17 Quadruple Color Probe as indicated by two gold (CDKN2A), two red (CEN 3), two green (CEN 7), and two blue (CEN 17) signals.



Example of an aberrant signal pattern: SPEC CDKN2A/CEN 3/7/17 Quadruple Color Probe hybridized to tumor cells showing a trisomy 9 as indicated by three CDKN2A signals (gold) in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2081-50	ZytoLight SPEC CDKN2A/CEN 3/7/17 Quadruple Color Probe CE IVD	/●/●/●	5 (50 µl)
Z-2081-200	ZytoLight SPEC CDKN2A/CEN 3/7/17 Quadruple Color Probe CE IVD	/●/●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC PAX5 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC PAX5 Dual Color Break Apart Probe is designed to detect rearrangements involving the chromosomal region 9p13.2 harboring the PAX5 (paired box 5, a.k.a. BSAP) gene.

The transcription factor PAX5 activates crucial genes for B-cell lineage differentiation and represses genes that play an important role in other hematopoietic lineages. PAX5 is also implicated in human B-cell malignancies, as it is deregulated by chromosomal translocations in a subset of acute lymphoblastic leukemias (ALL). B-progenitor ALL (B-ALL), a common pediatric malignancy, is characterized by the participation of PAX5 in specific chromosomal rearrangements that generate novel fusion proteins. All PAX5 fusion proteins contain the PAX5 DNA-binding domain and thus are predicted to retain the ability to bind to PAX5 transcriptional targets, but no longer provide normal transcriptional regulatory functions. The fusion proteins contribute to B-ALL formation by competitively inhibiting the transcriptional activation of wildtype PAX5.

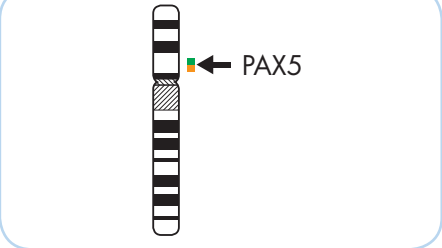
PAX5 rearranged ALL patients were shown to respond well to treatment with prednisone. Hence, the identification of PAX5 rearrangements by FISH may be of therapeutic significance in ALL.

References
Busslinger M, et al. (1996) Proc Natl Acad Sci U S A 93: 6129-34.
Cobaleda C, et al. (2007) Nat Immunol 8: 463-70.
Coyaud E, et al. (2010) Blood 115: 3089-97.
Mullighan CG, et al. (2007) Nature 446: 758-64.
Nebral K, et al. (2009) Leukemia 23: 134-43.
Offit K, et al. (1992) Blood 80: 2594-9.

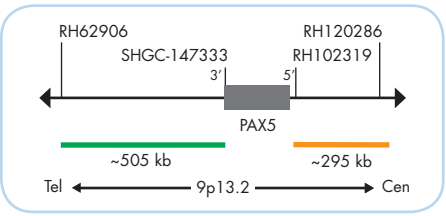
Probe Description

The ZytoLight® SPEC PAX5 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 9p13.2** (chr9:36,331,787-36,837,502) distal to the PAX5 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 9p13.2** (chr9:37,043,219-37,336,413) proximal to the PAX5 breakpoint region.
- Formamide based hybridization buffer



Ideogram of chromosome 9 indicating the hybridization locations.

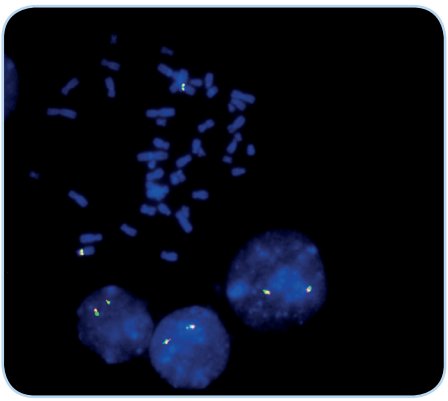


SPEC PAX5 Probe map (not to scale).

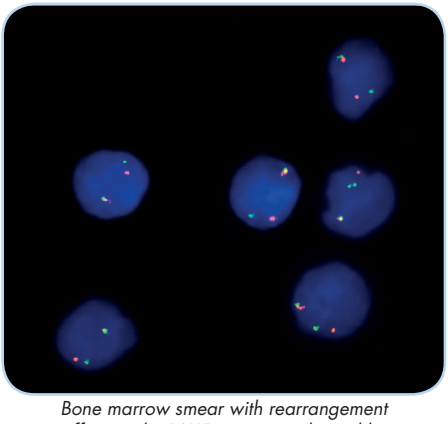
Results

In an interphase nucleus of a normal cell lacking a translocation involving the 9p13.2 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 9p13.2 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 9p13.2 locus and one 9p13.2 locus affected by a translocation or inversion.

Isolated orange signals are the result of deletions distal to the PAX5 breakpoint region or are due to unbalanced translocations affecting this chromosomal region.



SPEC PAX5 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus and to metaphase chromosomes of a normal cell.



Bone marrow smear with rearrangement affecting the PAX5 gene as indicated by one non-rearranged orange/green fusion signal, one orange and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2300-50	ZytoLight SPEC PAX5 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC NTRK2 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC NTRK2 Dual Color Break Apart Probe (PL163) is intended to be used for the qualitative detection of translocations involving the human NTRK2 gene at 9q21.33 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

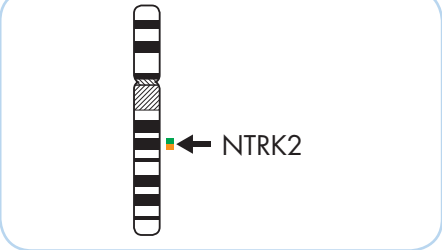
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

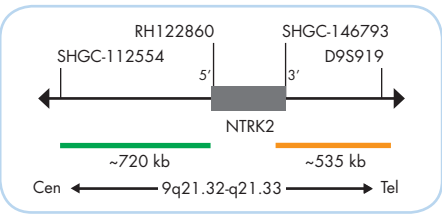
Probe Description

The ZytoLight® SPEC NTRK2 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 9q21.32-q21.33** (chr9:86,569,621-87,287,312) proximal to the NTRK2 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 9q21.33** (chr9:87,589,037-88,124,082) distal to the NTRK2 breakpoint region.
- Formamide based hybridization buffer



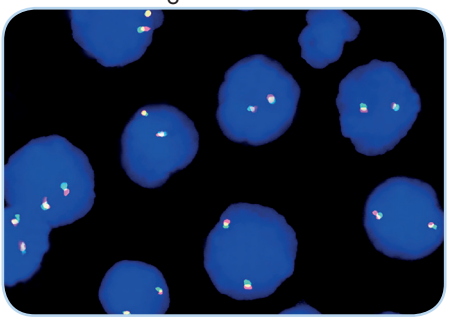
Ideogram of chromosome 9 indicating the hybridization locations.



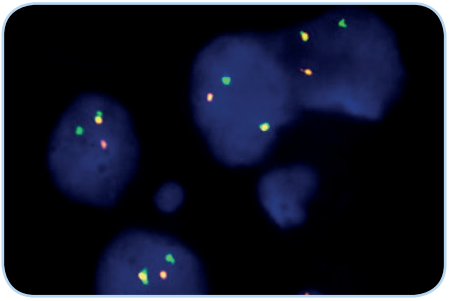
SPEC NTRK2 Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 9q21.32-q21.33 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 9q21.32-q21.33 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 9q21.32-q21.33 locus and one 9q21.32-q21.33 locus affected by a translocation. Isolated orange signals are the result of deletions proximal to the NTRK2 breakpoint region or are due to unbalanced translocations affecting this chromosomal region.



SPEC NTRK2 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: Peritoneal carcinoma tissue section with rearrangement of the NTRK2 gene as indicated by one non-rearranged orange/green fusion signal, one orange, and one separate green signal.

Kindly provided by the Institute of Pathology, University Medical Center Göttingen, Germany.

Prod. No.	Product	Label	Tests* (Volume)
Z-2205-50	ZytoLight SPEC NTRK2 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2205-200	ZytoLight SPEC NTRK2 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC NR4A3 Dual Color Break Apart Probe

CE IVD

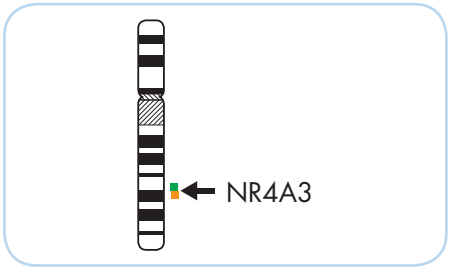
Background

The ZytoLight® SPEC NR4A3 Dual Color Break Apart Probe (PL102) is intended to be used for the qualitative detection of translocations involving the human NR4A3 gene at 9q22.33-q31.1 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

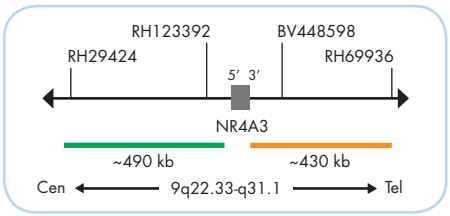
Probe Description

The ZytoLight® SPEC NR4A3 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 9q22.33** (chr9:102,070,916-102,561,593) proximal to the NR4A3 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 9q31.1** (chr9:102,636,487-103,065,504) distal to the NR4A3 breakpoint region.
- Formamide based hybridization buffer



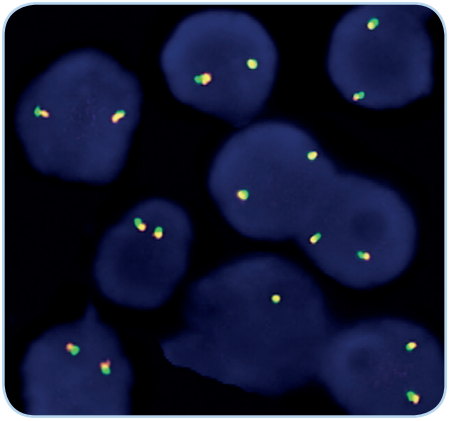
Ideogram of chromosome 9 indicating the hybridization locations.



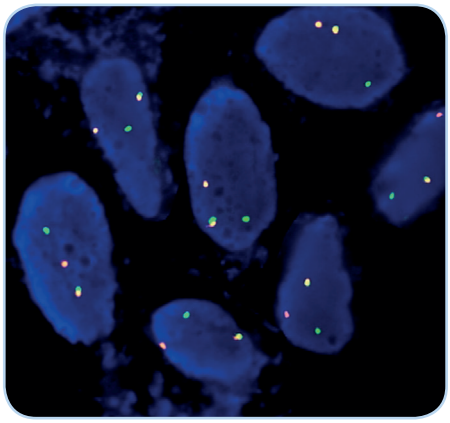
SPEC NR4A3 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 9q22.33-q31.1 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 9q22.33-q31.1 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 9q22.33-q31.1 locus and one 9q22.33-q31.1 locus affected by a translocation.



SPEC NR3A3 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signal per nucleus.



Example of an aberrant signal pattern: Extraskeletal myxoid chondrosarcoma tissue section with translocation affecting the 9q22.33-q31.1 locus as indicated by one orange/green fusion (non-rearranged) signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2145-50	ZytoLight SPEC NR4A3 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC ABL1 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC ABL1 Dual Color Break Apart Probe (PL157) is intended to be used for the qualitative detection of translocations involving the human ABL1 gene at 9q34.12 in cytologic specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20).

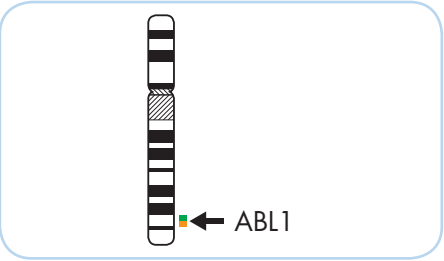
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

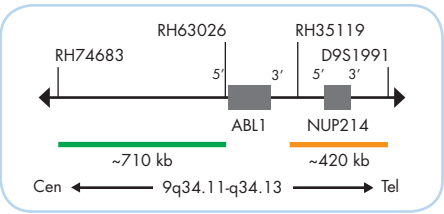
Probe Description

The ZytoLight® SPEC ABL1 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 9q34.11-q34.12** (chr9:132,872,357-133,580,236) proximal to the ABL1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 9q34.12-q34.13** (chr9:133,851,960-134,273,097) distal to the ABL1 breakpoint region.
- Formamide based hybridization buffer



Ideogram of chromosome 9 indicating the hybridization locations.

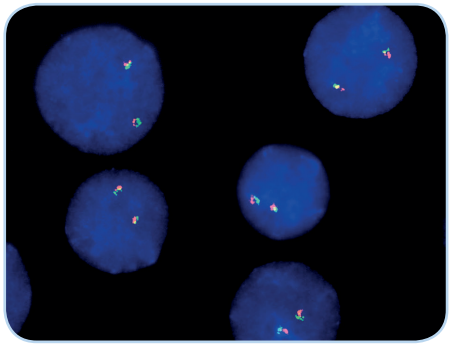


SPEC ABL1 Probe map (not to scale).

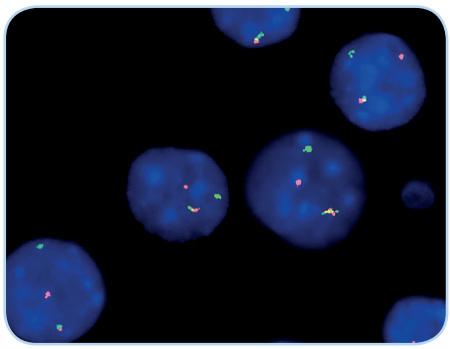
Results

In an interphase nucleus of a normal cell lacking a translocation involving the 9q34.11-q34.13 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 9q34.11-q34.13 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 9q34.11-q34.13 locus and one 9q34.11-q34.13 locus affected by a translocation.

Amplifications of the NUP214-ABL1 fusion genes will result in multiple orange signals or orange signal clusters.



SPEC ABL1 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: Bone marrow smear with translocation affecting the 9q34.11-q34.13 locus as indicated by one non-rearranged orange/green fusion signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2199-50	ZytoLight SPEC ABL1 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC BCR/ABL1 Dual Color Dual Fusion Probe

CE IVD

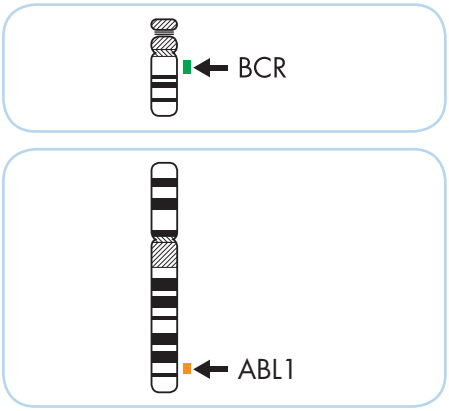
Background

The ZytoLight® SPEC BCR/ABL1 Dual Color Dual Fusion Probe (PL68) is intended to be used for the qualitative detection of the translocation t(9;22)(q34.1;q11.2) involving the human BCR and ABL1 genes in cytologic specimens, such as chronic myeloid leukemia (CML), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of CML and therapeutic measures should not be initiated based on the test result alone.

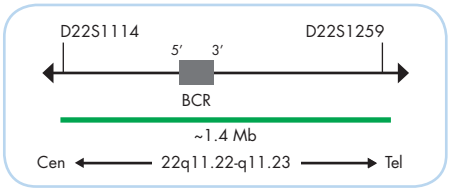
Probe Description

The ZytoLight® SPEC BCR/ABL1 Dual Color Dual Fusion Probe is composed of:

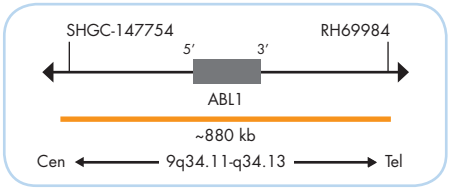
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~12 ng/µl), which target sequences mapping in 22q11.22-q11.23** (chr22:23,000,029-24,431,064) harboring the BCR gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~6 ng/µl), which target sequences mapping in 9q34.11-q34.13** (chr9:133,223,081-134,103,849) harboring the ABL1 gene region.
- Formamide based hybridization buffer



Ideograms of chromosomes 22 (above) and 9 (below) indicating the hybridization locations.



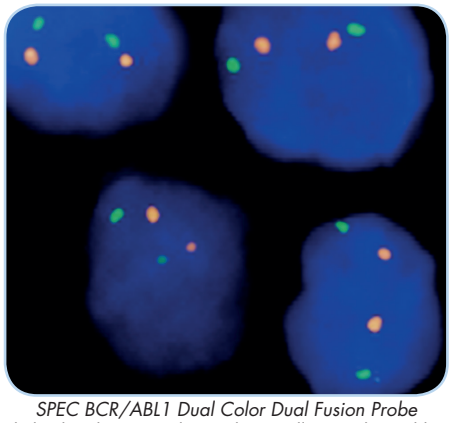
SPEC BCR Probe map (not to scale).



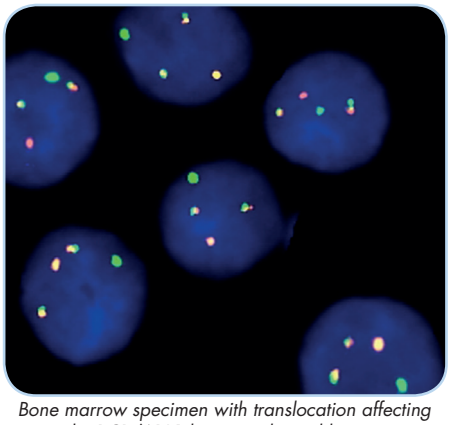
SPEC ABL1 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. A reciprocal translocation involving two breakpoints splits the two signals and generates a fusion signal on each of the chromosomes involved. The chromosomal regions which are not translocated are indicated by the single orange respectively green signal.



SPEC BCR/ABL1 Dual Color Dual Fusion Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Bone marrow specimen with translocation affecting the BCR/ABL1 loci as indicated by one separate orange signal, one separate green signal and two orange/green fusion signals.

Prod. No.	Product	Label	Tests* (Volume)
Z-2111-50	ZytoLight SPEC BCR/ABL1 Dual Color Dual Fusion Probe CE IVD	●/●	5 (50 µl)
Z-2111-200	ZytoLight SPEC BCR/ABL1 Dual Color Dual Fusion Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC NUP214 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC NUP214 Dual Color Break Apart Probe is designed for the detection of translocations involving the chromosomal region 9q34.13 harboring the NUP214 (nucleoporin 214, a.k.a. CAN, CAIN) gene.

Rearrangements of the NUP214 gene have been implicated in the pathogenesis of several types of hematologic malignancies, including T-cell acute lymphoblastic leukemia (T-ALL), acute myeloid leukemia (AML), and also myelodysplastic syndrome (MDS). Several fusion partners have been identified for NUP214. The most common are the DEK, SET, and the tyrosine kinase encoding gene ABL1.

The translocation t(6;9)(p22.3;q34.1) results in a DEK-NUP214 fusion and defines a specific subcategory of AML according to the World Health Organization 2008 classification.

The SET-NUP214 fusion is associated with T-ALL, less frequently with AML, and acute undifferentiated leukemia and can result from either a translocation or a deletion.

NUP214-ABL1 fusions are exclusively associated with T-ALL patients. These patients may be considered for a targeted therapy with specific tyrosine kinase inhibitors. The fusion is often located on amplified episomes and is cytogenetically cryptic but can be detected by FISH.

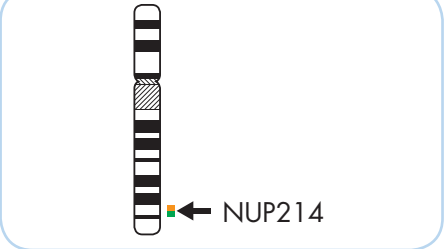
Malignancies with NUP214 rearrangements are associated with a poor prognosis indicating the usefulness of NUP214 also as a prognostic biomarker.

References
Fahrenkrog B (2014) New J Sci 2014: 468306.
Takeda A & Yaseen NR (2014) Semin Cancer Biol 27: 3-10.
von Lindern M, et al. (1992) Baillieres Clin Haematol 5: 857-79.
Zhou MH & Yang QM (2014) Oncol Lett 8: 959-62.

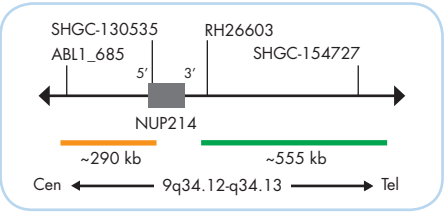
Probe Description

The ZytoLight® SPEC NUP214 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 9q34.13** (chr9:134,153,663-134,706,700) distal to the NUP214 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 9q34.12-q34.13** (chr9:133,739,333-134,028,546) proximal to the NUP214 breakpoint region.
- Formamid based hybridization buffer



Ideogram of chromosome 9 indicating the hybridization locations.

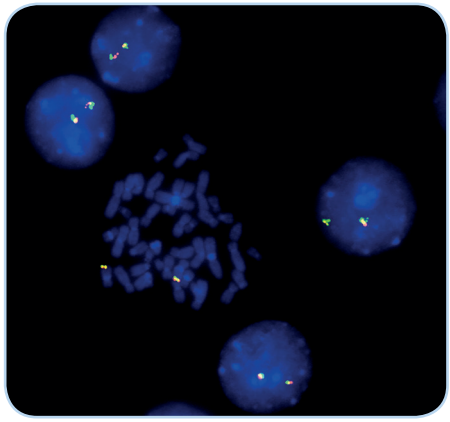


SPEC NUP214 Probe map (not to scale).

Results

In an interphase nucleus lacking a rearrangement involving the 9q34.12-q34.13 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 9q34.12-q34.13 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 9q34.12-q34.13 locus and one 9q34.12-q34.13 locus affected by a translocation.

Isolated green signals are the result of deletions proximal to the NUP214 breakpoint region.



SPEC NUP214 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus and to metaphase chromosomes of a normal cell.

Prod. No.	Product	Label	Tests* (Volume)
Z-2265-50	ZytoLight SPEC NUP214 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC KIF5B Dual Color Break Apart Probe

RUO

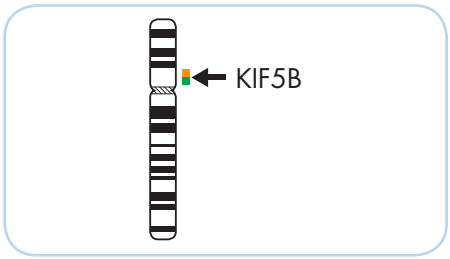
Background

The ZytoLight® SPEC KIF5B Dual Color Break Apart Probe (PL88) is intended to be used for the qualitative detection of translocations involving the human KIF5B gene at 10p11.22 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

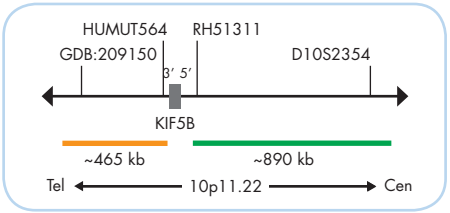
Probe Description

The ZytoLight® SPEC KIF5B Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 10p11.22** (chr10:32,400,431-33,289,946) proximal to the KIF5B breakpoint region.
- ZyOrange (excitation 547 nm/ emission at 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 10p11.22** (chr10:31,820,824-32,288,200) distal to the KIF5B breakpoint region.
- Formamide based hybridization buffer



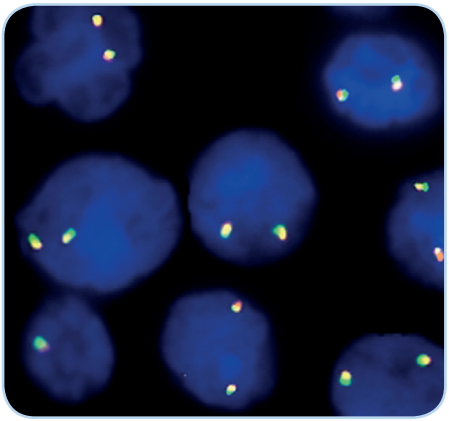
Ideogram of chromosome 10 indicating the hybridization locations.



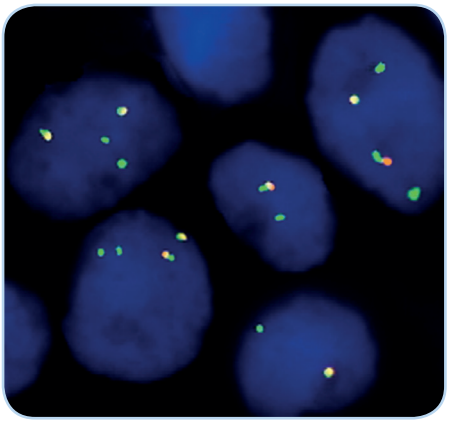
SPEC KIF5B Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 10p11.22 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 10p11.22 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 10p11.22 locus and one 10p11.22 locus affected by a translocation.



SPEC KIF5B Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: NSCLC tissue section with tetrasomy of chromosome 10 in some cells and an unbalanced translocation affecting KIF5B as indicated by one or two extra green signals.

Prod. No.	Product	Label	Tests* (Volume)
Z-2131-50	ZytoLight SPEC KIF5B Dual Color Break Apart Probe RUO	●/●	5 (50 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoLight® SPEC RET Dual Color Break Apart Probe

CE IVD

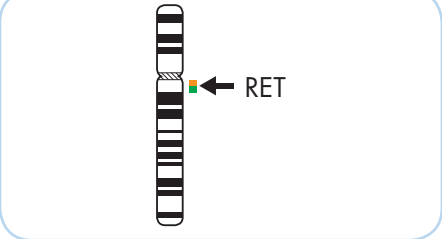
Background

The ZytoLight® SPEC RET Dual Color Break Apart Probe (PL105) is intended to be used for the qualitative detection of translocations involving the human RET gene at 10q11.21 in formalin-fixed, paraffin-embedded specimens, such as non-small cell lung cancer (NSCLC) or papillary thyroid carcinoma (PTC), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of NSCLC or PTC and therapeutic measures should not be initiated based on the test result alone.

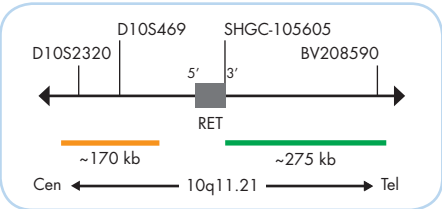
Probe Description

The ZytoLight® SPEC RET Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 10q11.21** (chr10:43,626,274-43,902,346) distal to the RET breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 10q11.21** (chr10:43,340,888-43,510,171) proximal to the RET breakpoint region.
- Formamide based hybridization buffer



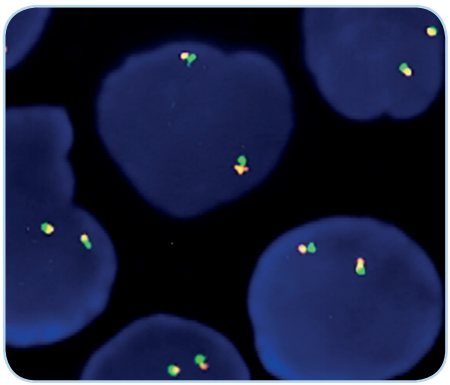
Ideogram of chromosome 10 indicating the hybridization locations.



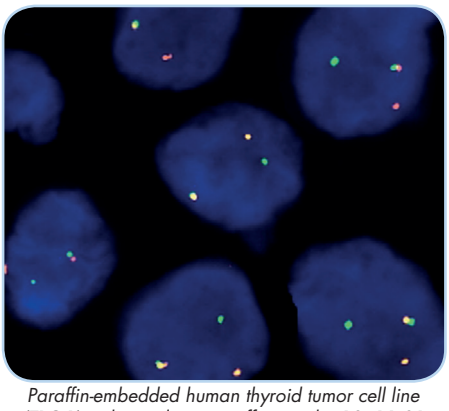
SPEC RET Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 10q11.21 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 10q11.21 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 10q11.21 locus and one 10q11.21 locus affected by a translocation or inversion. Isolated green signals are the result of deletions proximal to the RET breakpoint region.



SPEC RET Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Paraffin-embedded human thyroid tumor cell line (TPC-1) with translocation affecting the 10q11.21 locus as indicated by one orange/green fusion (non-rearranged) signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2148-50	ZytoLight SPEC RET Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2148-200	ZytoLight SPEC RET Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC PTEN/CEN 10 Dual Color Probe

CE IVD

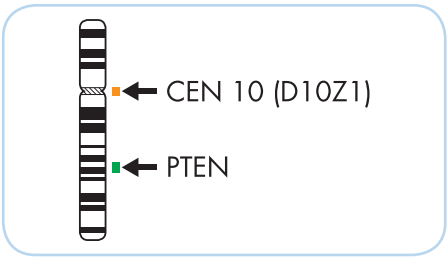
Background

The ZytoLight® SPEC PTEN/CEN 10 Dual Color Probe (PL37) is intended to be used for the qualitative detection of deletions involving the human PTEN gene as well as the detection of chromosome 10 alpha satellites in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

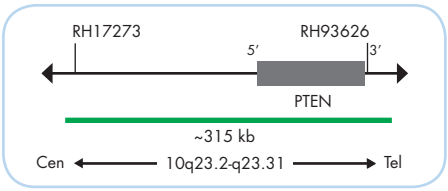
Probe Description

The ZytoLight® SPEC PTEN/CEN 10 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 10q23.2-q23.31** (chr10:89,440,649-89,755,790) harboring the PTEN gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 10p11.1-q11.1 specific for the alpha satellite centromeric region D10Z1 of chromosome 10.
- Formamide based hybridization buffer



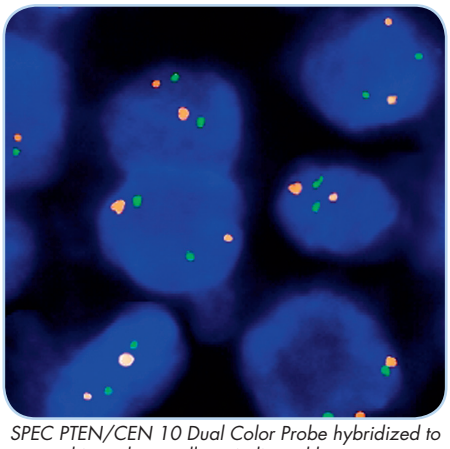
Ideogram of chromosome 10 indicating the hybridization locations.



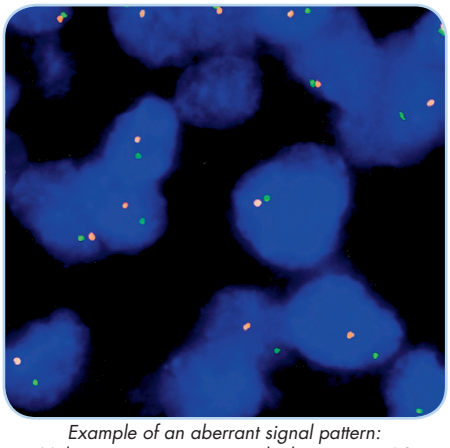
SPEC PTEN Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletions of the PTEN gene locus, a reduced number of green signals will be observed. Deletions affecting only parts of the PTEN gene might result in normal signal pattern with green signals of reduced size.



SPEC PTEN/CEN 10 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Example of an aberrant signal pattern: Melanoma tissue section with chromosome 10 monosomy as indicated by one orange and one green signal in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2078-50	ZytoLight SPEC PTEN/CEN 10 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2078-200	ZytoLight SPEC PTEN/CEN 10 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC FGFR2 Dual Color Break Apart Probe

CE IVD

Background

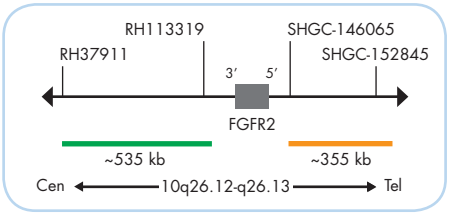
The ZytoLight® SPEC FGFR2 Dual Color Break Apart Probe (PL125) is intended to be used for the qualitative detection of translocations involving the human FGFR2 gene at 10q26.13 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

Probe Description

The ZytoLight® SPEC FGFR2 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 10q26.12-q26.13** (chr10:122,632,462-123,166,030) proximal to the FGFR2 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 10q26.13** (chr10:123,436,230-123,791,279) distal to the FGFR2 breakpoint region.
- Formamide based hybridization buffer

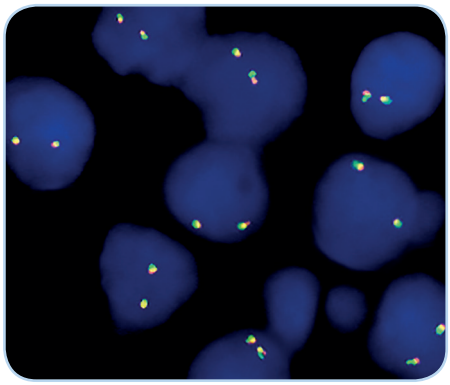
Ideogram of chromosome 10 indicating the hybridization locations.



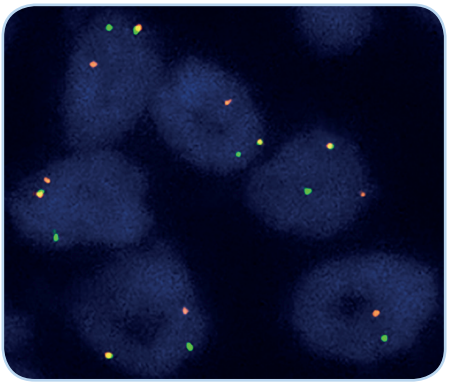
SPEC FGFR2 Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 10q26.13 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 10q26.13 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 10q26.13 locus and one 10q26.13 locus affected by a translocation.



SPEC FGFR2 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: Cholangiocellular adenocarcinoma tissue section with translocation of the FGFR2 gene as indicated by one non-rearranged orange/green fusion signal, one orange, and one separate green signal.

Kindly provided by Prof. Dr. Büttner, Cologne, Germany.

Prod. No.	Product	Label	Tests* (Volume)
Z-2169-50	ZytoLight SPEC FGFR2 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2169-200	ZytoLight SPEC FGFR2 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC FGFR2/CEN 10 Dual Color Probe

CE IVD

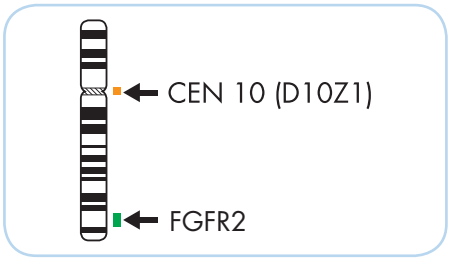
Background

The ZytoLight® SPEC FGFR2/CEN 10 Dual Color Probe (PL79) is intended to be used for the qualitative detection of amplifications involving the human FGFR2 gene as well as chromosome 10 alpha satellites in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel. The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

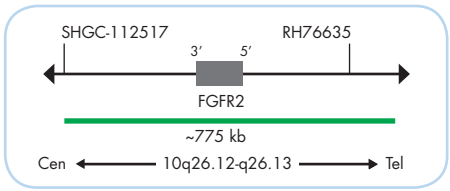
Probe Description

The ZytoLight® SPEC FGFR2/CEN 10 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 10q26.12-q26.13** (chr10:122,908,224-123,682,373) harboring the FGFR2 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 10p11.1-q11.1 specific for the alpha satellite centromeric region D10Z1 of chromosome 10.
- Formamide based hybridization buffer



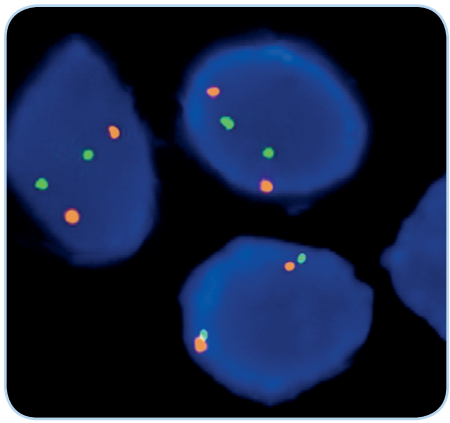
Ideogram of chromosome 10 indicating the hybridization locations.



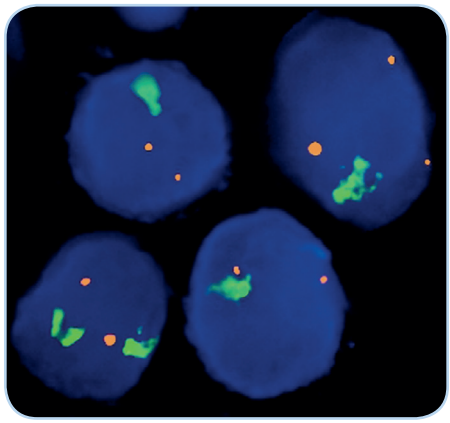
SPEC FGFR2 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. Nuclei with amplification of the FGFR2 gene locus 10q26.12-q26.13, or aneuploidy of chromosome 10 will show multiple copies of the green signal or large green signal clusters.



SPEC FGFR2/CEN 10 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Example of an aberrant signal pattern: Breast cancer tissue section with amplification of the FGFR2 gene as indicated by green signal clusters in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2122-200	ZytoLight SPEC FGFR2/CEN 10 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC CARS Dual Color Break Apart Probe

RUO

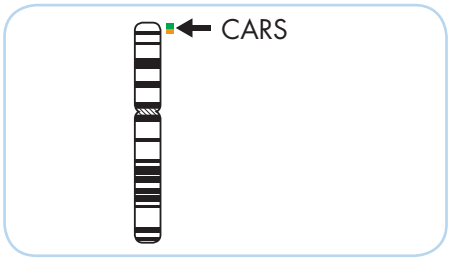
Background

The ZytoLight® SPEC CARS Dual Color Break Apart Probe (PL94) is intended to be used for the qualitative detection of translocations involving the human CARS gene at 11p15.4 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

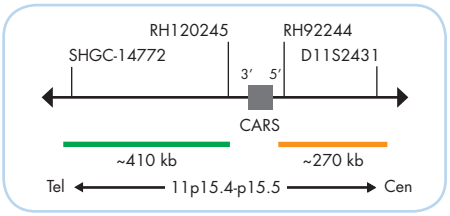
Probe Description

The ZytoLight® SPEC CARS Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 11p15.4-p15.5** (chr11:2,565,981-2,975,775) distal to the CARS breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 11p15.4** (chr11:3,092,154-3,363,120) proximal to the CARS breakpoint region.
- Formamide based hybridization buffer



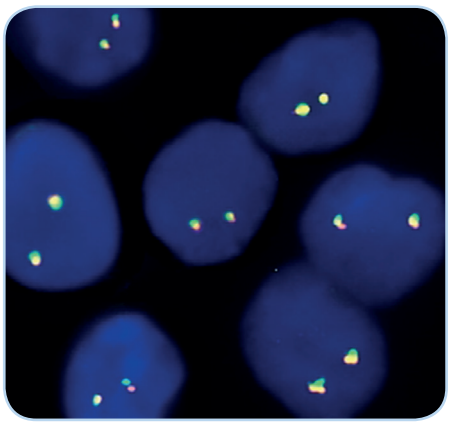
Ideogram of chromosome 11 indicating the hybridization locations.



SPEC CARS Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 11p15.4-p15.5 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 11p15.4-p15.5 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 11p15.4-p15.5 locus and one 11p15.4-p15.5 locus affected by a translocation.



SPEC CARS Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2137-50	ZytoLight SPEC CARS Dual Color Break Apart Probe RUO	●/●	5 (50 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoLight® SPEC NUP98 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC NUP98 Dual Color Break Apart Probe (PL223) is intended to be used for the qualitative detection of translocations involving the human NUP98 gene at 11p15.4 in cytologic specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20).

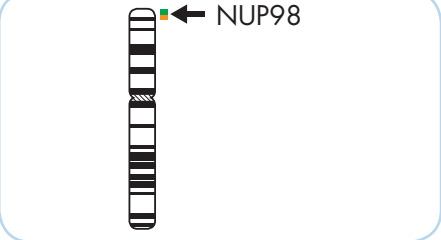
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

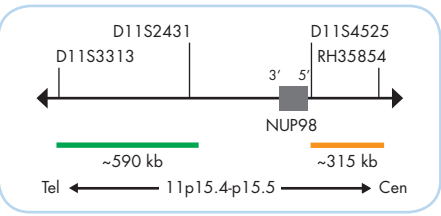
Probe Description

The ZytoLight® SPEC NUP98 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 11p15.4-p15.5** (chr11:2,773,748-3,363,120) distal to the NUP98 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 11p15.4** (chr11:3,829,054-4,142,792) proximal to the NUP98 breakpoint region.
- Formamide based hybridization buffer



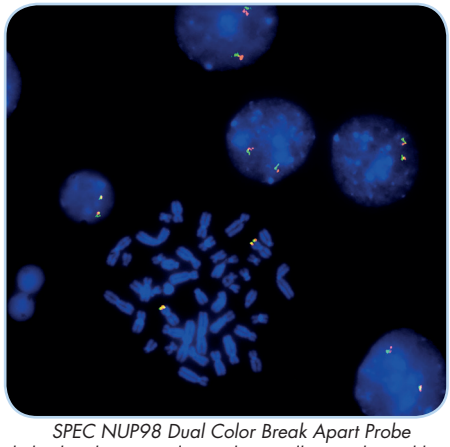
Ideogram of chromosome 11 indicating the hybridization locations.



SPEC NUP98 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 11p15.4-p15.5 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 11p15.4-p15.5 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 11p15.4-p15.5 locus and one 11p15.4-p15.5 locus affected by a translocation or inversion.



SPEC NUP98 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus and to metaphase chromosomes of a normal cell.

Prod. No.	Product	Label	Tests* (Volume)
Z-2266-50	ZytoLight SPEC NUP98 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC WT1 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC WT1 Dual Color Break Apart Probe is designed to detect translocations involving the chromosomal region 11p13 harboring the WT1 (Wilms tumor 1) gene.

The WT1 gene is located on 11p13 and encodes a zinc finger DNA-binding protein that acts as a transcriptional activator or repressor depending on the cellular or chromosomal context. Inactivating mutations in the tumor suppressor gene WT1 have been identified in patients with Wilms' tumor and in a subset of sporadic cancers.

However, in desmoblastic small round cell tumors (DSRCT) recurrent translocations affecting the WT1 gene have been found. DSRCT is a highly aggressive mesenchymal tumor that primarily affects male adolescents and young adults. The translocation t(11;22)(p13;q12.2) is detectable in virtually all DSRCT tested and results in the fusion of the potent transcriptional activator domain of the EWSR1 gene and the DNA-binding zinc-finger domains of the WT1 gene. The EWSR1-WT1 chimeric protein acts as an oncogenic transcription factor as evidenced by its ability to transform cells *in vitro*.

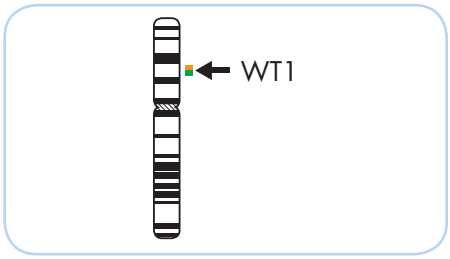
While EWSR1 rearrangements are present in about 90% of DSRCT but are also frequently found in other small round blue cell neoplasms as e.g. Ewing sarcoma, WT1 translocations are exclusively found in DSRCT. Hence, detection of the t(11;22) by Fluorescence *in situ* Hybridization represents a valuable tool for the differential diagnosis of DSRCT.

References
Gerald WL, et al. (1995) Proc Natl Acad Sci U S A 92: 1028-32.
Kim J, et al. (1998) Oncogene 16: 1973-9.
Ladanyi M & Gerald W (1994) Cancer Res 54: 2837-40.
Wang ZY, et al. (1993) J Biol Chem 268: 9172-5.

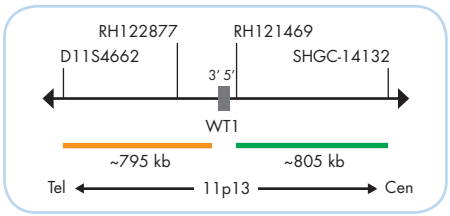
Probe Description

The ZytoLight® SPEC WT1 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 11p13** (chr11:32,492,523-33,297,615) proximal to the WT1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 11p13** (chr11:31,590,767-32,388,208) distal to the WT1 breakpoint region.
- Formamide based hybridization buffer



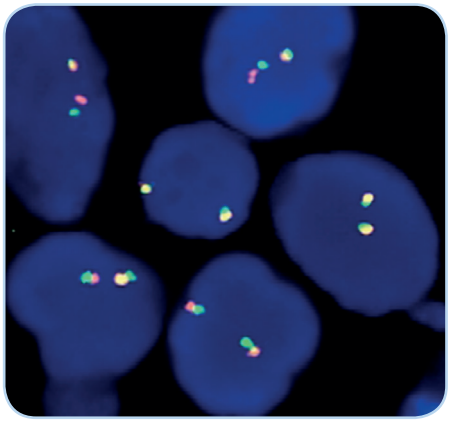
Ideogram of chromosome 11 indicating the hybridization locations.



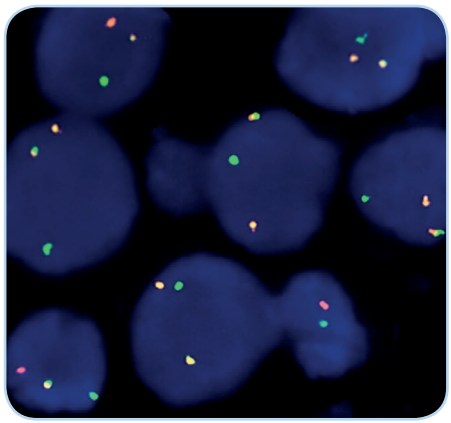
SPEC WT1 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 11p13 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 11p13 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 11p13 locus and one 11p13 locus affected by a translocation.



SPEC WT1 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Desmoblastic small round cell tumor tissue section with translocation affecting the 11p13 locus as indicated by one non-rearranged orange/green fusion signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2142-50	ZytoLight SPEC WT1 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC SPI1 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC SPI1 Dual Color Break Apart Probe is designed to detect rearrangements involving the chromosomal region 11p11.2 harboring the SPI1 (Spi-1 proto-oncogene, a.k.a. PU.1, SPI-A) gene.

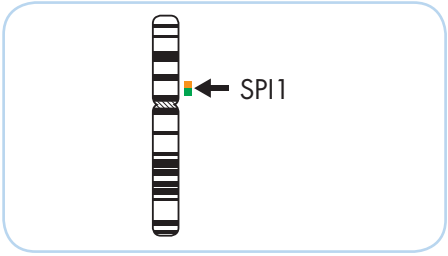
SPI1 is a member of the ETS family of transcription factors and is essential for the normal development of hematopoietic stem cells. SPI1 rearrangements were detected in some pediatric T-cell acute lymphoblastic leukemia (T-ALL) cases resulting in the fusion of the N-terminal region of the fusion partner (STMN1, TCF7, or BCL11B) to the C-terminal DNA binding ETS domain of the SPI1 protein. Hence, the resulting fusion proteins retain the transcriptional activity inherent to SPI1. SPI1 fusion positive cases show markedly elevated SPI1 expression, most likely because the fusion gene comes under the transcriptional control of the heterologous promoter of the respective partner gene. Overexpression of SPI1 is thought to contribute to T-cell leukemogenesis. Moreover, T-ALL patients with SPI1 fusion show a uniformly poor overall survival and seem to be incurable with current standard chemotherapy. This underscores the importance of detecting this subset of patients by FISH so that they may receive more intensive or alternative therapies.

References
Homminga I, et al. (2011) Cancer Cell 19: 484-97.
Liu Y, et al. (2017) Nat Genet 49: 1211-8.
Seki M, et al. (2017) Nat Genet 49: 1274-81.

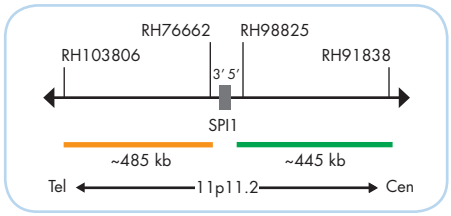
Probe Description

The ZytoLight® SPEC SPI1 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 11p11.2** (chr11:47,424,117-47,867,019) proximal to the SPI1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 11p11.2** (chr11:46,871,411-47,354,083) distal to the SPI1 breakpoint region.
- Formamide based hybridization buffer



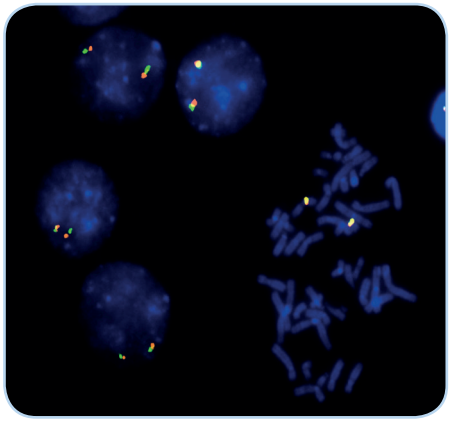
Ideogram of chromosome 11 indicating the hybridization locations.



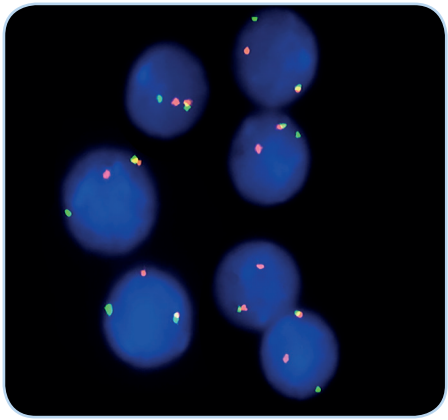
SPEC SPI1 Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 11p11.2 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 11p11.2 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 11p11.2 locus and one 11p11.2 locus affected by a translocation.



SPEC SPI1 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals in each nucleus and to metaphase chromosomes of a normal cell.



Bone marrow smear with translocation of the SPI1 gene as indicated by one non-rearranged orange/green fusion signal, one orange and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2291-50	ZytoLight SPEC SPI1 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC CCND1 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC CCND1 Dual Color Break Apart Probe (PL65) is intended to be used for the qualitative detection of translocations involving the human CCND1 gene at 11q13.3 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

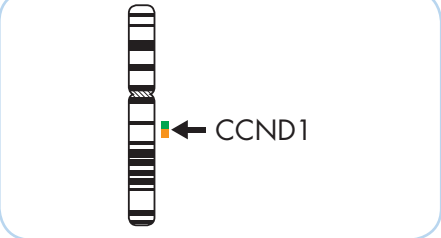
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

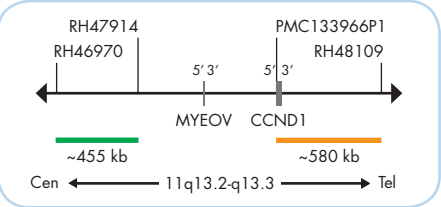
Probe Description

The ZytoLight® SPEC CCND1 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 11q13.2-q13.3** (chr11:68,249,010-68,705,283) proximal to the CCND1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 11q13.3** (chr11:69,453,301-70,031,240) distal to the CCND1 breakpoint region.
- Formamide based hybridization buffer



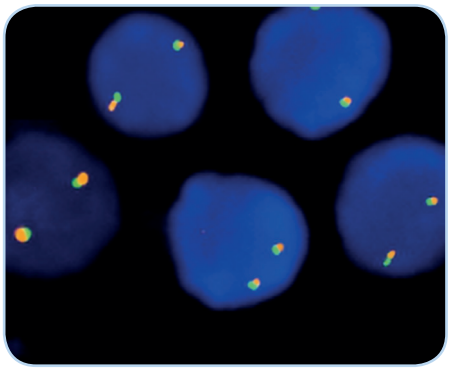
Ideogram of chromosome 11 indicating the hybridization locations.



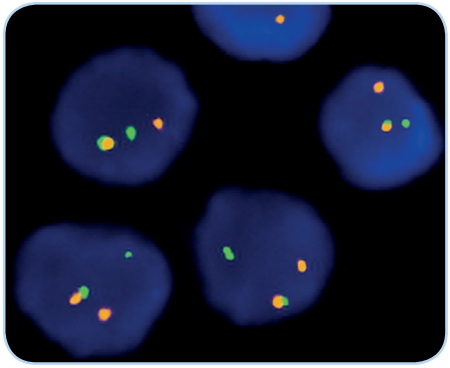
SPEC CCND1 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 11q13.2-q13.3 band, two orange/green fusion signals are expected representing two normal (non-rearranged) CCND1 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal CCND1 locus and one CCND1 locus affected by an 11q13.2-q13.3 translocation.



SPEC CCND1 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: Bone marrow biopsy section with translocation affecting the 11q13.2-q13.3 locus as indicated by one non-rearranged orange/green fusion signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2108-50	ZytoLight SPEC CCND1 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2108-200	ZytoLight SPEC CCND1 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC CCND1/CEN 11 Dual Color Probe

CE IVD

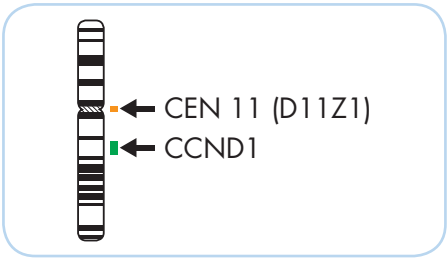
Background

The ZytoLight® SPEC CCND1/CEN 11 Dual Color Probe (PL28) is intended to be used for the qualitative detection of amplifications involving the human CCND1 gene as well as the detection of chromosome 11 alpha satellites in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

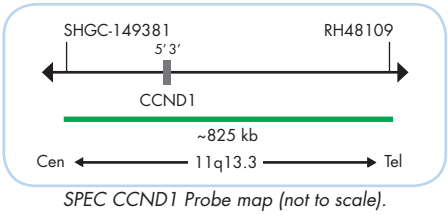
Probe Description

The ZytoLight® SPEC CCND1/CEN 11 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 11q13.3** (chr11:69,203,885-70,031,240) harboring the CCND1 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 11p11.11-q11 specific for the alpha satellite centromeric region D11Z1 of chromosome 11.
- Formamide based hybridization buffer



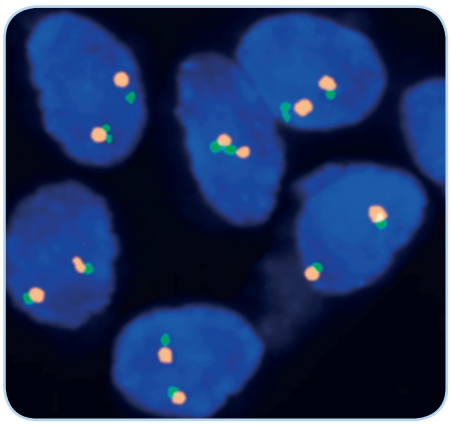
Ideogram of chromosome 11 indicating the hybridization locations.



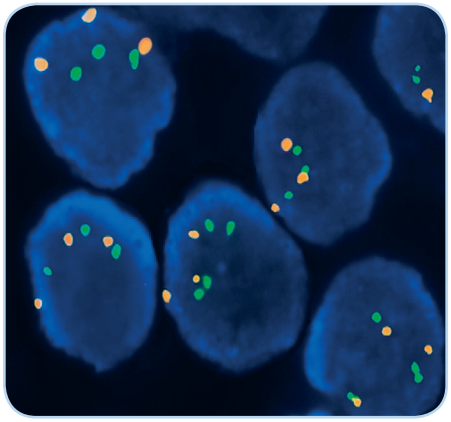
SPEC CCND1 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the CCND1 gene locus, multiple copies of the green signal or large green signal clusters will be observed.



SPEC CCND1/CEN 11 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Example of an aberrant signal pattern: Polysomy of chromosome 11 as indicated by three orange (CEN 11) and three green (CCND1) signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2071-50	ZytoLight SPEC CCND1/CEN 11 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2071-200	ZytoLight SPEC CCND1/CEN 11 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC CCND1/IGH Dual Color Dual Fusion Probe

CE IVD

Background

The ZytoLight® SPEC CCND1/IGH Dual Color Dual Fusion Probe (PL82) is intended to be used for the qualitative detection of the translocation t(11;14)(q13.3;q32.3) in cytologic or formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with ZytoLight® FISH Implementation Kits (Prod. No. Z-2028-5/-20, or Z-2099-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

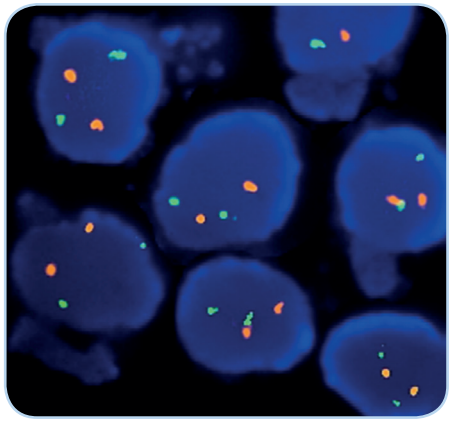
Probe Description

The ZytoLight® SPEC CCND1/IGH Dual Color Dual Fusion Probe is composed of:

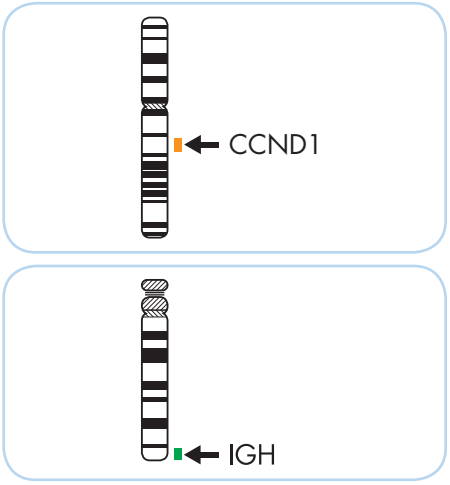
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~6.0 ng/µl), which target sequences mapping in 11q13.3** (chr11:68,522,105-70,031,240) harboring the CCND1 gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~12.0 ng/µl), which target sequences mapping in 14q32.33** (chr14:105,462,169-106,995,000) harboring the IGH locus.
- Formamide based hybridization buffer

Results

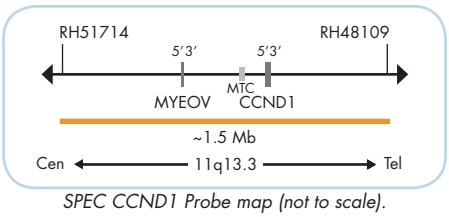
In a normal interphase nucleus, two orange and two green signals are expected. A reciprocal CCND1/IGH translocation leads to two orange/green fusion signals indicating both rearranged chromosomes. Additionally, the non-rearranged chromosomes are indicated by one orange signal and a separate green signal, respectively.



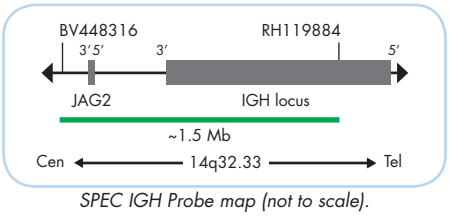
SPEC CCND1/IGH Dual Color Dual Fusion Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



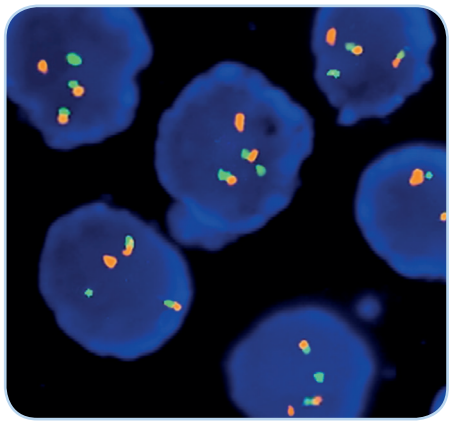
Ideograms of chromosomes 11 (above) and 14 (below) indicating the hybridization locations.



SPEC CCND1 Probe map (not to scale).



SPEC IGH Probe map (not to scale).



Example of an aberrant signal pattern: Section of an iliac crest biopsy with translocation affecting the CCND1/IGH loci as indicated by one separate orange signal, one separate green signal, and two orange/green fusion signals.

Prod. No.	Product	Label	Tests* (Volume)
Z-2125-50	ZytoLight SPEC CCND1/IGH Dual Color Dual Fusion Probe CE IVD	/●	5 (50 µl)
Z-2125-200	ZytoLight SPEC CCND1/IGH Dual Color Dual Fusion Probe CE IVD	/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC MAML2 Dual Color Break Apart Probe

CE IVD

Background

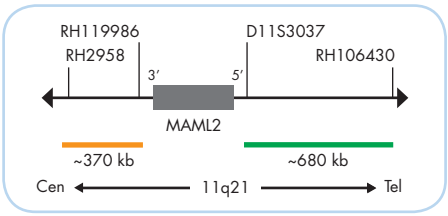
The ZytoLight® SPEC MAML2 Dual Color Break Apart Probe (PL5) is intended to be used for the qualitative detection of translocations involving the human MAML2 gene at 11q21 in formalin-fixed, paraffin-embedded specimens, such as mucoepidermoid carcinoma (MEC), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of MEC and therapeutic measures should not be initiated based on the test result alone.

Probe Description

The ZytoLight® SPEC MAML2 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 11q21** (chr11:96,115,829-96,797,136) distal to the MAML2 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 11q21** (chr11:95,296,828-95,668,215) proximal to the MAML2 breakpoint region.
- Formamide based hybridization buffer

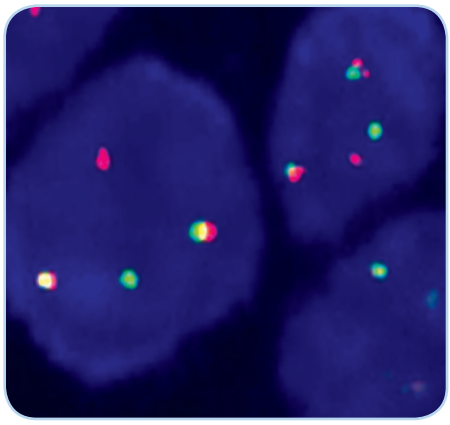
Ideogram of chromosome 11 indicating the hybridization locations.



SPEC MAML2 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 11q21 band two orange/green fusion signals are expected representing two normal (non-rearranged) 11q21 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 11q21 locus and one 11q21 locus affected by the translocation specific for mucoepidermoid carcinomas.



Mucoepidermoid carcinoma section with translocation affecting the 11q21 locus as indicated by one separate orange and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2014-50	ZytoLight SPEC MAML2 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2014-200	ZytoLight SPEC MAML2 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC BIRC3/MALT1 Dual Color Dual Fusion Probe

CE IVD

Background

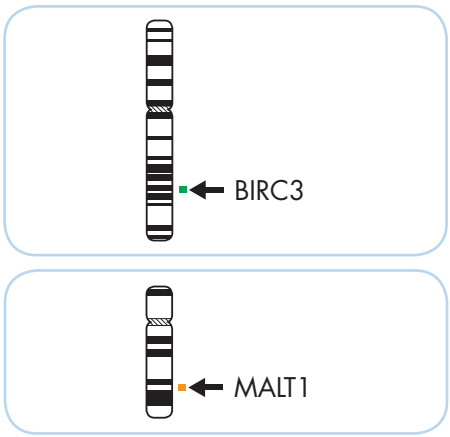
The ZytoLight® SPEC BIRC3/MALT1 Dual Color Dual Fusion Probe is designed to detect translocations involving the chromosomal region 11q22.2 harboring the BIRC3 (baculoviral IAP repeat containing 3, a.k.a. API2) gene and the chromosomal region 18q21.32 harboring the MALT1 (MALT1 paracaspase, a.k.a. MLT) gene. The recurrent translocation t(11;18)(q22.2;q21.3) is frequently found in mucosa-associated lymphoid tissue (MALT) lymphoma which represents the most common extranodal B-cell tumor and accounts for 5-10% of all non-Hodgkin lymphoma. The translocation results in the expression of chimeric fusion transcripts comprising the N-terminal end of the apoptosis inhibitor BIRC3 which is highly expressed in adult lymphoid tissue and C-terminal parts of the MALT1 protease.

The BIRC3/MALT1 fusion protein was shown to induce proteolytic cleavage of NF-kappa-B-inducing kinase (NIK) ultimately resulting in constitutive non-canonical NF-kappa-B signaling, enhanced B-cell adhesion, and apoptosis resistance. It is assumed that disruption of the BIRC3-NIK interaction and/or blocking of MALT1 protease or NIK kinase activity could represent new treatment approaches for refractory t(11;18)-positive MALT lymphoma.

Probe Description

The ZytoLight® SPEC BIRC3/MALT1 Dual Color Dual Fusion Probe is composed of:

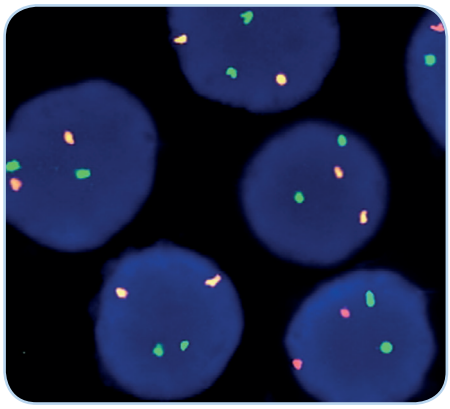
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (12 ng/µl), which target sequences mapping in 11q22.1-q22.2** (chr11:101,756,072-102,581,817) harboring the BIRC3 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (6 ng/µl), which target sequences mapping in 18q21.31-q21.32** (chr18:56,021,766-56,724,408) harboring the MALT1 gene region.
- Formamide based hybridization buffer



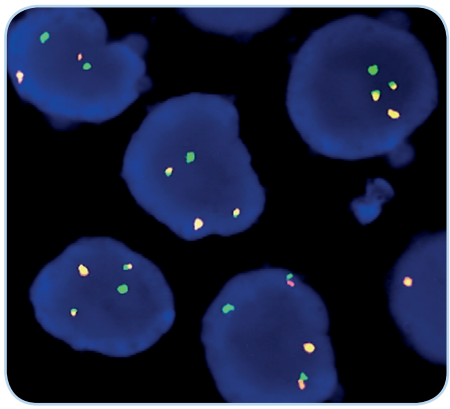
Ideograms of chromosomes 11 (above) and 18 (below) indicating the hybridization locations.

Results

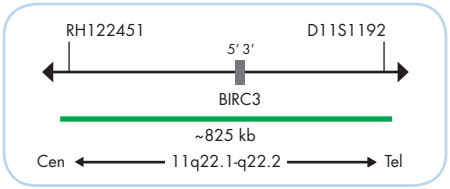
In a normal interphase nucleus, two orange and two green signals are expected. A reciprocal translocation involving two breakpoints splits the two signals and generates a fusion signal on each of the chromosomes involved. The chromosomal regions which are not translocated are indicated by the single orange and green signal, respectively.



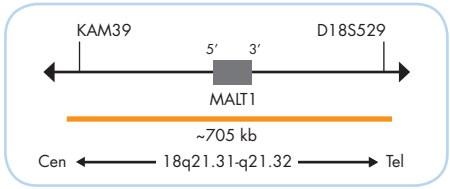
SPEC BIRC3/MALT1 Dual Color Dual Fusion Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



MALT lymphoma tissue section with translocation affecting the BIRC3/MALT1 loci as indicated by one separate orange signal, one separate green signal, and two orange/green fusion signals.



SPEC BIRC3 Probe map (not to scale).



SPEC MALT1 Probe map (not to scale).

References
Dierlamm J, et al. (1999) Blood 93: 3601-9.
Dierlamm J, et al. (2000) Blood 96: 2215-8.
Morgan JA, et al. (1999) Cancer Res 59: 6205-13.
Rosebeck S, et al. (2011) Science 331: 468-72.

Prod. No.	Product	Label	Tests* (Volume)
Z-2146-50	ZytoLight SPEC BIRC3/MALT1 Dual Color Dual Fusion Probe CE IVD	●/●	5 (50 µl)
Z-2146-200	ZytoLight SPEC BIRC3/MALT1 Dual Color Dual Fusion Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZYTOVISION Molecular diagnostics simplified FE064-1-23

ZytoLight® SPEC ATM/CEN 11 Dual Color Probe

CE IVD

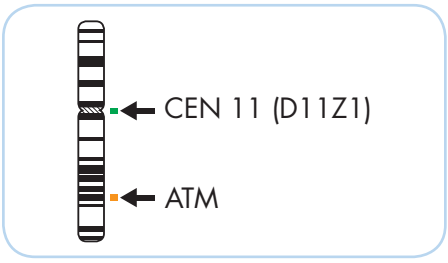
Background

The ZytoLight® SPEC ATM/CEN 11 Dual Color Probe (PL254) is intended to be used for the qualitative detection of deletions involving the human ATM gene as well as the detection of chromosome 11 alpha satellites in cytologic specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel. The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

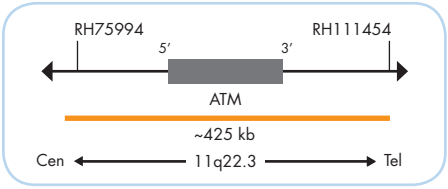
Probe Description

The ZytoLight® SPEC ATM/CEN 11 Dual Color Probe is composed of:

- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 11q22.3** (chr11:107,957,618-108,380,921) harboring the ATM gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 11p11.11-q11 specific for the alpha satellite centromeric region D11Z1 of chromosome 11.
- Formamide based hybridization buffer



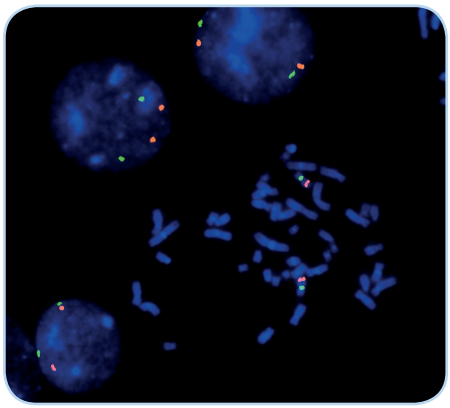
Ideogram of chromosome 11 indicating the hybridization locations.



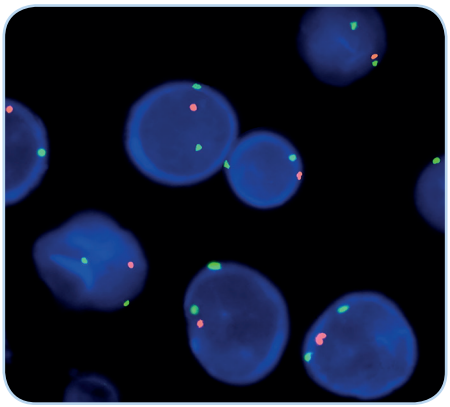
SPEC ATM Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletion of the ATM gene locus, one or no copy of the orange signal will be observed.



SPEC ATM/CEN 11 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus and to metaphase chromosomes of a normal cell.



Example of an aberrant signal pattern: CLL with deletion affecting the ATM locus as indicated by one orange signal in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2297-50	ZytoLight SPEC ATM/CEN 11 Dual Color Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC ATM/CEN 12 Dual Color Probe

CE IVD

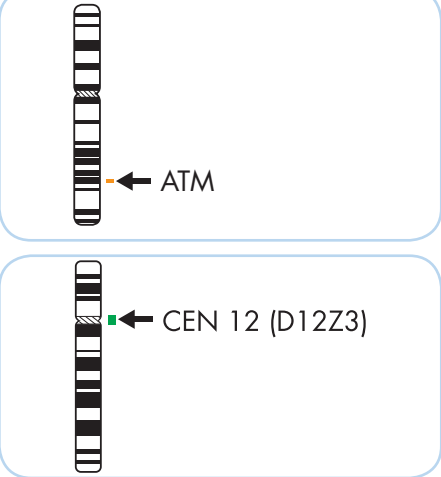
Background

The ZytoLight® SPEC ATM/CEN 12 Dual Color Probe (PL250) is intended to be used for the qualitative detection of deletions involving the human ATM gene as well as the detection of chromosome 12 alpha satellites in cytologic specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel. The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

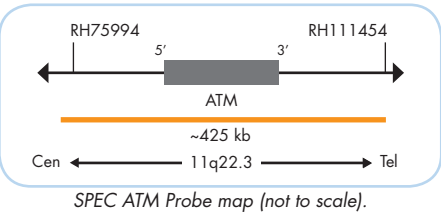
Probe Description

The ZytoLight® SPEC ATM/CEN 12 Dual Color Probe is composed of:

- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 11q22.3** (chr11:107,957,618-108,380,921) harboring the ATM gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 12p11.1-q11 specific for the alpha satellite centromeric region D12Z3 of chromosome 12.
- Formamide based hybridization buffer



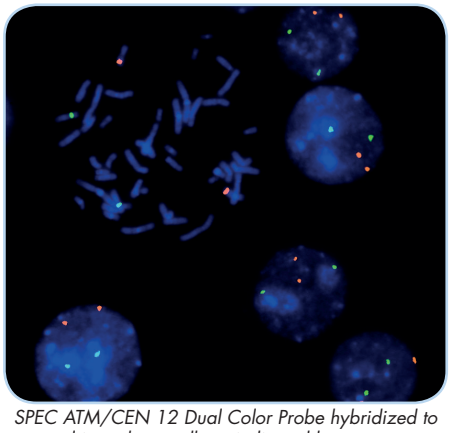
Ideograms of chromosomes 11 (above) and 12 (below) indicating the hybridization locations.



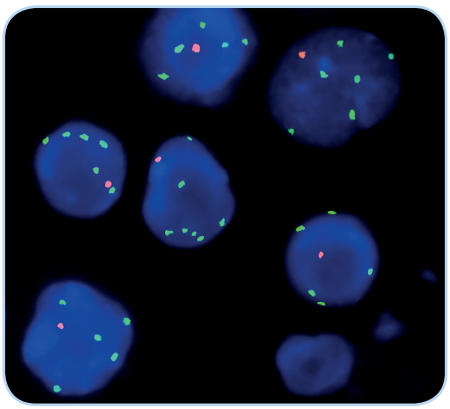
SPEC ATM Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletion of the ATM gene locus, one or no copy of the orange signal will be observed. In a cell with trisomy or polysomy 12, three or more copies of the green signal will be observed, respectively.



SPEC ATM/CEN 12 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus and to metaphase chromosomes of a normal cell.



Example of an aberrant signal pattern: CLL with deletion of the ATM gene and amplification affecting the centromeric region of chromosome 12 as indicated by one orange signal and five or more green signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2296-50	ZytoLight SPEC ATM/CEN 12 Dual Color Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC TP53/ATM Dual Color Probe

CE IVD

Background

The ZytoLight® SPEC TP53/ATM Dual Color Probe (PL115) is intended to be used for the qualitative detection of deletions involving the human TP53 gene as well as the human ATM gene in cytologic specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20).

The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

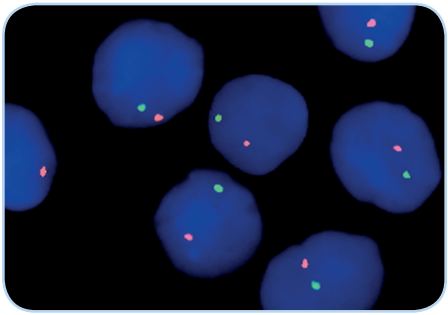
Probe Description

The ZytoLight® SPEC TP53/ATM Dual Color Probe is composed of:

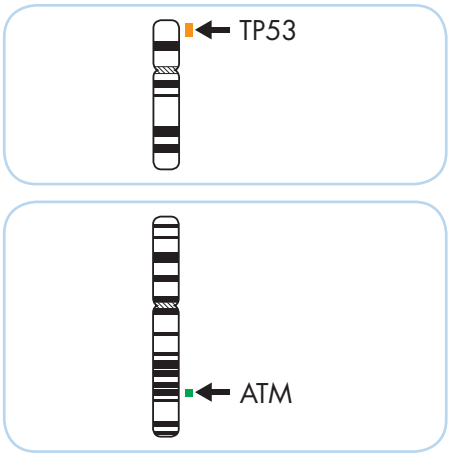
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 17p13.1** (chr17:7,495,749-7,663,022) harboring the TP53 gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 11q22.3** (chr11:107,957,618-108,380,921) harboring the ATM gene region.
- Formamide based hybridization buffer

Results

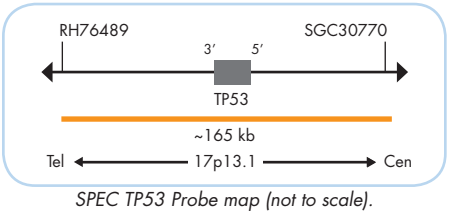
Using the SPEC TP53/ATM Dual Color Probe in a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletions affecting the TP53 gene locus, a reduced number of orange signals will be observed. Deletions affecting only parts of the TP53 locus might result in a normal signal pattern with orange signals of reduced size. In a cell with ATM gene deletions, a reduced number of green signals will be observed. Deletions affecting only parts of the ATM locus might result in a normal signal pattern with green signals of reduced size.



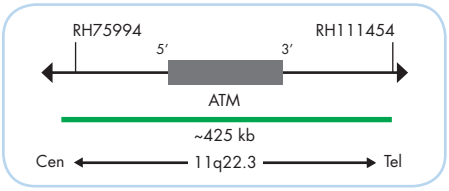
Example of an aberrant signal pattern: SPEC TP53/ATM Dual Color Probe hybridized to bone marrow biopsy with deletions of the ATM and the TP53 genes as indicated by one green and one orange signal in each nucleus.



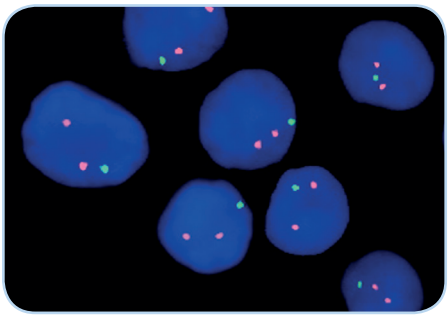
Ideograms of chromosomes 17 (above) and 11 (below) indicating the hybridization locations.



SPEC TP53 Probe map (not to scale).



SPEC ATM Probe map (not to scale).



Example of an aberrant signal pattern: SPEC TP53/ATM Dual Color Probe hybridized to bone marrow smear with deletion of the ATM gene as indicated by one green signal in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2159-50	ZytoLight SPEC TP53/ATM Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2159-200	ZytoLight SPEC TP53/ATM Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC D13S319/13q34/CEN 12 Triple Color Probe

CE IVD

Background

The ZytoLight® SPEC D13S319/13q34/CEN 12 Triple Color Probe (PL116) is intended to be used for the qualitative detection of deletions involving the human D13S319 region as well as the detection of chromosome 13q34 specific sequences and chromosome 12 alpha satellites in cytologic specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20).

The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

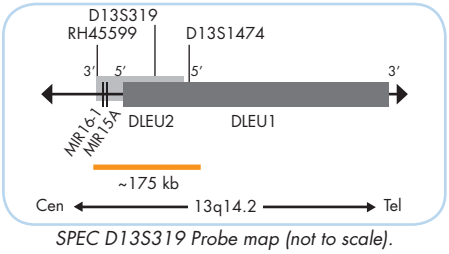
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

Ideograms of chromosomes 13 (above) and 12 (below) indicating the hybridization locations.

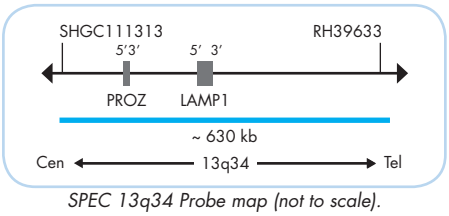
Probe Description

The ZytoLight® SPEC D13S319/13q34/CEN 12 Triple Color Probe is composed of:

- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 13q14.2** (chr13:50,607,438-50,781,256) harboring the D13S319 locus.
- ZyBlue (excitation at 418 nm and emission 467 nm) labeled polynucleotides (~37 ng/µl), which target sequences mapping in 13q34** (chr13:113,691,216-114,323,467) harboring the LAMP1 gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 12p11.1-q11 specific for the alpha satellite centromeric region D12Z3 of chromosome 12.
- Formamide based hybridization buffer



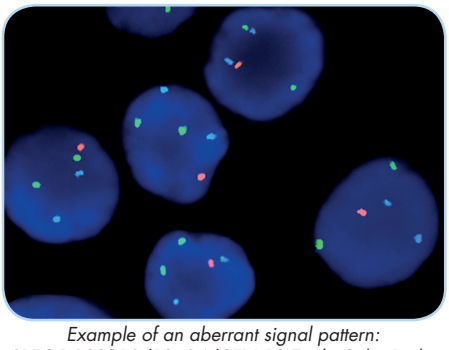
SPEC D13S319 Probe map (not to scale).



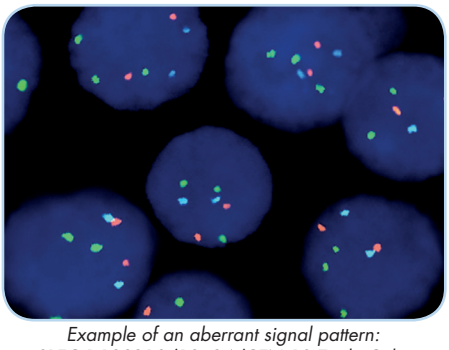
SPEC 13q34 Probe map (not to scale).

Results

Using the SPEC D13S319/13q34/CEN 12 Triple Color Probe in a normal interphase nucleus, two orange, two green, and two blue signals are expected. In a cell with deletions affecting the D13S319 locus, a reduced number of orange signals will be observed. Deletions affecting only parts of the D13S319 locus might result in a normal signal pattern with orange signals of reduced size. In a cell with trisomy or polysomy 12, three or more copies of the green signal will be observed, respectively.



Example of an aberrant signal pattern: SPEC D13S319/13q34/CEN 12 Triple Color Probe hybridized to bone marrow biopsy section with deletion of the D13S319 locus as indicated by one orange signal and two blue signals in each nucleus.



Example of an aberrant signal pattern: SPEC D13S319/13q34/CEN 12 Triple Color Probe hybridized to bone marrow smear with trisomy of chromosome 12 as indicated by three green signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2160-50	ZytoLight SPEC D13S319/13q34/CEN 12 Triple Color Probe CE IVD	●/●/●	5 (50 µl)
Z-2160-200	ZytoLight SPEC D13S319/13q34/CEN 12 Triple Color Probe CE IVD	●/●/●	20 (200 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC D13S319/13q34 Dual Color Probe

CE IVD

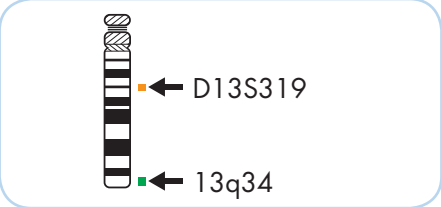
Background

The ZytoLight® SPEC D13S319/13q34 Dual Color Probe (PL235) is intended to be used for the qualitative detection of deletions involving the human D13S319 region and chromosome 13q34 specific sequences in cytologic specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

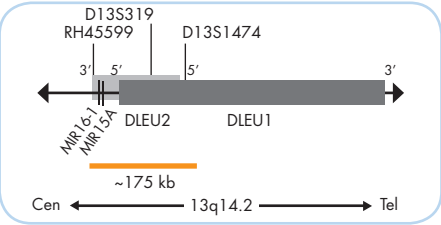
Probe Description

The ZytoLight® SPEC D13S319/13q34 Dual Color Probe is composed of:

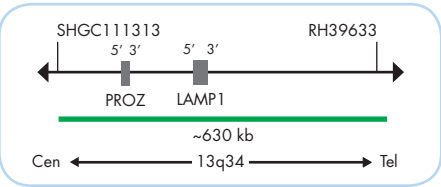
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 13q14.2** (chr13:50,607,438-50,781,256) harboring the D13S319 locus.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 13q34** (chr13:113,691,216-114,323,467).
- Formamide based hybridization buffer



Ideogram of chromosome 13 indicating the hybridization locations.



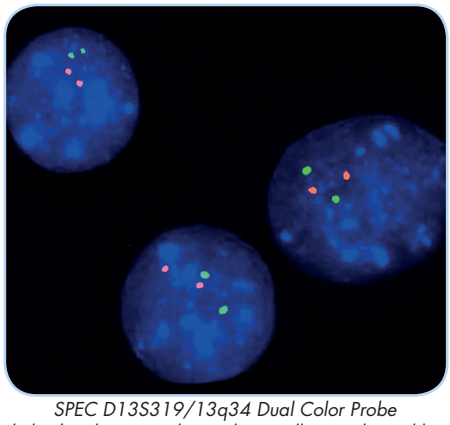
SPEC D13S319 Probe map (not to scale).



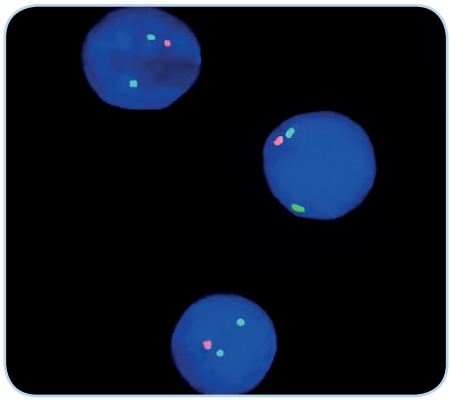
SPEC 13q34 Probe map (not to scale).

Results

Using the SPEC D13S319/13q34 Dual Color Probe in a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletions affecting the D13S319 locus, a reduced number of orange signals will be observed. Deletions affecting only parts of the D13S319 locus might result in a normal signal pattern with orange signals of reduced size. If deletions affect the D13S319 locus as well as the 13q34 locus, this might result in a reduced number of orange and green signals.



SPEC D13S319/13q34 Dual Color Probe hybridized to normal interphase cells as indicated by two green and two orange signals in each nucleus.



Example of an aberrant signal pattern: Bone marrow smear with deletion of the D13S319 locus as indicated by one orange and two green signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2280-50	ZytoLight SPEC D13S319/13q34 Dual Color Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC 11q gain/loss Triple Color Probe

CE IVD

Background

The ZytoLight® SPEC 11q gain/loss Triple Color Probe (PL174) is intended to be used for the qualitative detection of human 11q alterations involving human 11q23.3 and 11q24.1-q25 specific sequences in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

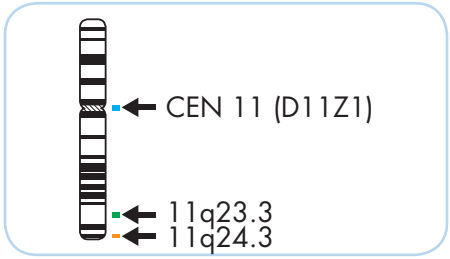
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

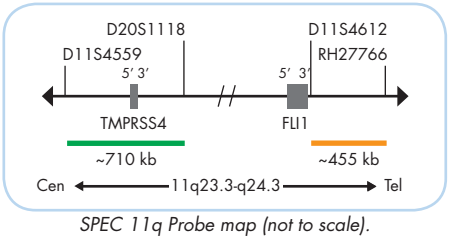
Probe Description

The ZytoLight® SPEC 11q gain/loss Triple Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in the minimal gained region (MGR) at 11q23.3** (chr11:117,574,074-118,284,029).
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in the minimal loss region (MLR) at 11q24.3** (chr11:128,707,454-129,161,227).
- ZyBlue (excitation 418 nm/emission 467 nm) labeled polynucleotides (~12 ng/µl), which target sequences mapping in 11p11.11-q11 specific for the alpha satellite centromeric region D11Z1 of chromosome 11.
- Formamide based hybridization buffer



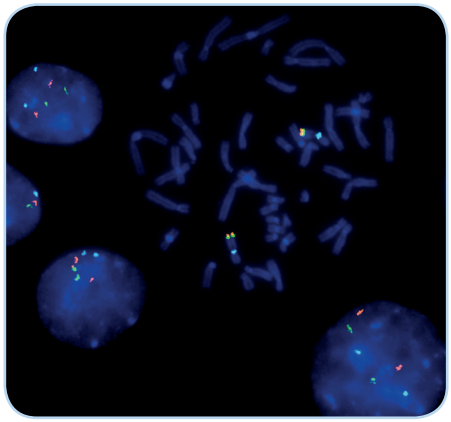
Ideogram of chromosome 11 indicating the hybridization locations.



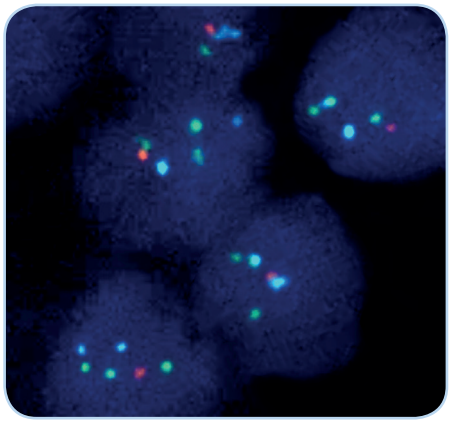
SPEC 11q Probe map (not to scale).

Results

In a normal interphase nucleus, two green, two orange, and two blue signals are expected. In a cell with amplification at 11q23.3 and deletion at 11q24.3, multiple copies of the green signals and a reduced number of orange signals will be observed.



SPEC 11q gain/loss Triple Color Probe hybridized to normal interphase cells as indicated by two green, two orange, and two blue signals per nucleus and to metaphase chromosomes of a normal cell.



Example of an aberrant signal pattern: Burkitt-like lymphoma tissue section with 11q aberration as indicated by three green signals and one orange signal indicating the gain and loss at 11q, respectively.

Prod. No.	Product	Label	Tests* (Volume)
Z-2216-50	ZytoLight SPEC 11q gain/loss Triple Color Probe CE IVD	●/●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC KMT2A Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC KMT2A Dual Color Break Apart Probe (PL151) is intended to be used for the qualitative detection of translocations involving the human KMT2A gene at 11q23.3 in cytologic specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20).

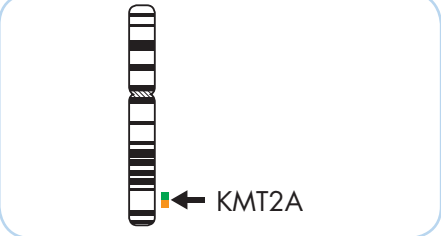
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

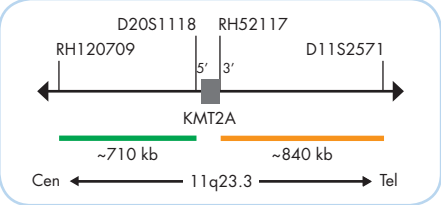
Probe Description

The ZytoLight® SPEC KMT2A Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 11q23.3** (chr11:117,574,074-118,284,029) proximal to the KMT2A breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 11q23.3** (chr11:118,399,293-119,237,675) distal to the KMT2A breakpoint region.
- Formamide based hybridization buffer



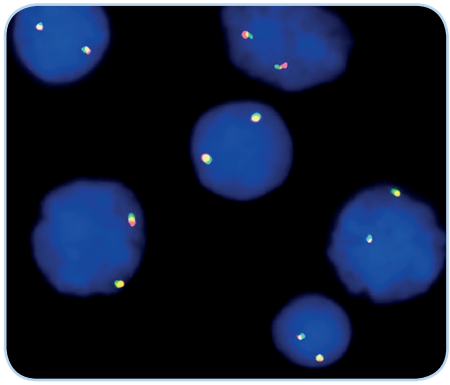
Ideogram of chromosome 11 indicating the hybridization locations.



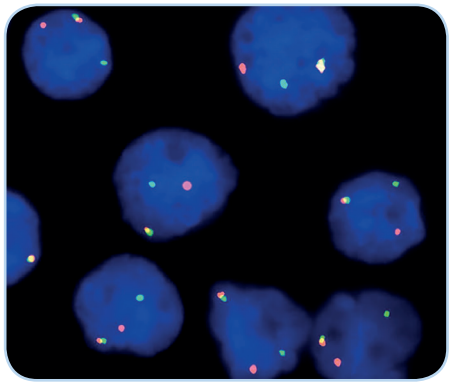
SPEC KMT2A Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 11q23.3 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 11q23.3 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 11q23.3 locus and one 11q23.3 locus affected by a translocation.



SPEC KMT2A Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: Bone marrow smear with translocation of the KMT2A gene as indicated by one non-rearranged orange/green fusion signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2193-50	ZytoLight SPEC KMT2A Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2193-200	ZytoLight SPEC KMT2A Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC ZNF384 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC ZNF384 Dual Color Break Apart Probe is designed to detect translocations involving the chromosomal region 12p13.31 harboring the ZNF384 gene.

The ZNF384 (zinc-finger protein 384, a.k.a. CIZ) gene encodes a transcription factor involved in the regulation of matrix metalloproteinases.

Rearrangements of the ZNF384 gene are recurrent in acute leukemia and are most frequently found in precursor B-cell acute lymphoblastic leukemia (BCP-ALL) in children and young adults with an incidence of about 3-4%. ZNF384-related fusion genes with multiple fusion partners have been found to define a distinct subgroup of pediatric BCP-ALL with a characteristic immunophenotype. Known translocation partners are TCF3 (19p13.3), EWSR1 (22q12.2), TAF15 (17q12), EP300 (22q13.2), ARID1B (6q25.3), CREBBP (16p13.3), and BMP2K (4q21.21) with TCF3 being the most prevalent. The breakpoints are located within the ZNF384 gene. However, the balanced translocations are resulting in fusion genes including the complete protein coding information.

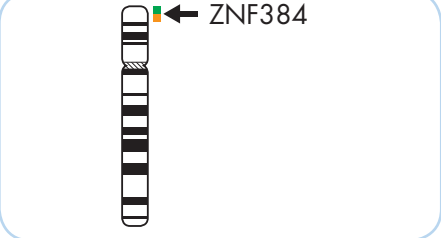
Since ZNF384-related fusion genes are difficult to detect by common G-banding, investigation by FISH may be of diagnostic and prognostic relevance.

References
Hirabayashi S, et al. (2017) Haematologica 102: 118-29.
Krance RA, et al. (1992) Leukemia 6: 251-5.
La Starza R, et al. (2005) Leukemia 19: 1696-9.
Shago M, et al. (2016) Pediatr Blood Cancer 63: 1915-21.

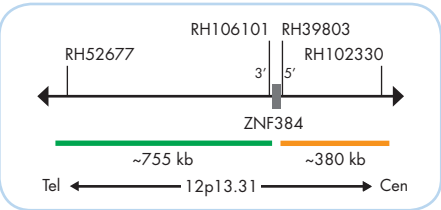
Probe Description

The ZytoLight® SPEC ZNF384 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 12p13.31** (chr12:6,016,809-6,771,300) distal to the ZNF384 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 12p13.31** (chr12:6,799,546-7,175,222) proximal to the ZNF384 breakpoint region.
- Formamide based hybridization buffer



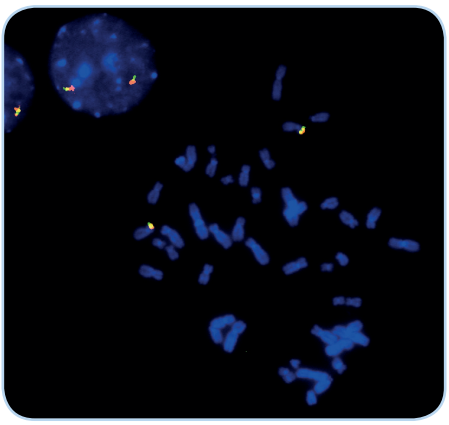
Ideogram of chromosome 12 indicating the hybridization locations.



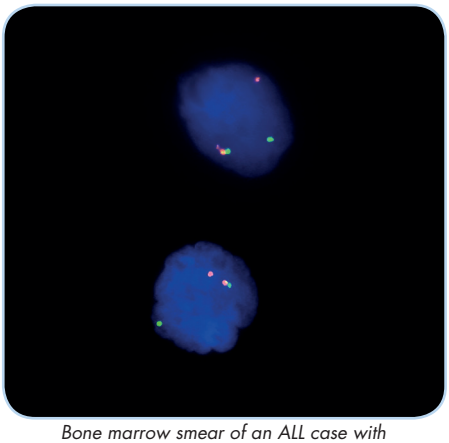
SPEC ZNF384 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 12p13.31 band, two orange/green fusion signals are expected, representing two normal (non-rearranged) 12p13.31 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 12p13.31 locus and one 12p13.31 locus affected by a ZNF384 translocation.



SPEC ZNF384 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus and to metaphase chromosomes of a normal cell.



Bone marrow smear of an ALL case with translocation of the ZNF384 gene as indicated by one orange/green fusion signal, one separate green, and one separate orange signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2275-50	ZytoLight SPEC ZNF384 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC ETV6 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC ETV6 Dual Color Break Apart Probe (PL135) is intended to be used for the qualitative detection of translocations involving the human ETV6 gene at 12p13.2 in cytologic specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20).

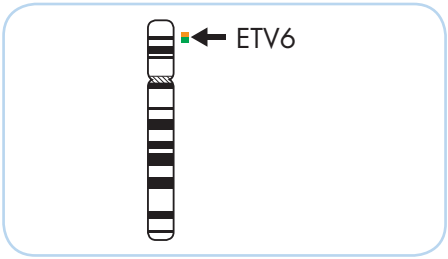
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

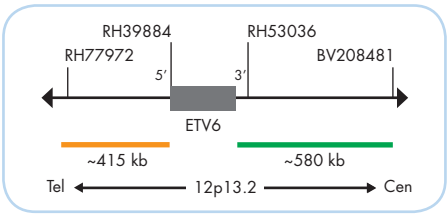
Probe Description

The ZytoLight® SPEC ETV6 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 12p13.2** (chr12:12,054,737-12,634,328) proximal to the ETV6 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 12p13.2** (chr12:11,393,774-11,808,608) distal to the ETV6 breakpoint region.
- Formamide based hybridization buffer



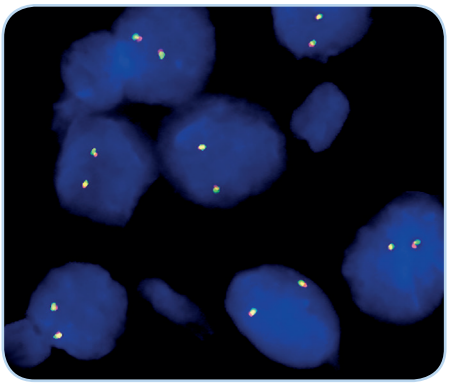
Ideogram of chromosome 12 indicating the hybridization locations.



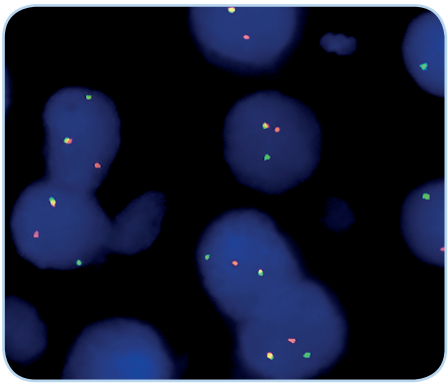
SPEC ETV6 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 12p13.2 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 12p13.2 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 12p13.2 locus and one 12p13.2 locus affected by a translocation.



SPEC ETV6 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: MASC tissue section of the salivary glands with translocation of the ETV6 gene as indicated by one non-rearranged orange/green fusion signal, one orange and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2176-50	ZytoLight SPEC ETV6 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2176-200	ZytoLight SPEC ETV6 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC ETV6/RUNX1 Dual Color Dual Fusion Probe

CE IVD

Background

The ZytoLight® SPEC ETV6/RUNX1 Dual Color Dual Fusion Probe is designed for the detection of the specific translocation involving the chromosomal region 12p13.2 harboring the ETV6 (ETS variant 6, a.k.a. TEL) gene and the chromosomal region 21q22.12 harboring the RUNX1 (runt related transcription factor 1, a.k.a. AML1) gene. The balanced chromosomal translocation t(12;21)(p13.2;q22.1), which leads to ETV6/RUNX1 fusion, represents the most frequent genetic rearrangement in initial childhood B-cell precursor (BCP) acute lymphoblastic leukemia (ALL) (19-27%) and has been associated with good prognosis. The ETV6/RUNX1 fusion protein, comprising a putative repressor domain of ETV6, a member of the ETS family of transcription factors, fused to RUNX1, the DNA-binding subunit of the RUNX1/CBF beta transcription factor complex, acts as a trans-dominant repressor of RUNX1 regulated target genes involved in hematopoiesis.

Three secondary aberrations in ETV6/RUNX1 positive ALL have been found to negatively influence the clinical course: deletion of the second non-translocated ETV6 allele, gains of the RUNX1 gene, and duplication of the derivative chromosome 21.

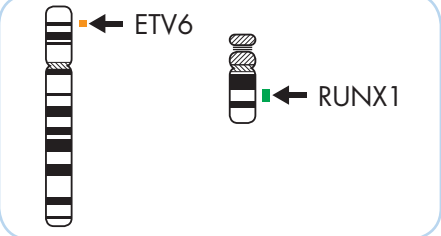
Detection of t(12;21) by Fluorescence *in situ* Hybridization enables the simultaneous identification of the most common secondary changes and thus provides additional information about the possible outcome of the disease in patients with ALL.

References
Fenrick R, et al. (1999) Mol Cell Biol 19: 6566-74.
Martínez-Ramírez A, et al. (2001) Haematologica 86: 1245-53.
Morrow M, et al. (2007) Oncogene 26: 4404-14.
Peter A, et al. (2009) Eur J Haematol 83: 420-32.
Shurtleff SA, et al. (1995) Leukemia 9: 1985-9.

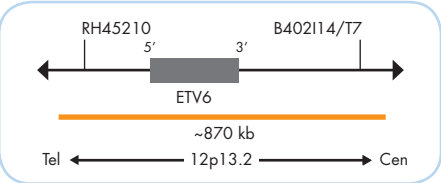
Probe Description

The ZytoLight® SPEC ETV6/RUNX1 Dual Color Dual Fusion Probe is composed of:

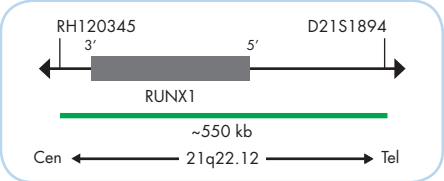
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~6 ng/µl), which target sequences mapping in 12p13.2** (chr12:11,586,400-12,454, 330) harboring the ETV6 gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~12 ng/µl), which target sequences mapping in 21q22.12** (chr21:36,106,492-36,657,941) harboring the RUNX1 gene region.
- Formamide based hybridization buffer



Ideograms of chromosomes 12 (left) and 21 (right) indicating the hybridization locations.



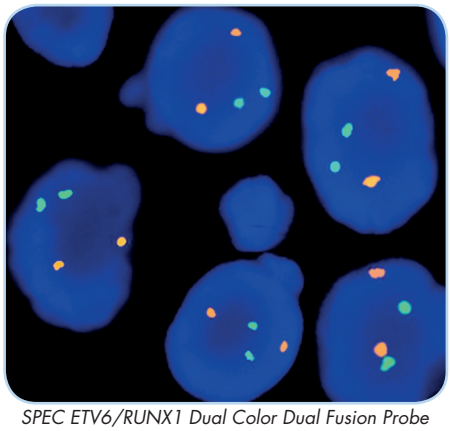
SPEC ETV6 Probe map (not to scale).



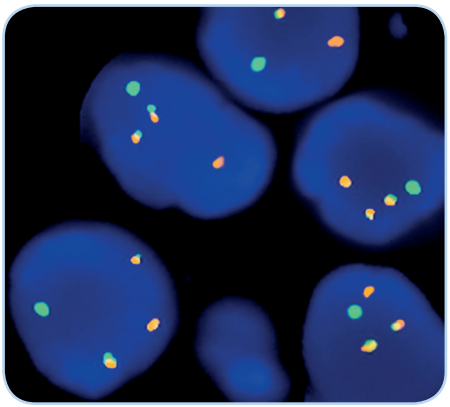
SPEC RUNX1 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. A reciprocal translocation involving two breakpoints splits the two signals and generates a fusion signal on each of the chromosomes involved. The chromosomal regions which are not translocated are indicated by the single orange and green signal, respectively.



SPEC ETV6/RUNX1 Dual Color Dual Fusion Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Bone marrow tissue section with translocation affecting the ETV6/RUNX1 loci as indicated by one separate orange signal, one separate green signal, and two orange/green fusion signals.

Prod. No.	Product	Label	Tests* (Volume)
Z-2157-50	ZytoLight SPEC ETV6/RUNX1 Dual Color Dual Fusion Probe CE IVD	●/●	5 (50 µl)
Z-2157-200	ZytoLight SPEC ETV6/RUNX1 Dual Color Dual Fusion Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC KRAS/CEN 12 Dual Color Probe

CE IVD

Background

The ZytoLight® SPEC KRAS/CEN 12 Dual Color Probe (PL72) is intended to be used for the qualitative detection of amplifications involving the human KRAS gene as well as chromosome 12 alpha satellites in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

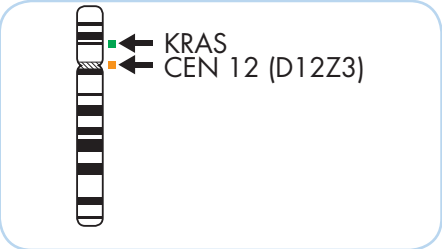
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

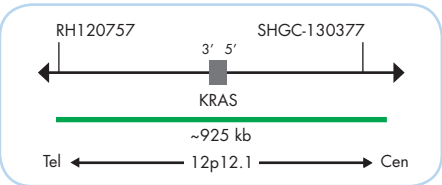
Probe Description

The ZytoLight® SPEC KRAS/CEN 12 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 12p12.1** (chr12:24,916,728-25,839,353) harboring the KRAS gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 12p11.1-q11 specific for the alpha satellite centromeric region D12Z3 of chromosome 12.
- Formamide based hybridization buffer



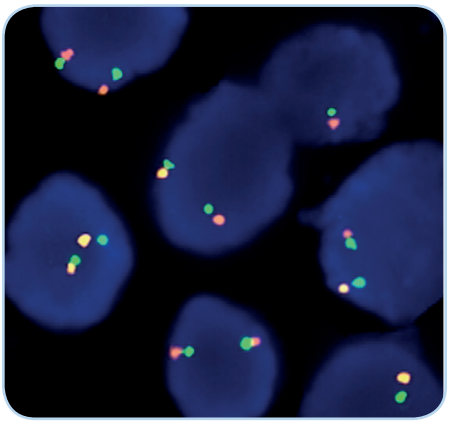
Ideogram of chromosome 12 indicating the hybridization locations.



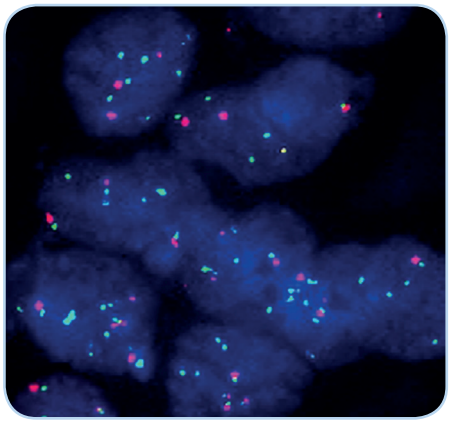
SPEC KRAS Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. Nuclei with amplification of the KRAS gene locus 12p12.1 or aneuploidy of chromosome 12 will show multiple copies of the green signal or large green signal clusters.



SPEC KRAS/CEN 12 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Example of an aberrant signal pattern: Lung cancer tissue section with amplification of the KRAS gene (green).

Image kindly provided by Prof. Diebold, Lucerne, Switzerland.

Prod. No.	Product	Label	Tests* (Volume)
Z-2115-200	ZytoLight SPEC KRAS/CEN 12 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC ERBB3/CEN 12 Dual Color Probe

RUO

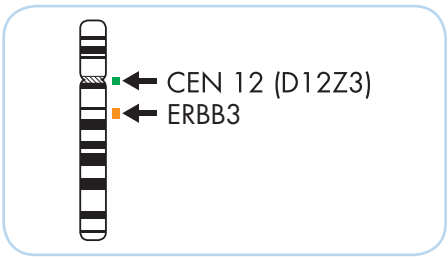
Background

The ZytoLight® SPEC ERBB3/CEN 12 Dual Color Probe (PL13) is intended to be used for the qualitative detection of human ERBB3 gene amplifications as well as the detection of chromosome 12 alpha satellites in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

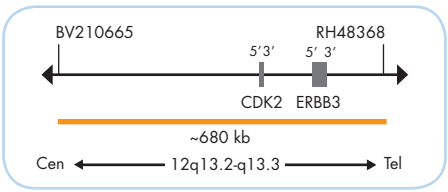
Probe Description

The ZytoLight® SPEC ERBB3/CEN 12 Dual Color Probe is composed of:

- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 12q13.2-q13.3** (chr12:55,938,458-56,616,182) harboring the ERBB3 gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 12p11.1-q11 specific for the alpha satellite centromeric region D12Z3 of chromosome 12.
- Formamide based hybridization buffer



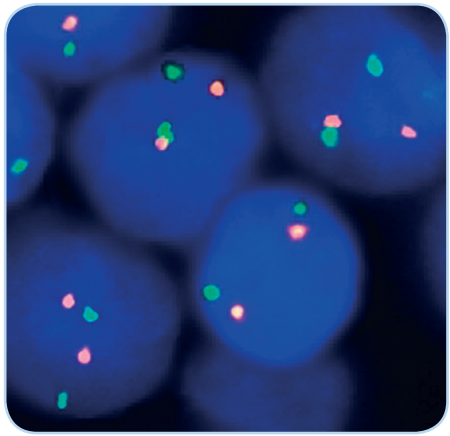
Ideogram of chromosome 12 indicating the hybridization locations.



SPEC ERBB3 Probe map (not to scale).

Results

Using the SPEC ERBB3/CEN 12 Dual Color Probe in a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the ERBB3 gene locus, multiple copies of the orange signal or orange signal clusters will be observed.



SPEC ERBB3/CEN 12 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2056-200	ZytoLight SPEC ERBB3/CEN 12 Dual Color Probe RUO	●/●	20 (200 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoLight® SPEC DDIT3 Dual Color Break Apart Probe

CE IVD

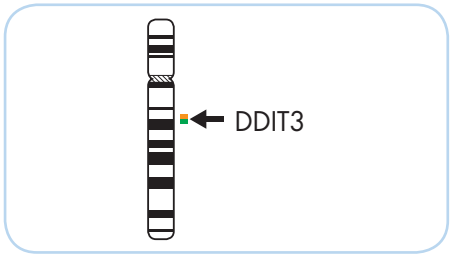
Background

The ZytoLight® SPEC DDIT3 Dual Color Break Apart Probe (PL58) is intended to be used for the qualitative detection of translocations involving the human DDIT3 gene at 12q13.3 in formalin-fixed, paraffin-embedded specimens, such as myxoid liposarcomas (MLPS), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of MLPS and therapeutic measures should not be initiated based on the test result alone.

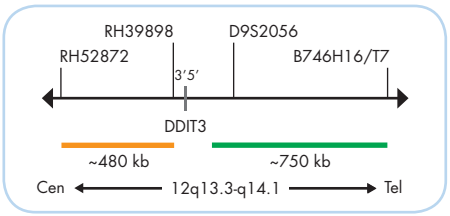
Probe Description

The ZytoLight® SPEC DDIT3 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 12q13.3-14.1** (chr12:58,024,366-58,775,832) distal to the DDIT3 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 12q13.3** (chr12:57,386,312-57,865,800) proximal to the DDIT3 breakpoint region.
- Formamide based hybridization buffer



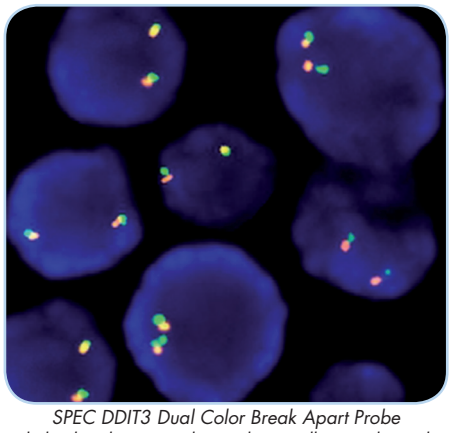
Ideogram of chromosome 12 indicating the hybridization locations.



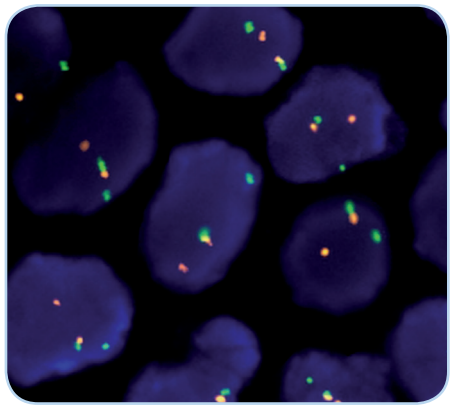
SPEC DDIT3 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 12q13.3-q14.1 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 12q13.3-q14.1 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 12q13.3-q14.1 locus and one 12q13.3-q14.1 locus affected by a 12q13.3-q14.1 translocation.



SPEC DDIT3 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Myxoid liposarcoma tissue section with translocation affecting the 12q13.3-q14.1 locus as indicated by one non-rearranged orange/green fusion signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2100-50	ZytoLight SPEC DDIT3 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2100-200	ZytoLight SPEC DDIT3 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC CDK4/CEN 12 Dual Color Probe

CE IVD

Background

The ZytoLight® SPEC CDK4/CEN 12 Dual Color Probe (PL61) is intended to be used for the qualitative detection of amplifications involving the human CDK4 gene as well as the detection of chromosome 12 alpha satellites in formalin-fixed, paraffin-embedded specimens, such as atypical lipomatous tumor/well-differentiated liposarcoma (ALT/WDLPS) and dedifferentiated liposarcoma (DDLPS), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

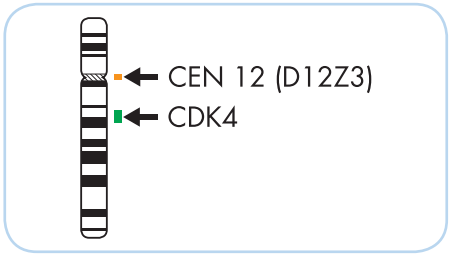
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of ALT/WDLPS and DDLPS and therapeutic measures should not be initiated based on the test result alone.

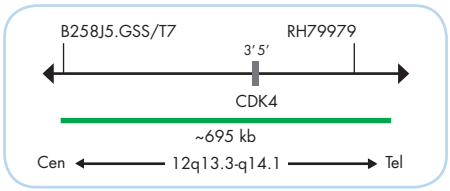
Probe Description

The ZytoLight® SPEC CDK4/CEN 12 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 12q13.3-q14.1** (chr12:57,740,440-58,435,534) harboring the CDK4 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 12p11.1-q11 specific for the alpha satellite centromeric region D12Z3 of chromosome 12.
- Formamide based hybridization buffer



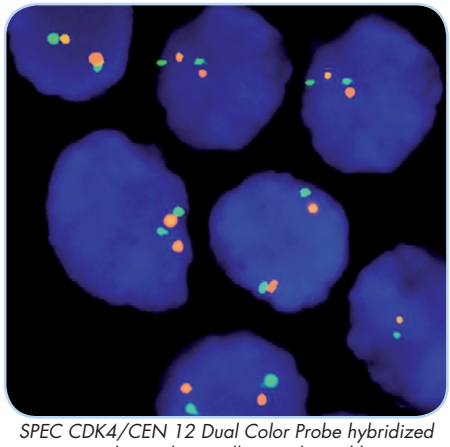
Ideogram of chromosome 12 indicating the hybridization locations.



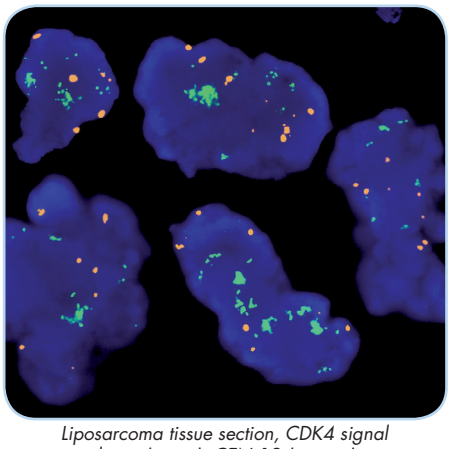
SPEC CDK4 Probe map (not to scale).

Results

In a normal interphase nucleus two orange and two green signals are expected. Nuclei with amplification of the CDK4 gene locus 12q13.3-q14.1, or polysomy of chromosome 12 will show multiple copies of the green signal or large green signal clusters.



SPEC CDK4/CEN 12 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Liposarcoma tissue section, CDK4 signal cluster (green), CEN 12 (orange).

Prod. No.	Product	Label	Tests* (Volume)
Z-2103-50	ZytoLight SPEC CDK4/CEN 12 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2103-200	ZytoLight SPEC CDK4/CEN 12 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC MDM2/CEN 12 Dual Color Probe

CE IVD

Background

The ZytoLight® SPEC MDM2/CEN 12 Dual Color Probe (PL18) is intended to be used for the qualitative detection of amplifications involving the human MDM2 gene as well as the detection of chromosome 12 alpha satellites in formalin-fixed, paraffin-embedded specimens, such as atypical lipomatous tumor/well differentiated liposarcoma (ALT/WDLPS) and dedifferentiated liposarcoma (DDLPS), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

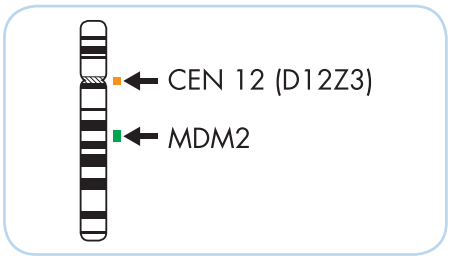
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of ALT/WDLPS and DDLPS and therapeutic measures should not be initiated based on the test result alone.

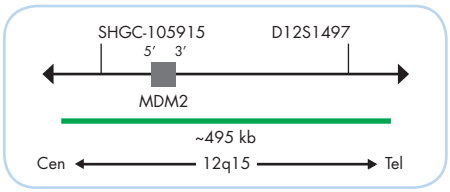
Probe Description

The ZytoLight® SPEC MDM2/CEN 12 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 12q15** (chr12:69,071,802-69,565,421) harboring the MDM2 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 12p11.1-q11 specific for the alpha satellite centromeric region D12Z3 of chromosome 12.
- Formamide based hybridization buffer



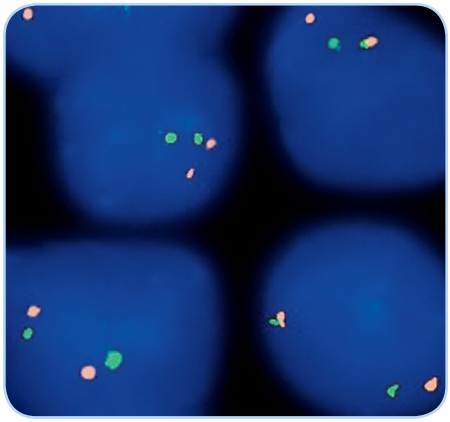
Ideogram of chromosome 12 indicating the hybridization locations.



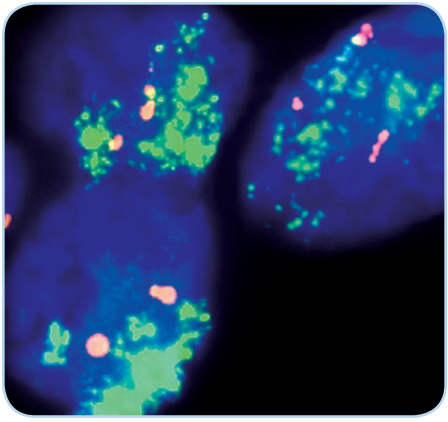
SPEC MDM2 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the MDM2 gene locus, multiple copies of the green signal or green signal clusters will be observed.



Normal interphase cells, MDM2 (green), CEN 12 (orange).



Liposarcoma tissue section with amplification of the MDM2 gene (green), CEN 12 (orange).

Prod. No.	Product	Label	Tests* (Volume)
Z-2013-50	ZytoLight SPEC MDM2/CEN 12 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2013-200	ZytoLight SPEC MDM2/CEN 12 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC FOXO1 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC FOXO1 Dual Color Break Apart Probe (PL96) is intended to be used for the qualitative detection of translocations involving the human FOXO1 gene at 13q14.11 in formalin-fixed, paraffin-embedded specimens, such as alveolar rhabdomyosarcoma (ARMS), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

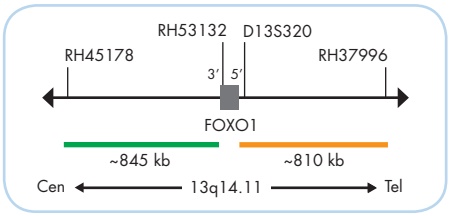
The probe is intended to be used as an aid to the differential diagnosis of ARMS and therapeutic measures should not be initiated based on the test result alone.

Probe Description

The ZytoLight® SPEC FOXO1 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 13q14.11** (chr13:40,285,558-41,132,595) proximal to the FOXO1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 13q14.11** (chr13:41,246,917-42,054,781) distal to the FOXO1 breakpoint region.
- Formamide based hybridization buffer

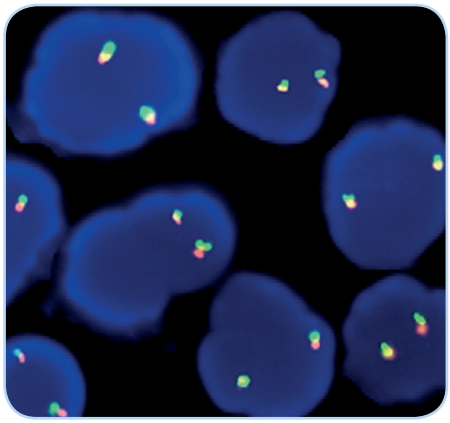
Ideogram of chromosome 13 indicating the hybridization locations.



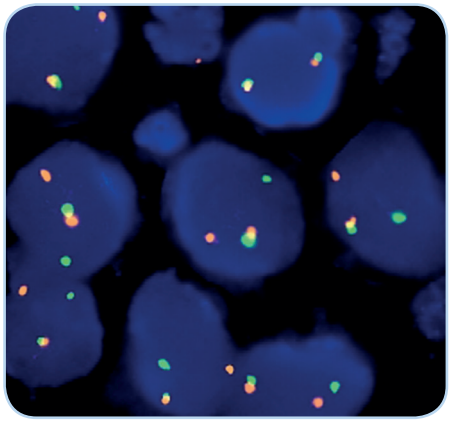
SPEC FOXO1 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 13q14.11 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 13q14.11 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 13q14.11 locus and one 13q14.11 locus affected by a translocation.



SPEC FOXO1 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Rhabdomyosarcoma tissue section with translocation affecting the 13q14.11 locus harboring FOXO1 as indicated by one orange/green fusion signal (non-rearranged), one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2139-50	ZytoLight SPEC FOXO1 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC FOXO1/PAX3 Dual Color Single Fusion Probe

CE IVD

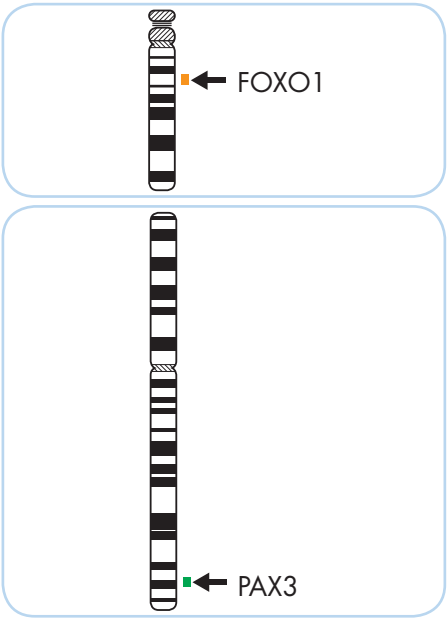
Background

The ZytoLight® SPEC FOXO1/PAX3 Dual Color Single Fusion Probe (PL16) is intended to be used for the qualitative detection of translocation t(2;13)(q36;q14.1) involving the human FOXO1 and PAX3 genes in formalin-fixed, paraffin-embedded specimens, such as alveolar rhabdomyosarcoma (ARMS), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of ARMS and therapeutic measures should not be initiated based on the test result alone.

Probe Description

The ZytoLight® SPEC FOXO1/PAX3 Dual Color Single Fusion Probe is composed of:

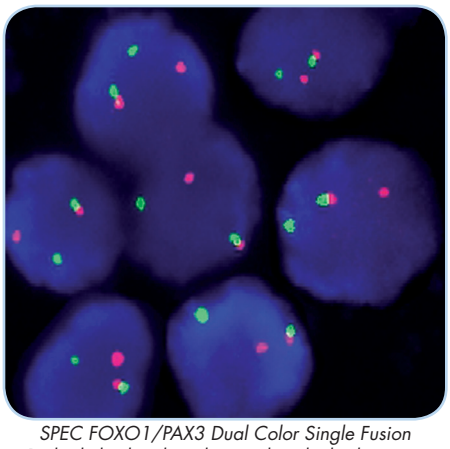
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 13q14.11** (chr13:40,816,168-41,132,595) proximal to the FOXO1 breakpoint region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 2q36.1** (chr2:223,196,078-223,539,352) distal to the PAX3 breakpoint region.
- Formamide based hybridization buffer



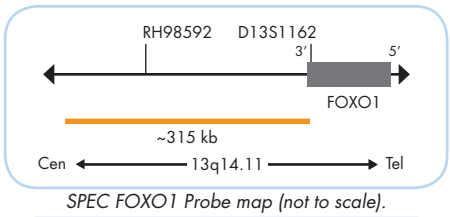
Ideograms of chromosomes 13 (above) and 2 (below) indicating the hybridization locations.

Results

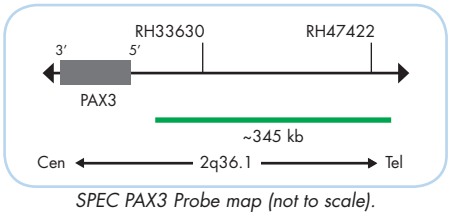
In an interphase nucleus lacking the t(2;13), two orange and two green signals are expected.
In a cell harboring the t(2;13), one orange signal, one green signal, and one orange/green fusion signal will be observed.



SPEC FOXO1/PAX3 Dual Color Single Fusion Probe hybridized to abnormal nuclei harboring a t(2;13)(q35;q14) as indicated by one orange, one green, and one orange/green fusion signal.



SPEC FOXO1 Probe map (not to scale).



SPEC PAX3 Probe map (not to scale).

Prod. No.	Product	Label	Tests* (Volume)
Z-2018-50	ZytoLight SPEC FOXO1/PAX3 Dual Color Single Fusion Probe CE IVD	●/●	5 (50 µl)
Z-2018-200	ZytoLight SPEC FOXO1/PAX3 Dual Color Single Fusion Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC FOXO1/PAX3 TriCheck™ Probe

CE IVD

Background

The ZytoLight® SPEC FOXO1/PAX3 TriCheck™ Probe (PL143) is intended to be used for the qualitative detection of rearrangements involving the human FOXO1 gene at 13q14.11 and the human PAX3 gene at 2q36.1 in formalin-fixed, paraffin-embedded specimens, such as alveolar rhabdomyosarcoma (ARMS), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of ARMS and therapeutic measures should not be initiated based on the test result alone.

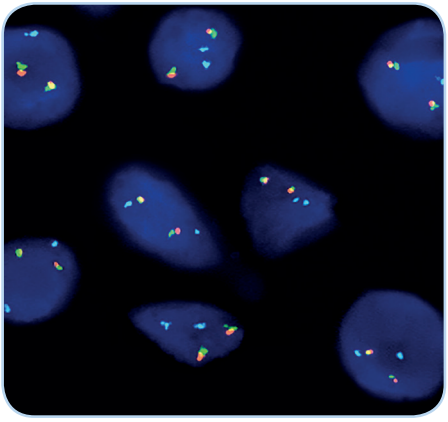
Probe Description

The ZytoLight® SPEC FOXO1/PAX3 TriCheck™ Probe is composed of:

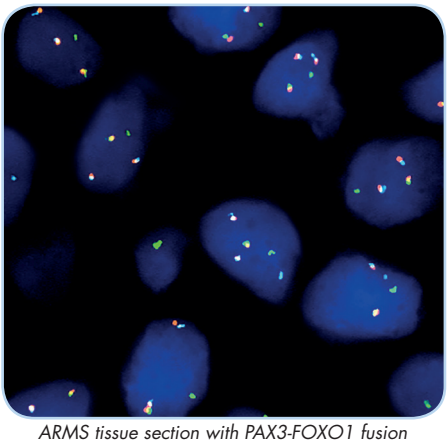
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 13q14.11** (chr13:41,246,917-42,054,781) distal to the FOXO1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 13q14.11** (chr13:40,578,036-41,132,595) proximal to the FOXO1 breakpoint region.
- ZyBlue (excitation at 418 nm and emission 467 nm) labeled polynucleotides (~37 ng/µl), which target sequences mapping in 2q36.1** (chr2:223,196,078-223,936,825) distal to the PAX3 breakpoint region.
- Formamide based hybridization buffer

Results

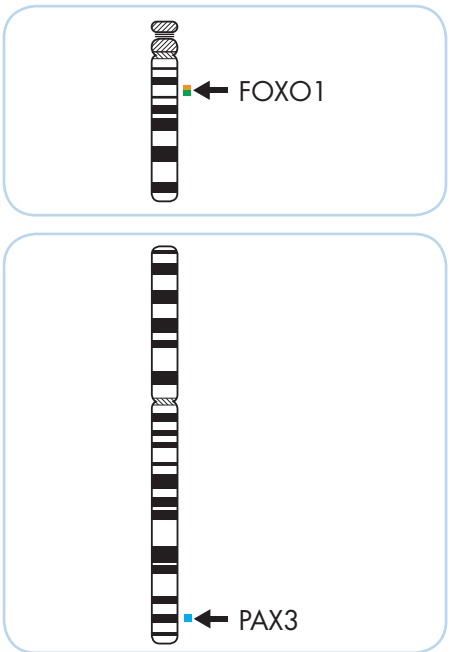
In an interphase nucleus without PAX3-FOXO1 rearrangement, two green/orange fusion signals and two blue signals are expected.
A PAX3-FOXO1 fusion is indicated by one separate orange signal co-localizing with one blue signal and one separate green signal.
A FOXO1 translocation without involvement of PAX3 is indicated by the split of one green/orange fusion signal without co-localization of the separated orange signal with one blue signal.



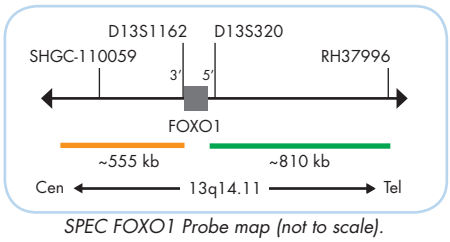
SPEC FOXO1/PAX3 TriCheck™ Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals and two blue signals per nucleus.



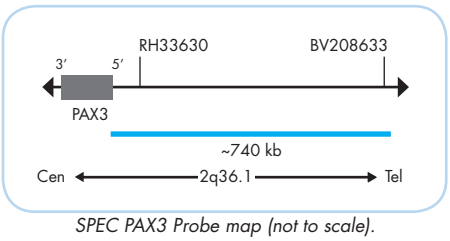
ARMS tissue section with PAX3-FOXO1 fusion as indicated by orange/blue fusion signals.



Ideograms of chromosomes 13 (above) and 2 (below) indicating the hybridization locations.



SPEC FOXO1 Probe map (not to scale).



SPEC PAX3 Probe map (not to scale).

Prod. No.	Product	Label	Tests* (Volume)
Z-2185-50	ZytoLight SPEC FOXO1/PAX3 TriCheck Probe CE IVD	●/●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC FOXO1/PAX7 Dual Color Single Fusion Probe

CE IVD

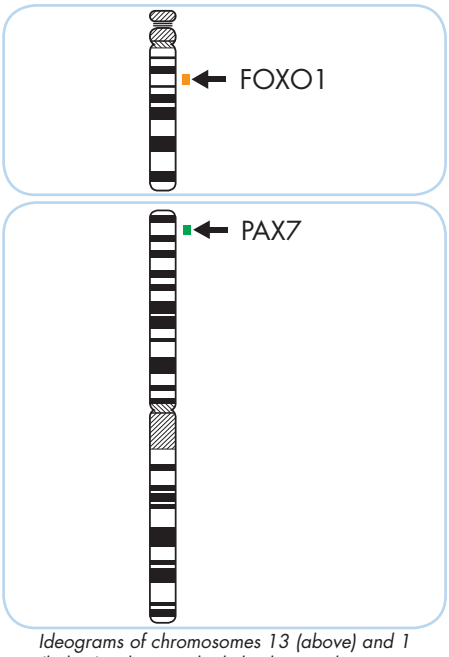
Background

The ZytoLight® SPEC FOXO1/PAX7 Dual Color Single Fusion Probe (PL17) is intended to be used for the qualitative detection of translocation t(1;13)(p36.1;q14.1) involving the human FOXO1 and PAX7 genes in formalin-fixed, paraffin-embedded specimens, such as alveolar rhabdomyosarcoma (ARMS), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of ARMS and therapeutic measures should not be initiated based on the test result alone.

Probe Description

The ZytoLight® SPEC FOXO1/PAX7 Dual Color Single Fusion Probe is composed of:

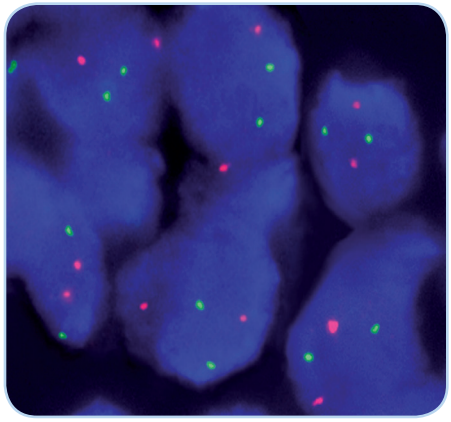
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 13q14.11** (chr13:40,816,168-41,132,595) proximal to the FOXO1 breakpoint region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 1p36.13** (chr1:18,139,970-18,956,785) distal to the PAX7 breakpoint region.
- Formamide based hybridization buffer



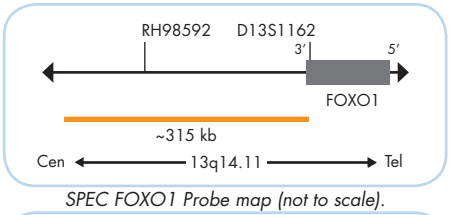
Ideograms of chromosomes 13 (above) and 1 (below) indicating the hybridization locations.

Results

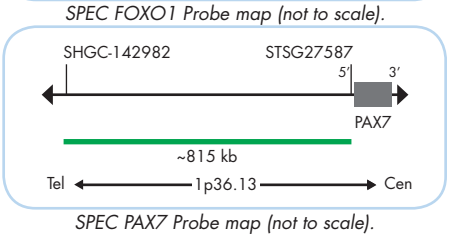
In an interphase nucleus lacking the t(1;13), two orange and two green signals are expected.
In a cell harboring the t(1;13), one orange signal, one green signal, and one orange/green fusion signal will be observed.



SPEC FOXO1/PAX7 Dual Color Single Fusion Probe hybridized to normal interphase cells as indicated by two orange and two green signals.



SPEC FOXO1 Probe map (not to scale).



SPEC PAX7 Probe map (not to scale).

Prod. No.	Product	Label	Tests* (Volume)
Z-2019-50	ZytoLight SPEC FOXO1/PAX7 Dual Color Single Fusion Probe CE IVD	●/●	5 (50 µl)
Z-2019-200	ZytoLight SPEC FOXO1/PAX7 Dual Color Single Fusion Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC RB1/13q34 Dual Color Probe

CE IVD

Background

The ZytoLight® SPEC RB1/13q34 Dual Color Probe is designed for the detection of deletions affecting the RB1 gene. The RB1 (RB transcriptional corepressor 1, a.k.a. pRb) gene is located on 13q14.2 and encodes a protein which acts as a tumor suppressor playing a crucial role in cell cycle regulation and genome stability. Deletions of RB1 are frequently found in retinoblastoma. However, either monoallelic or biallelic deletions of RB1 are also common in a wide variety of solid tumors and hematologic malignancies such as multiple myeloma (MM) and chronic lymphocytic leukemia (CLL).

While 13q14 deletions exclusive of RB1 confer a more favorable prognosis in CLL patients, 13q14 deletions that encompass the RB1 locus (present in approx. 20% of all CLL cases) are associated with shortened survival.

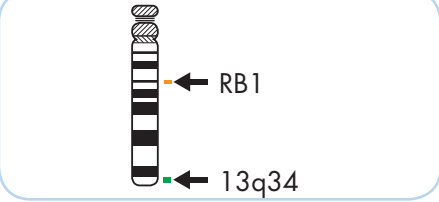
Hence, FISH is a valuable tool for the detection of RB1 gene deletions and can be used in combination with further biological markers, morphology and clinical information for the prediction of disease progression and overall survival.

References
Dal Bo M, et al. (2011) Genes Chromosomes Cancer 50: 633-43.
Dao DD, et al. (1994) Leukemia 8: 1280-4.
Di Fiore R, et al. (2013) J Cell Physiol 228: 1676-87.
Juge-Morineau N, et al. (1997) Leuk Lymphoma 24: 229-37.
Orlandi EM, et al. (2013) Hematol Oncol 31: 136-42.
Ouillette P, et al. (2011) Clin Cancer Res 17: 6778-90.

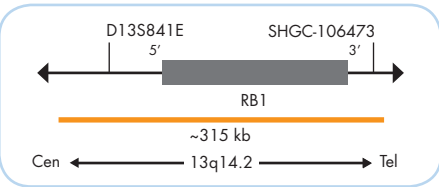
Probe Description

The ZytoLight® SPEC RB1/13q34 Dual Color Probe is composed of:

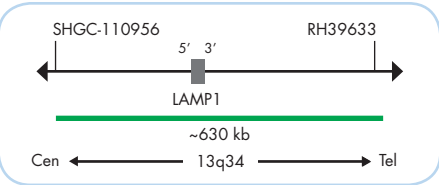
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 13q14.2** (chr13:48,776,918-49,092,570) harboring the RB1 gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 13q34** (chr13:113,691,216-114,323,467).
- Formamide based hybridization buffer



Ideogram of chromosome 13 indicating the hybridization locations.



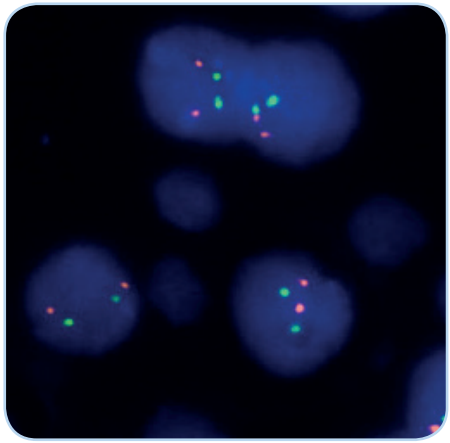
SPEC RB1 Probe map (not to scale).



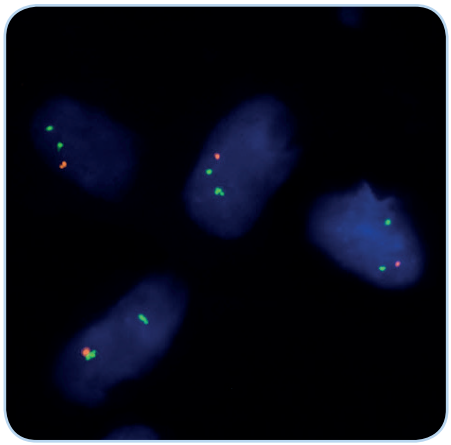
SPEC 13q34 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletions affecting the RB1 gene locus, one or no copy of the orange signal will be observed.



SPEC RB1/13q34 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



SPEC RB1/13q34 Dual Color Probe hybridized to lipoma tissue section with deletion of the RB1 gene as indicated by one orange signal and two green signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2324-50	ZytoLight SPEC RB1/13q34 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2324-200	ZytoLight SPEC RB1/13q34 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC IGH Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC IGH Dual Color Break Apart Probe (PL67) is intended to be used for the qualitative detection of translocations involving the human IGH locus at 14q32.33 in cytologic or formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with ZytoLight® FISH Implementation Kits (Prod. No. Z-2028-5/-20, or Z-2099-20).

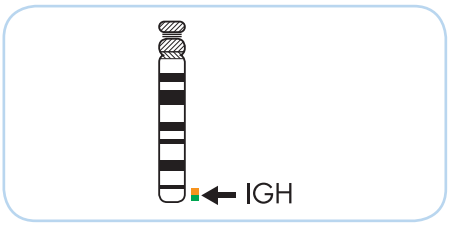
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

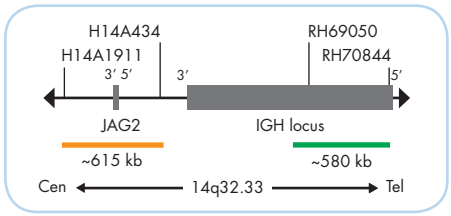
Probe Description

The ZytoLight® SPEC IGH Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 14q32.33** (chr14:106,690,778-107,268,412) distal to the IGH breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 14q32.33** (chr14:105,296,741-105,909,611) proximal to the IGH breakpoint region.
- Formamide based hybridization buffer



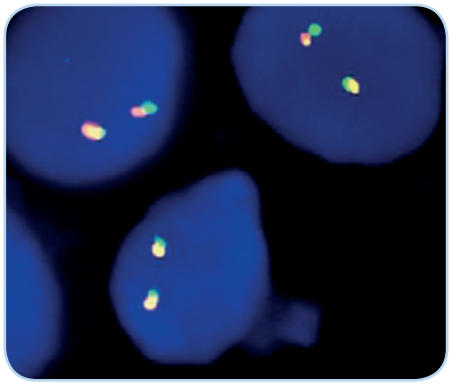
Ideogram of chromosome 14 indicating the hybridization locations.



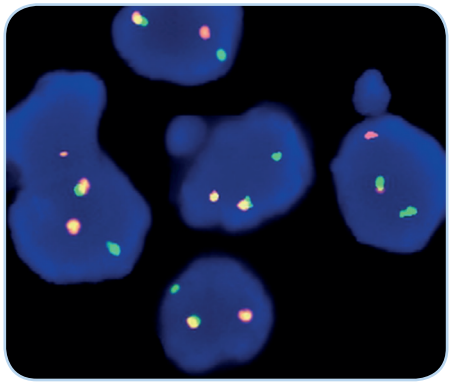
SPEC IGH Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 14q32.33 band two orange/green fusion signals are expected representing two normal (non-rearranged) 14q32.33 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 14q32.33 locus and one 14q32.33 locus affected by a translocation.



SPEC IGH Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: Burkitt lymphoma tissue section with translocation affecting the 14q32.33 locus as indicated by one non-rearranged orange/green fusion signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2110-50	ZytoLight SPEC IGH Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2110-200	ZytoLight SPEC IGH Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC Prader-Willi Dual Color Probe

CE IVD

Background

The ZytoLight® SPEC Prader-Willi Dual Color Probe is designed to detect deletions affecting the chromosomal region 15q11.2 harboring the SNRPN (small nuclear ribonucleoprotein polypeptide N, a.k.a. PWCR) gene.

The Prader-Willi syndrome (PWS) is a sporadic genetic disorder caused by genomic errors that inactivate paternally-inherited genes in the PWS critical region on chromosome 15q11-q13. The absence of expression of one or more of these genes contributes to different phenotypes of PWS. There are three main genetic causes: paternal 5-7 Mb deletion of the 15q11-q13 region, maternal uniparental disomy 15, or imprinting defects in the PWS critical region.

The SNRPN gene is located within the PWS region and has an important regulatory role over the imprinted genes located in chromosome 15.

The estimated prevalence of the disease ranges between 1/15,000 and 1/30,000 newborns. PWS patients clinically display a characteristic pattern of symptoms including hypotonia with poor suck and poor weight gain in infancy, mild mental retardation, hypogonadism, growth hormone insufficiency causing short stature, early childhood-onset hyperphagia and obesity, characteristic appearance, and behavioral and sometimes psychiatric disturbance.

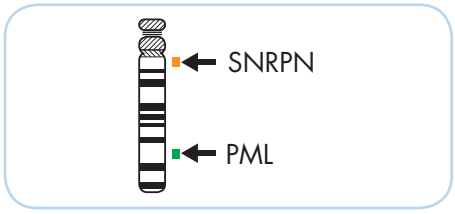
Early diagnosis offers the opportunity to significantly improve health and quality of life of people with PWS. FISH analysis can be performed to detect deletions within the PWS critical region and can help to confirm PWS diagnosis in patients with clinical features characteristic for PWS.

References
Cassidy AB & Driscoll DJ (2009) Eur J Hum Genet 17: 3-13.
Costa RA, et al. (2019) Front Endocrinol (Lausanne) 10: 864.

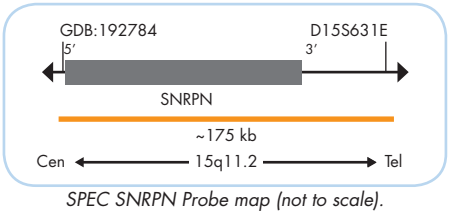
Probe Description

The ZytoLight® SPEC Prader-Willi Dual Color Probe is composed of:

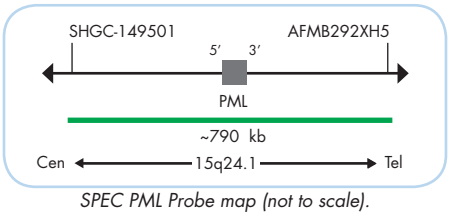
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 15q11.2** (chr15:25,097,811-25,270,969) harboring the SNRPN gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 15q24.1** (chr15:73,910,690-74,699,298) harboring the PML gene region.
- Formamide based hybridization buffer



Ideogram of chromosome 15 indicating the hybridization locations.



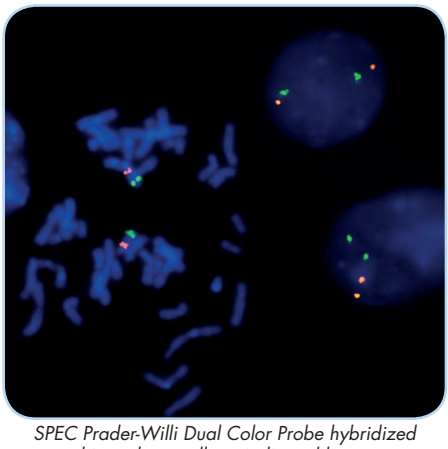
SPEC SNRPN Probe map (not to scale).



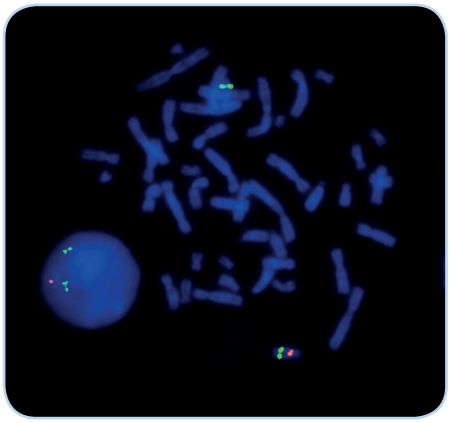
SPEC PML Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletion of the SNRPN gene locus, a reduced number of orange signals will be observed.



SPEC Prader-Willi Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus and to metaphase chromosomes of a normal cell.



Lymphocytes and metaphase chromosomes from a Prader-Willi syndrome case showing deletion affecting the chromosomal region 15q11.2 as indicated by the loss of one orange signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2318-50	ZytoLight SPEC Prader-Willi Dual Color Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC Angelman Dual Color Probe

CE IVD

Background

The ZytoLight® SPEC Angelman Dual Color Probe (PL273) is intended to be used for the qualitative detection of human UBE3A gene deletions as well as the detection of the human PML gene in cytologic specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20).

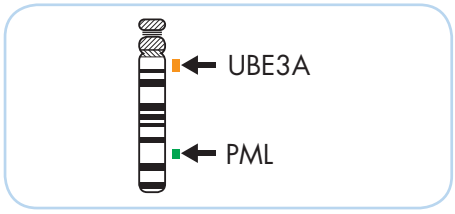
The product is intended for professional use only. All tests using the above mentioned product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

Interpretation of the results must be made within the context of the patient´s clinical history with respect to further clinical and pathologic data of the patient by a qualified pathologist/human geneticist.

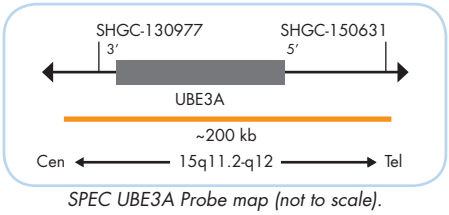
Probe Description

The ZytoLight® SPEC Angelmann Dual Color Probe is composed of:

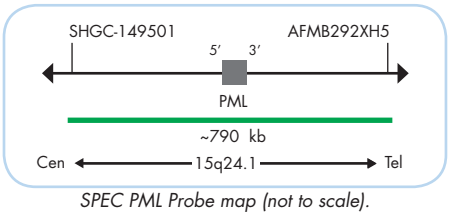
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 15q11.2-q12** (chr15:25,550,004-25,748,900) harboring the UBE3A gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 15q24.1** (chr15:73,910,690-74,699,298) harboring the PML gene region.
- Formamide based hybridization buffer



Ideogram of chromosome 15 indicating the hybridization locations.



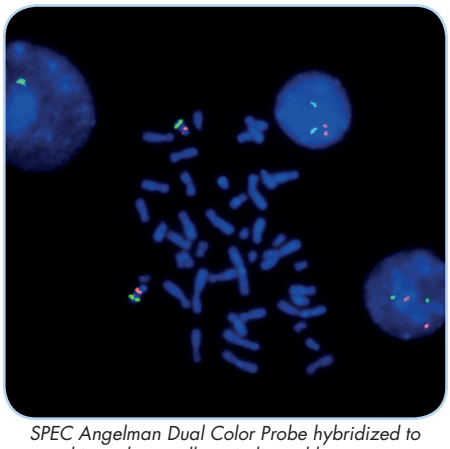
SPEC UBE3A Probe map (not to scale).



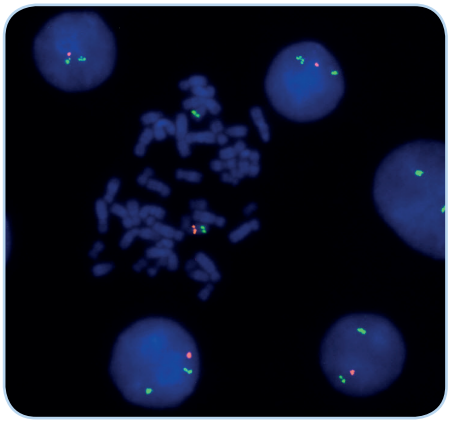
SPEC PML Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletion of the UBE3A gene locus, a reduced number of orange signals will be observed.



SPEC Angelman Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus and to metaphase chromosomes of a normal cell.



Lymphocytes and metaphase chromosomes from an Angelman syndrome case showing deletion affecting the chromosomal region 15q11.2-q12 as indicated by the loss of one orange signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2319-50	ZytoLight SPEC Angelman Dual Color Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC NUTM1 Dual Color Break Apart Probe

CE IVD

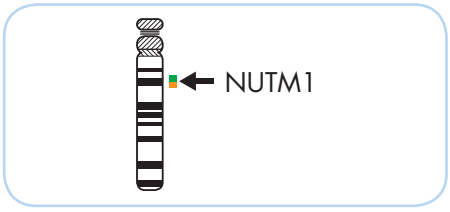
Background

The ZytoLight® SPEC NUTM1 Dual Color Break Apart Probe (PL166) is intended to be used for the qualitative detection of translocations involving the human NUTM1 gene at 15q14 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

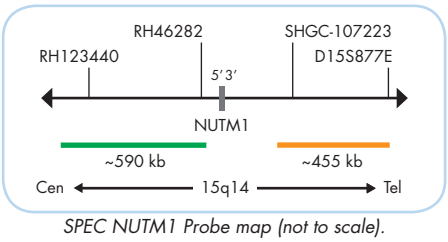
Probe Description

The ZytoLight® SPEC NUTM1 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 15q14** (chr15:33,999,791-34,587,649) proximal to the NUTM1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 15q14** (chr15:34,873,659-35,326,986) distal to the NUTM1 breakpoint region.
- Formamide based hybridization buffer.



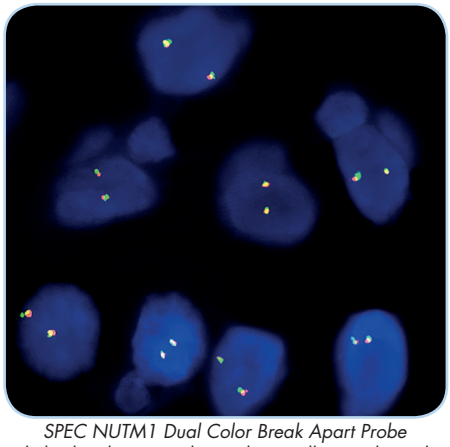
Ideogram of chromosome 15 indicating the hybridization locations.



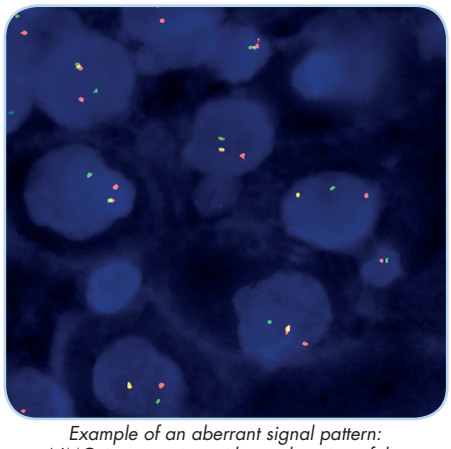
SPEC NUTM1 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 15q14 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 15q14 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 15q14 locus and one 15q14 locus affected by a translocation.



SPEC NUTM1 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: NMC tissue section with translocation of the NUTM1 gene as indicated by one non-rearranged orange/green fusion signal, one orange and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2208-200	ZytoLight SPEC NUTM1 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC PML/RARA Dual Color Dual Fusion Probe

CE IVD

Background

The ZytoLight® SPEC PML/RARA Dual Color Dual Fusion Probe is designed to detect the translocation t(15;17)(q24;q21.2) affecting the PML gene in the chromosomal region 15q24.1 and the RARA locus in 17q21.2.

Translocations involving the PML (promyelocytic leukemia, a.k.a. MYL) gene and the RARA (retinoic acid receptor alpha, a.k.a. RARα) gene are considered to be characteristic for acute promyelocytic leukemia (APL), a subtype of acute myeloid leukemia.

Various fusion partners of RARA have been identified, however, in 95% of all APL cases, rearrangements involving the PML gene are detectable. This translocation t(15;17)(q24;q21) leads to a gene fusion of the PML and the RARA gene. The fusion is supposed to play a fundamental role in induction, development, and progression of APL.

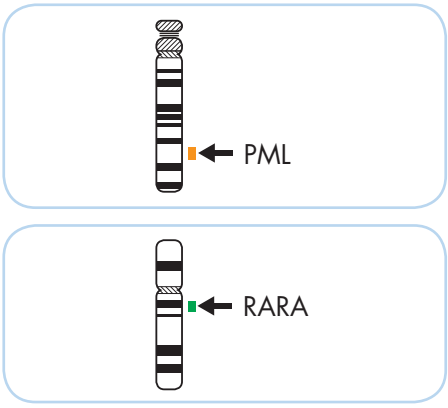
Since the PML/RARA fusion accounts for the response of these neoplasms to all-trans retinoic acid (ATRA) therapy and other conventional chemotherapy it is important to accurately distinguish between t(15;17) translocations and translocations involving other partners of RARA.

References
Abe S, et al. (2008) Cancer Genet and Cytogenet 184: 44-7.
Brockmann SR, et al. (2003) Cancer Genet and Cytogenet 145: 144-51.
Reiter A, et al. (2004) Acta Hematol 112: 55-67.
Sanz MA, et al. (2009) Blood 113: 1875-91.

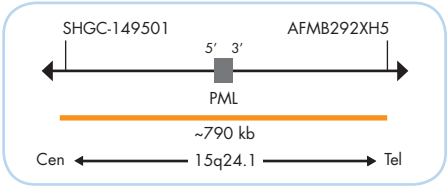
Probe Description

The ZytoLight® SPEC PML/RARA Dual Color Dual Fusion Probe is composed of:

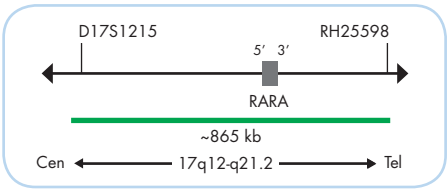
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~12 ng/µl), which target sequences mapping in 17q12-q21.2** (chr17:37,953,503-38,818,030).
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~6 ng/µl), which target sequences mapping in 15q24.1** (chr15:73,910,690-74,699,298).
- Formamid based hybridization buffer



Ideograms of chromosomes 15 (above) and 17 (below) indicating the hybridization locations.



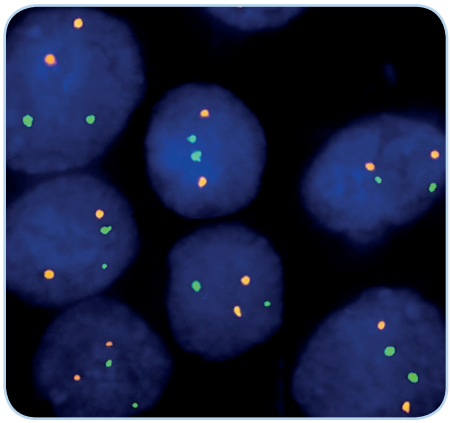
SPEC PML Probe map (not to scale).



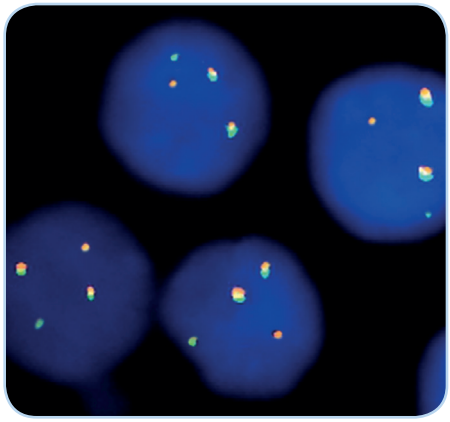
SPEC RARA Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. A reciprocal PML/RARA translocation leads to two orange/green fusion signals indicating both rearranged chromosomes. Additionally, the non-rearranged chromosomes are indicated by one orange signal and a separate green signal, respectively.



SPEC PML/RARA Dual Color Dual Fusion Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Bone marrow biopsy section with translocation affecting the PML/RARA loci as indicated by one separate orange signal, one separate green signal, and two orange/green fusion signals.

Prod. No.	Product	Label	Tests* (Volume)
Z-2113-50	ZytoLight SPEC PML/RARA Dual Color Dual Fusion Probe CE IVD	●/●	5 (50 µl)
Z-2113-200	ZytoLight SPEC PML/RARA Dual Color Dual Fusion Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC NTRK3 Dual Color Break Apart Probe

CE IVD

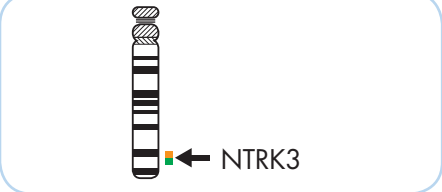
Background

The ZytoLight® SPEC NTRK3 Dual Color Break Apart Probe (PL164) is intended to be used for the qualitative detection of translocations involving the human NTRK3 gene at 15q25.3 in cytologic or formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH).
The probe is intended to be used in combination with ZytoLight® FISH Implementation Kits (Prod. No. Z-2028-5/-20, or Z-2099-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

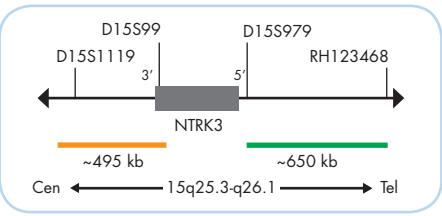
Probe Description

The ZytoLight® SPEC NTRK3 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 15q25.3-q26.1** (chr15:88,825,346-89,475,889) distal to the NTRK3 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 15q25.3** (chr15:87,976,717-88,471,002) proximal to the NTRK3 breakpoint region.
- Formamide based hybridization buffer



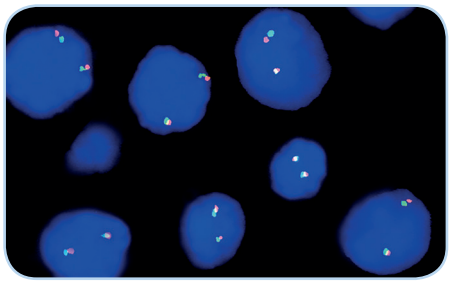
Ideogram of chromosome 15 indicating the hybridization locations.



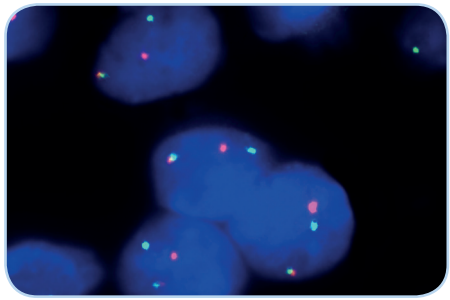
SPEC NTRK3 Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 15q25.3-q26.1 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 15q25.3-q26.1 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 15q25.3-q26.1 locus and one 15q25.3-q26.1 locus affected by a translocation. Isolated orange signals are the result of deletions distal to the NTRK3 breakpoint region or are due to unbalanced translocations affecting this chromosomal region.



SPEC NTRK3 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: Secretory breast carcinoma tissue section with translocation affecting the 15q25.3-q26.1 locus as indicated by one non-rearranged orange/green fusion signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2206-50	ZytoLight SPEC NTRK3 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2206-200	ZytoLight SPEC NTRK3 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC CREBBP Dual Color Break Apart Probe

CE IVD

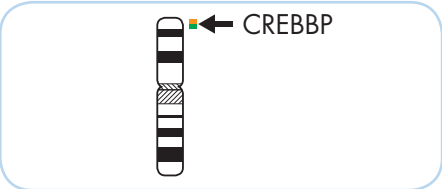
Background

The ZytoLight® SPEC CREBBP Dual Color Break Apart Probe is designed for the detection of translocations involving the chromosomal region 16p13.3 harboring the CREBBP (CREB binding protein, a.k.a. CBP, RTS) gene. The CREBBP protein regulates transcription by means of histone acetyltransferase activity and by binding to several proteins with key cell cycle functions, such as p53 and NFκB. Rearrangements of the CREBBP gene have been observed in several hematologic malignancies. Three different fusion partners have been described so far. KMT2A (a.k.a. MLL) is fused to CREBBP in therapy-related acute myeloid (AML) or lymphoid leukemia (ALL) and myelodysplastic syndrome (MDS) with t(11;16)(q23.3;p13.3). The translocation t(10;16)(q22.2;p13.3) was reported in some AML cases and fuses KAT6B (a.k.a. MORF) to CREBBP. CREBBP is also rearranged with KAT6A (a.k.a. MOZ) in *de novo* and therapy-related AML with t(8;16)(p11.2;p13.3) after treatment with topoisomerase II inhibitors. This rearrangement is associated with an infrequent but well-defined type of AML that has characteristic morphocytochemical features. The prognosis is usually extremely poor, with a median survival of two months.
The KAT6A/CREBBP AML tends to develop within two years of adjuvant chemotherapy, especially in former breast cancer patients.
Thus, FISH analysis for the detection of CREBBP translocation may serve as a diagnostic tool to identify cases with hematologic malignancies with an aggressive presentation.

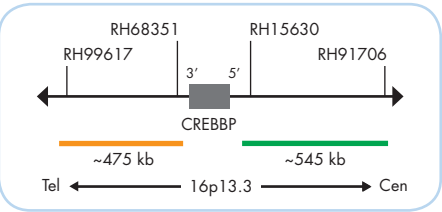
Probe Description

The ZytoLight® SPEC CREBBP Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 16p13.3** (chr16:3,978,217-4,521,684) proximal to the CREBBP breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 16p13.3** (chr16:3,287,067-3,762,188) distal to the CREBBP breakpoint region.
- Formamide based hybridization buffer



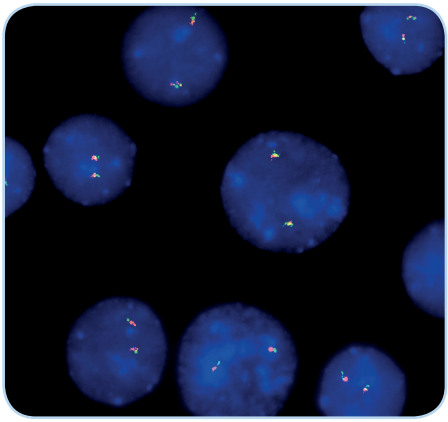
Ideogram of chromosome 16 indicating the hybridization locations.



SPEC CREBBP Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 16p13.3 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 16p13.3 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 16p13.3 locus and one 16p13.3 locus affected by a translocation.



SPEC CREBBP Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.

References
Borrow J, et al. (1996) Nat Genet 14: 33-41.
Camós M, et al. (2006) Cancer Res 66: 6947-54.
Gupta A, et al. (2014) Case Rep Oncol Med 2014: 361748.
Rozman M, et al. (2004) Genes Chromosomes Cancer 40: 140-5.
Taki T, et al. (1997) Blood 89: 3945-50.
Vizmanos JL, et al. (2003) Genes Chromosomes Cancer 36: 402-5.

Prod. No.	Product	Label	Tests* (Volume)
Z-2267-50	ZytoLight SPEC CREBBP Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC FUS Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC FUS Dual Color Break Apart Probe (PL87) is intended to be used for the qualitative detection of translocations involving the human FUS gene at 16p11.2 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

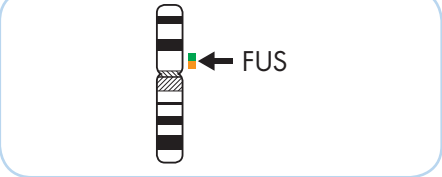
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

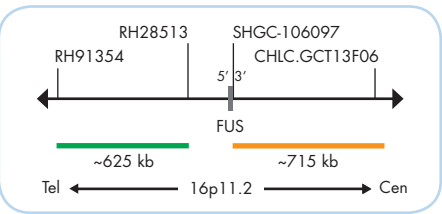
Probe Description

The ZytoLight® SPEC FUS Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 16p11.2** (chr16:30,383,304-31,007,836) distal to the FUS breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 16p11.2** (chr16:31,213,259-31,927,155) proximal to the FUS breakpoint region.
- Formamide based hybridization buffer



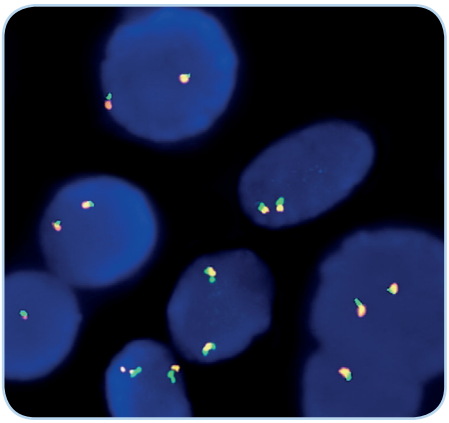
Ideogram of chromosome 16 indicating the hybridization locations.



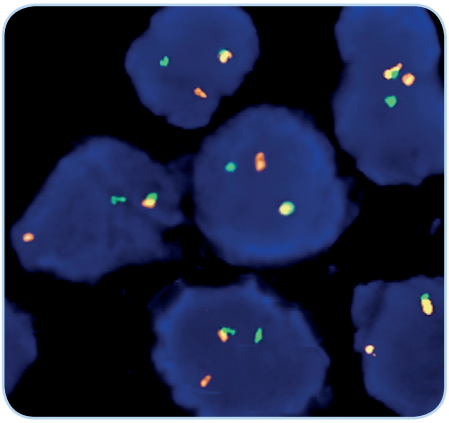
SPEC FUS Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 16p11.2 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 16p11.2 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 16p11.2 locus and one 16p11.2 locus affected by a 16p11.2 translocation.



SPEC FUS Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: Myxoid liposarcoma tissue section with translocation affecting the 16p11.2 locus as indicated by one non-rearranged orange/green fusion signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2130-50	ZytoLight SPEC FUS Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC CBFB Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC CBFB Dual Color Break Apart Probe (PL165) is intended to be used for the qualitative detection of translocations involving the human CBFB gene at 16q22.1 in cytologic specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20).

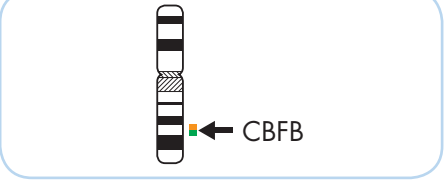
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

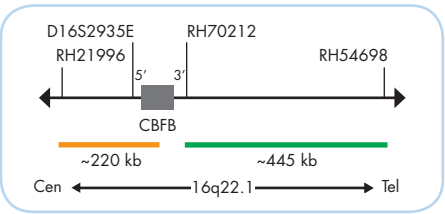
Probe Description

The ZytoLight® SPEC CBFB Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 16q22.1** (chr16:67,161,347-67,605,304) distal to the CBFB breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 16q22.1** (chr16:66,882,262-67,102,895) proximal to the CBFB breakpoint region.
- Formamide based hybridization buffer



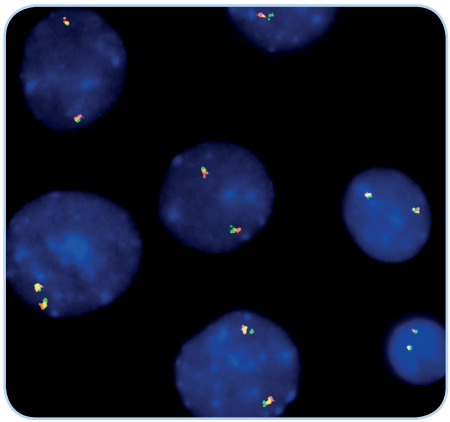
Ideogram of chromosome 16 indicating the hybridization locations.



SPEC CBFB Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 16q22.1 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 16q22.1 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 16q22.1 locus and one 16q22.1 locus affected by a translocation. In case of a deletion distal to the CBFB breakpoint region a single orange signal can be expected.



SPEC CBFB Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2207-50	ZytoLight SPEC CBFB Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC MAF/IGH Dual Color Dual Fusion Probe

CE IVD

Background

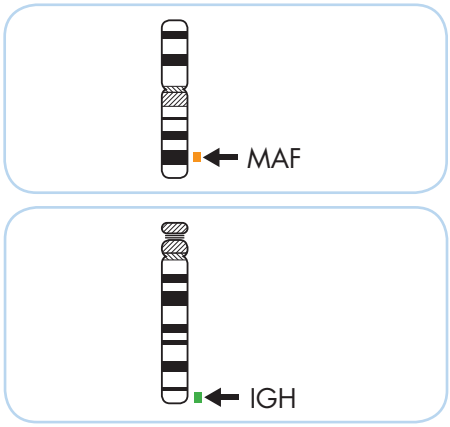
The ZytoLight® SPEC MAF/IGH Dual Color Dual Fusion Probe is designed to detect the translocations affecting the MAF gene in the chromosomal region 16q23.2 and the IGH locus in 14q32.33. The translocation t(14;16)(q32.3;q23) is frequently found in multiple myeloma (MM).
MM is a malignant post-germinal center tumor of somatically-mutated, isotype-switched plasma cells that accumulate in the bone marrow. It is often preceded by a premalignant state known as monoclonal gammopathy of undetermined significance (MGUS). Five recurrent primary translocations involving the immunoglobulin heavy locus (IGH) have been identified in 40% of MGUS and MM tumors. They include t(11;14)(q13.3;q32.3), t(6;14)(p21.1;q32.3), t(4;14)(p16.3;q32.3), t(14;16)(q32.3;q23), and t(14;20)(q32.3;q12), which involve the genes CCND1, CCND3, FGFR3 and NSD2, MAF, and MAFB, respectively. All of these translocations lead to the dysregulation and overexpression of the target genes as a consequence of their juxtaposition to regulatory sequences of the IGH locus. t(14;16) occurs in approximately 5% of MM patients and is associated with a more aggressive clinical outcome. The 16q23 breakpoints have been found to be scattered 550-1280 kb centromerically to the MAF gene within the WWOX gene. Hence, detection of t(14;16) by FISH represents a useful prognostic tool and may aid in therapeutic decision making in MM.

References
Chesi M, et al. (1998) Blood 91: 4457-63.
Fabris S, et al. (2005) Genes Chromosomes Cancer 42: 117-27.
Fonseca R, et al. (2009) Leukemia 23: 2210-21.
Gabrea A, et al. (2006) DNA Repair (Amst) 5: 1225-33.

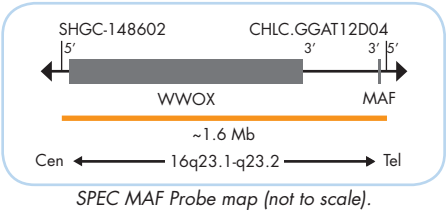
Probe Description

The ZytoLight® SPEC MAF/IGH Dual Color Dual Fusion Probe is composed of:

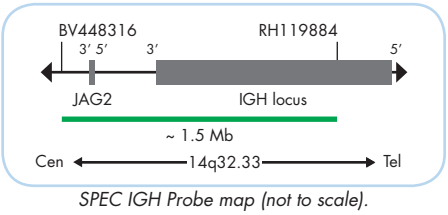
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~6.0 ng/µl), which target sequences mapping in 16q23.1-q23.2** (chr16:78,089,697-79,657,277) harboring the MAF gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~12.0 ng/µl), which target sequences mapping in 14q32.33** (chr14:105,462,169-106,995,000) harboring the IGH locus.
- Formamid based hybridization buffer



Ideograms of chromosome 16 (above) and 14 (below) indicating the hybridization locations.



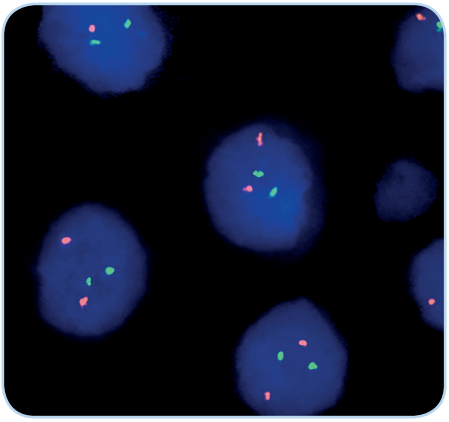
SPEC MAF Probe map (not to scale).



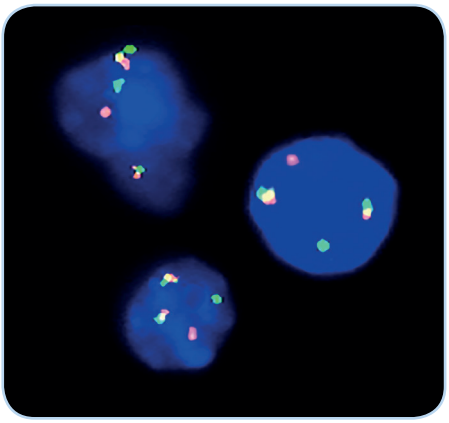
SPEC IGH Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. A reciprocal translocation involving two breakpoints splits the two signals and generates a fusion signal on each of the chromosomes involved. The chromosomal regions which are not translocated are indicated by the single orange and green signal, respectively.



SPEC MAF/IGH Dual Color Dual Fusion Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Bone marrow CD138+ cells with translocation affecting the MAF/IGH loci as indicated by two orange/green fusion signals, a single orange, and a separate green signal in each nucleus.

Kindly provided by Prof. Dr. Oskar A. Haas, Vienna, Austria.

Prod. No.	Product	Label	Tests* (Volume)
Z-2270-50	ZytoLight SPEC MAF/IGH Dual Color Dual Fusion Probe CE IVD	●/●	5 (50 µl)
Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC MAFB/IGH Dual Color Dual Fusion Probe

CE IVD

Background

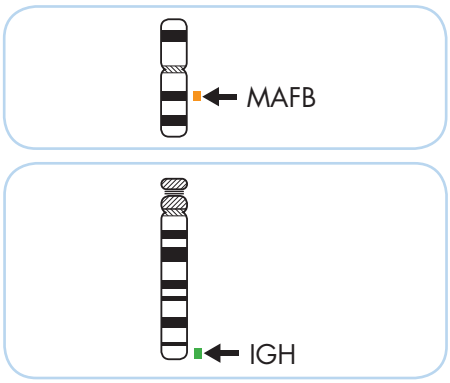
The ZytoLight® SPEC MAFB/IGH Dual Color Dual Fusion Probe is designed to detect the translocations affecting the MAFB gene in the chromosomal region 20q12 and the IGH locus in 14q32.33. The translocation t(14;20)(q32.3;q12) is frequently found in multiple myeloma (MM).
MM is a low proliferative, malignant post-germinal center tumor of somatically mutated, isotype-switched plasma cells that accumulate in the bone marrow.
It is often preceded by a premalignant state known as monoclonal gammopathy of undetermined significance (MGUS).
Five recurrent primary translocations involving the immunoglobulin heavy locus (IGH) have been identified in 40% of MGUS and MM tumors. They include t(11;14)(q13.3;q32.3), t(6;14)(p21.1;q32.3), t(4;14)(p16.3;q32.3), t(14;16)(q32.3;q23), and t(14;20)(q32.3;q12), which involve the genes CCND1, CCND3, FGFR3 and NSD2, MAF, and MAFB, respectively. All of these translocations lead to the deregulation and overexpression of the target genes as a consequence of their juxtaposition to regulatory sequences of the IGH locus.
The t(14;20) occurs in approximately 1-2% of MM patients and is associated with an adverse prognosis. Thus, currently, detection of t(14;20) by FISH is a reliable prognostic tool and may sustain therapeutic decision making in MM.

References
Boersma-Vreugdenhil GR, et al. (2004) Br J Haematol 126: 355-63.
Chesi M, et al. (1998) Blood 92: 4457-63.
Fabris S, et al. (2005) Genes Chromosomes Cancer 42: 117-27.
Fonseca R, et al. (2009) Leukemia 23: 2210-21.
Gabrea A, et al. (2006) DNA Repair (Amst) 5: 1225-33.
Hanamura I, et al. (2001) Jpn N Cancer Res 92: 638-44.

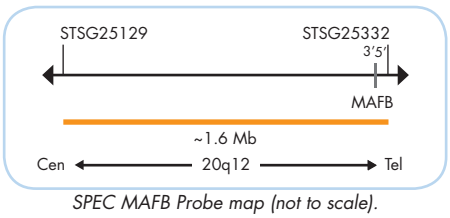
Probe Description

The ZytoLight® SPEC MAFB/IGH Dual Color Dual Fusion Probe is composed of:

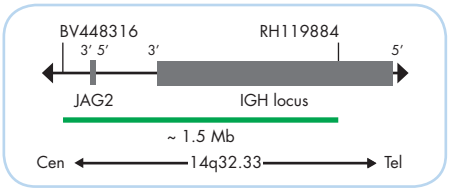
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~6.0 ng/µl), which target sequences mapping in 20q12** (chr20:37,782,012-39,385,613) harboring the MAFB gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~12.0 ng/µl), which target sequences mapping in 14q32.33** (chr14:105,462,169-106,995,000) harboring the IGH locus.
- Formamid based hybridization buffer



Ideograms of chromosome 20 (above) and 14 (below) indicating the hybridization locations.



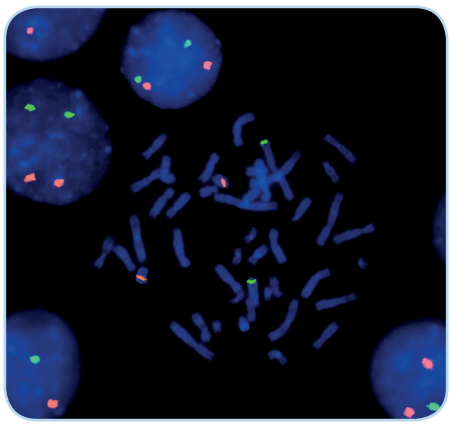
SPEC MAFB Probe map (not to scale).



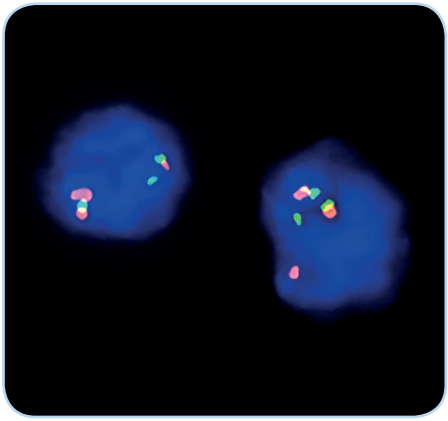
SPEC IGH Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. A reciprocal translocation involving two breakpoints splits the two signals and generates a fusion signal on each of the chromosomes involved. The chromosomal regions which are not translocated are indicated by the single orange and green signal, respectively.



SPEC MAFB/IGH Dual Color Dual Fusion Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus and to metaphase chromosomes of a normal cell.



Bone marrow CD138+ cells with translocation affecting the MAFB/IGH loci as indicated by two orange/green fusion signals, a single orange, and a separate green signal in each nucleus.

Kindly provided by Prof. Dr. Oskar A. Haas, Vienna, Austria.

Prod. No.	Product	Label	Tests* (Volume)
Z-2271-50	ZytoLight SPEC MAFB/IGH Dual Color Dual Fusion Probe CE IVD	●/●	5 (50 µl)
Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC TP53/17q22 Dual Color Probe

CE IVD

Background

The ZytoLight® SPEC TP53/17q22 Dual Color Probe (PL156) is intended to be used for the qualitative detection of deletions involving the human TP53 gene as well as the detection of gains of chromosome 17q22 specific sequences in cytologic or formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with ZytoLight® FISH Implementation Kits (Prod. No. Z-2028-5/-20, or Z-2099-20).

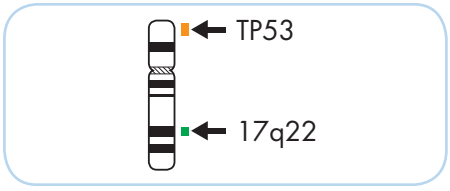
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

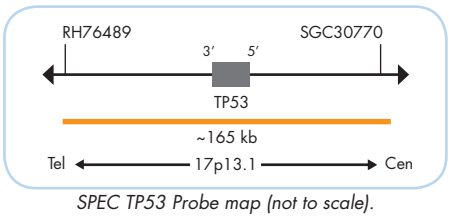
Probe Description

The ZytoLight® SPEC TP53/17q22 Dual Color Probe is composed of:

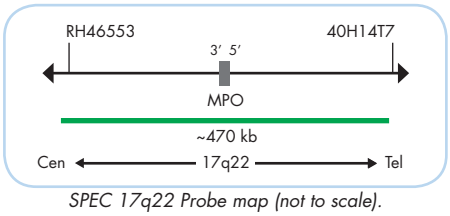
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 17p13.1** (chr17:7,495,749-7,663,022) harboring the TP53 gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 17q22** (chr17:56,124,338-56,594,220).
- Formamide based hybridization buffer



Ideogram of chromosome 17 indicating the hybridization locations.



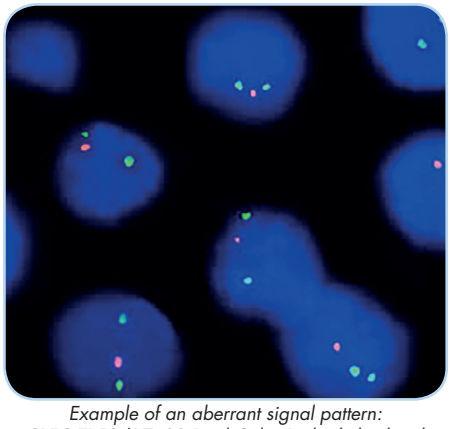
SPEC TP53 Probe map (not to scale).



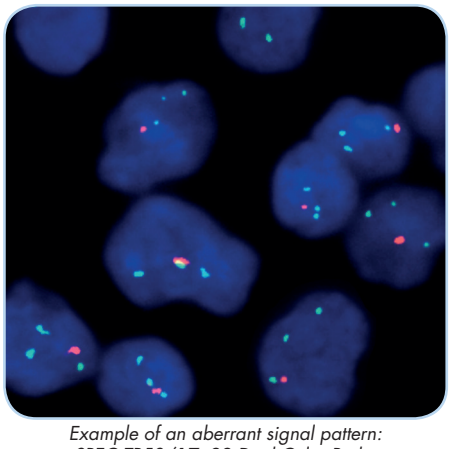
SPEC 17q22 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletion of the TP53 gene locus, one orange signal and two green signals can be detected. A gain of 17q involving the 17q22 region will result in three or more green signals and two orange signals. Isochromosome 17q is indicated by three green signals and one orange signal.



Example of an aberrant signal pattern: SPEC TP53/17q22 Dual Color Probe hybridized to bone marrow tissue section with deletion of the TP53 gene as indicated by one orange signal and two green signals in each nucleus.



Example of an aberrant signal pattern: SPEC TP53/17q22 Dual Color Probe hybridized to a bone marrow smear with isochromosome 17q as indicated by three green signals and one orange signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2198-50	ZytoLight SPEC TP53/17q22 Dual Color Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC TP53/CEN 17 Dual Color Probe

CE IVD

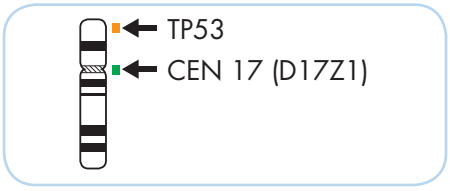
Background

The ZytoLight® SPEC TP53/CEN 17 Dual Color Probe (PL109) is intended to be used for the qualitative detection of deletions involving the human TP53 gene as well as the detection of chromosome 17 alpha satellites in cytologic or formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH).
The probe is intended to be used in combination with ZytoLight® FISH Implementation Kits (Prod. No. Z-2028-5/-20, or Z-2099-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

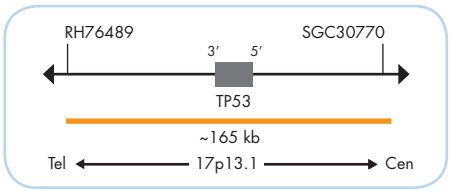
Probe Description

The ZytoLight® SPEC TP53/CEN 17 Dual Color Probe is composed of:

- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 17p13.1** (chr17:7,495,749-7,663,022) harboring the TP53 gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 17p11.1-q11.1 specific for the alpha satellite centromeric region D17Z1 of chromosome 17.
- Formamide based hybridization buffer



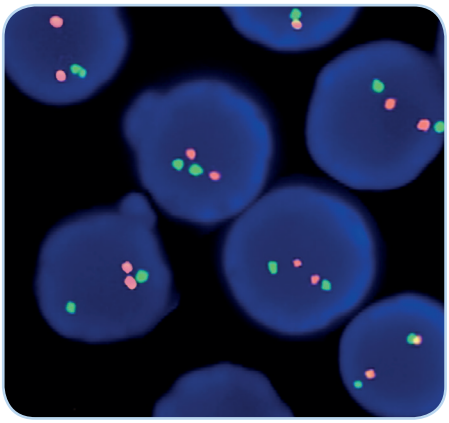
Ideogram of chromosome 17 indicating the hybridization locations.



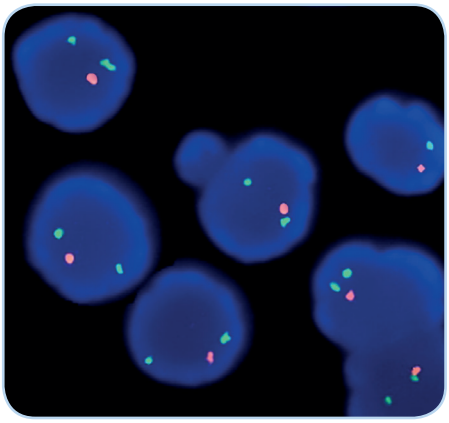
SPEC TP53 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletions affecting the TP53 gene locus, one or no copy of the orange signal will be observed.



SPEC TP53/CEN 17 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Example of an aberrant signal pattern: SPEC TP53/CEN 17 Dual Color Probe hybridized to bone marrow tissue section with deletion of the TP53 gene as indicated by one orange signal and two green signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2153-50	ZytoLight SPEC TP53/CEN 17 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2153-200	ZytoLight SPEC TP53/CEN 17 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC USP6 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC USP6 Dual Color Break Apart Probe (PL107) is intended to be used for the qualitative detection of translocations involving the human USP6 gene at 17p13.2 in formalin-fixed, paraffin-embedded specimens, such as aneurysmal bone cyst (ABC) or nodular fasciitis (NF), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

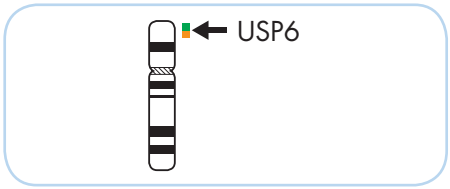
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of ABC or NF and therapeutic measures should not be initiated based on the test result alone.

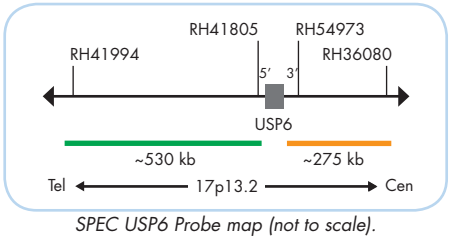
Probe Description

The ZytoLight® SPEC USP6 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 17p13.2** (chr17:4,489,889-5,017,582) distal to the USP6 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 17p13.2** (chr17:5,087,046-5,361,104) proximal to the USP6 breakpoint region.
- Formamide based hybridization buffer



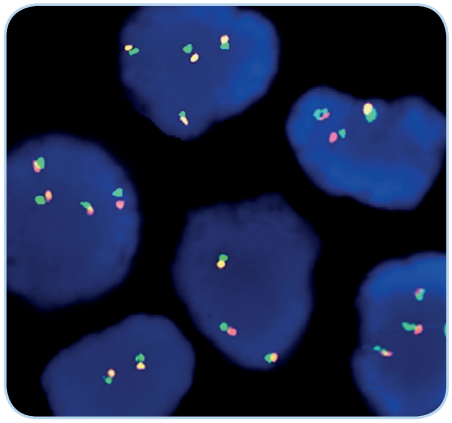
Ideogram of chromosome 17 indicating the hybridization locations.



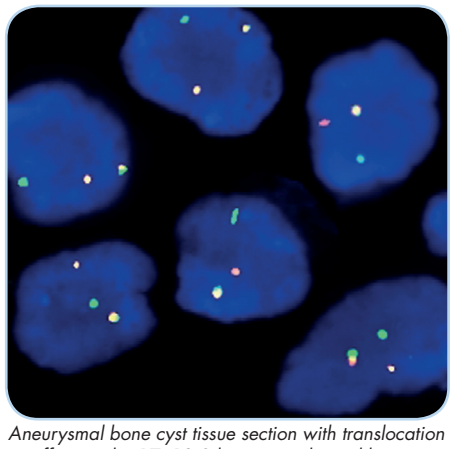
SPEC USP6 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 17p13.2 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 17p13.2 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 17p13.2 locus and one 17p13.2 locus affected by a translocation.



SPEC USP6 Break Apart Probe hybridized to aneurysmal bone cyst tissue section with polysomy of chromosome 17 but without translocation affecting the 17p13.2 locus as indicated by multiple orange/green fusion signals per nucleus.



Aneurysmal bone cyst tissue section with translocation affecting the 17p13.2 locus as indicated by one orange/green fusion (non-rearranged) signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2151-50	ZytoLight SPEC USP6 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2151-200	ZytoLight SPEC USP6 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC YWHAE Dual Color Break Apart Probe

CE IVD

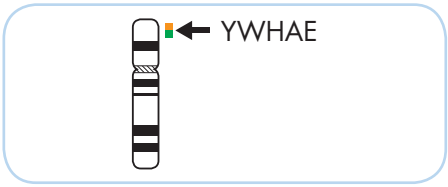
Background

The ZytoLight® SPEC YWHAE Dual Color Break Apart Probe (PL134) is intended to be used for the qualitative detection of translocations involving the human YWHAE gene at 17p13.3 in formalin-fixed, paraffin-embedded specimens, such as endometrial stromal sarcoma (ESS), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of ESS and therapeutic measures should not be initiated based on the test result alone.

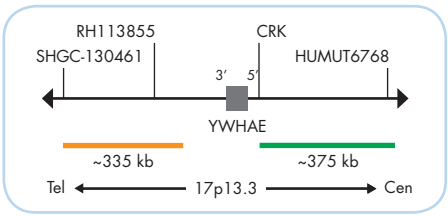
Probe Description

The ZytoLight® SPEC YWHAE Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 17p13.3** (chr17:1,339,752-1,716,668) proximal to the YWHAE breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 17p13.3** (chr17:791,171-1,124,746) distal to the YWHAE breakpoint region.
- Formamide based hybridization buffer



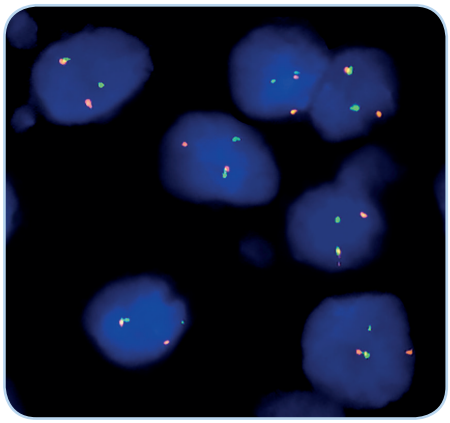
Ideogram of chromosome 17 indicating the hybridization locations.



SPEC YWHAE Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 17p13.3 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 17p13.3 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 17p13.3 locus and one 17p13.3 locus affected by a translocation.



Endometrial stromal sarcoma tissue section with translocation affecting the YWHAE gene as indicated by one non-rearranged orange/green fusion signal, one orange, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2175-50	ZytoLight SPEC YWHAE Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC ERBB2/CEN 17 Dual Color Probe

CE IVD

Background

The ZytoLight® SPEC ERBB2/CEN 17 Dual Color Probe (PL8) is intended to be used for the qualitative detection of amplifications involving the human ERBB2 gene as well as the detection of chromosome 17 alpha satellites in formalin-fixed, paraffin-embedded specimens, such as breast cancer and gastric/gastroesophageal junction cancer, by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

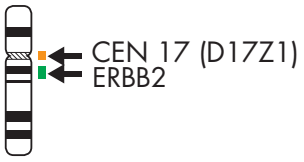
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of breast cancer and gastric/gastroesophageal junction cancer and therapeutic measures should not be initiated based on the test result alone.

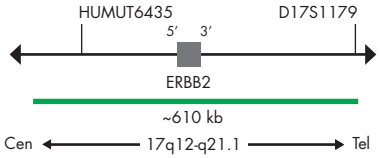
Probe Description

The ZytoLight® SPEC ERBB2/CEN 17 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 17q12-q21.1** (chr17:37,572,531-38,181,308) harboring the ERBB2 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 17p11.1-q11.1 specific for the alpha satellite centromeric region D17Z1 of chromosome 17.
- Formamide based hybridization buffer



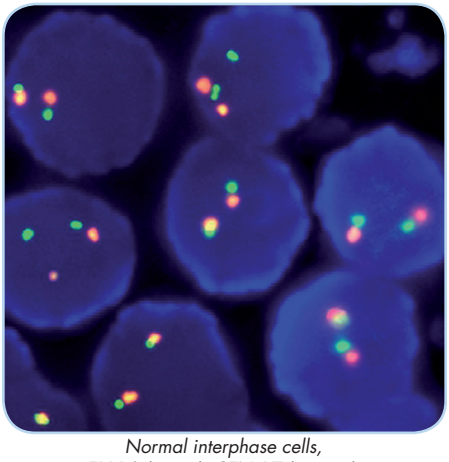
Ideogram of chromosome 17 indicating the hybridization locations.



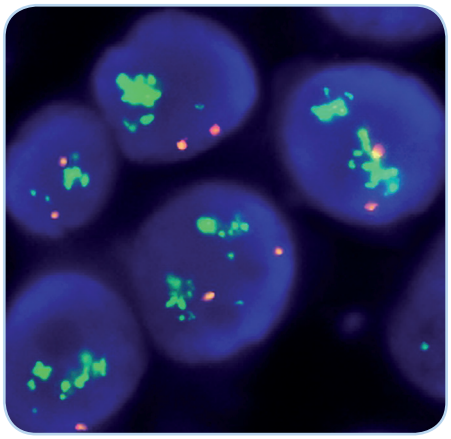
SPEC ERBB2 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the ERBB2 gene locus, multiple copies of the green signal or green signal clusters will be observed.



Normal interphase cells, ERBB2 (green), CEN 17 (orange).



Breast carcinoma tissue section, ERBB2 gene cluster (green), CEN 17 (orange).

Prod. No.	Product	Label	Tests* (Volume)
Z-2015-50	ZytoLight SPEC ERBB2/CEN 17 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2015-200	ZytoLight SPEC ERBB2/CEN 17 Dual Color Probe CE IVD	●/●	20 (200 µl)
Z-2020-5	ZytoLight SPEC ERBB2/CEN 17 Dual Color Probe Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; Probe, 0.05 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml	●/●	5
Z-2020-20	ZytoLight SPEC ERBB2/CEN 17 Dual Color Probe Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; Probe, 0.2 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml	●/●	20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® CEN 17/SPEC ERBB2 Dual Color Probe

CE IVD

Background

The ZytoLight® CEN 17/SPEC ERBB2 Dual Color Probe (PL36) is intended to be used for the qualitative detection of amplifications involving the human ERBB2 gene as well as the detection of chromosome 17 alpha satellites in formalin-fixed, paraffin-embedded specimens, such as breast cancer and gastric/gastroesophageal junction cancer, by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

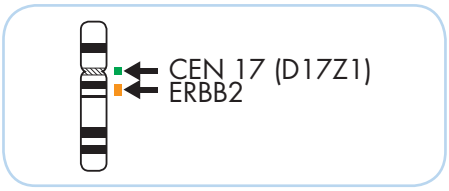
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of breast cancer and gastric/gastroesophageal junction cancer and therapeutic measures should not be initiated based on the test result alone.

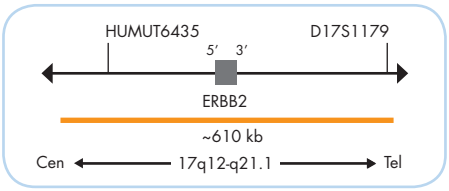
Probe Description

The ZytoLight® CEN 17/SPEC ERBB2 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 17p11.1-q11.1 specific for the alpha satellite centromeric region D17Z1 of chromosome 17.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 17q12-q21.1** (chr17:37,572,531-38,181,308) harboring the ERBB2 gene region.
- Formamide based hybridization buffer



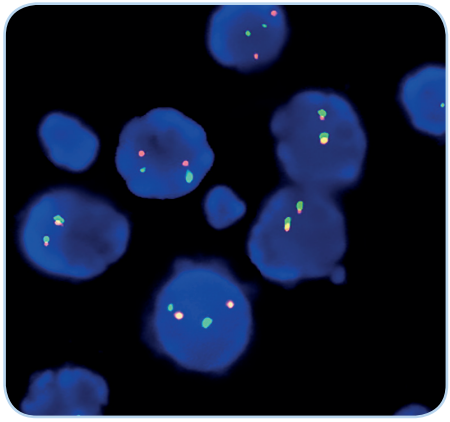
Ideogram of chromosome 17 indicating the hybridization locations.



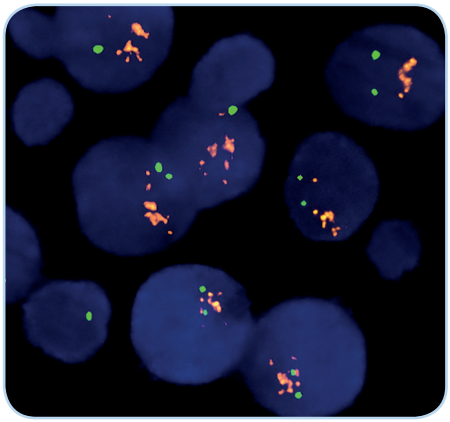
SPEC ERBB2 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the ERBB2 gene locus, multiple copies of the orange signal or orange signal clusters will be observed.



Normal interphase cells, ERBB2 (orange), CEN 17 (green).



Breast carcinoma tissue section, ERBB2 gene cluster (orange), CEN 17 (green).

Prod. No.	Product	Label	Tests* (Volume)
Z-2077-50	ZytoLight CEN 17/SPEC ERBB2 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2077-200	ZytoLight CEN 17/SPEC ERBB2 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC ERBB2/D17S122 Dual Color Probe

CE IVD

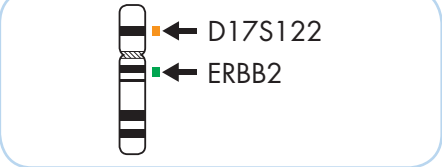
Background

The ZytoLight® SPEC ERBB2/D17S122 Dual Color Probe (PL148) is intended to be used for the qualitative detection of amplifications involving the human ERBB2 gene as well as the detection of the D17S122 locus in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

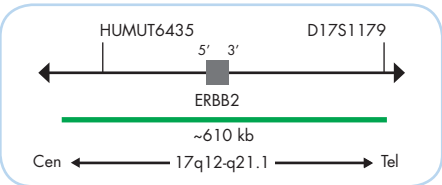
Probe Description

The ZytoLight® SPEC ERBB2/D17S122 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 17q12-q21.1** (chr17:37,572,531-38,181,308) harboring the ERBB2 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 17p12** (chr17:14,954,785-15,434,017) harboring the D17S122 locus.
- Formamide based hybridization buffer



Ideogram of chromosome 17 indicating the hybridization locations.

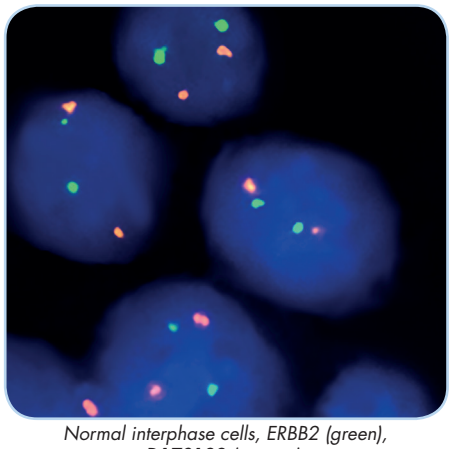


SPEC ERBB2 Probe map (not to scale).

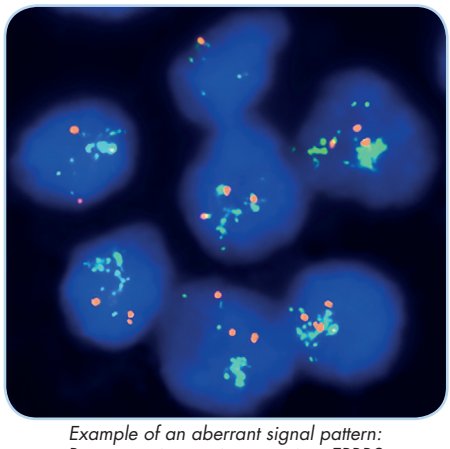
SPEC D17S122 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the ERBB2 gene locus, multiple copies of the green signal or green signal clusters will be observed.



Normal interphase cells, ERBB2 (green), D17S122 (orange).



Example of an aberrant signal pattern: Breast carcinoma tissue section, ERBB2 gene cluster (green), D17S122 (orange).

Prod. No.	Product	Label	Tests* (Volume)
Z-2190-50	ZytoLight SPEC ERBB2/D17S122 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2190-200	ZytoLight SPEC ERBB2/D17S122 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC ERBB2/TOP2A/CEN 17 Triple Color Probe

CE IVD

Background

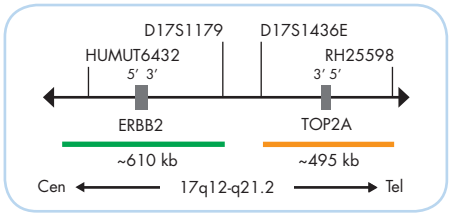
The ZytoLight® SPEC ERBB2/TOP2A/CEN 17 Triple Color Probe (PL52) is intended to be used for the qualitative detection of amplifications involving the human ERBB2 gene and the human TOP2A gene as well as the detection of chromosome 17 alpha satellites in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

Probe Description

The ZytoLight® SPEC ERBB2/TOP2A/CEN 17 Triple Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 17q12-q21.1** (chr17:37,572,531-38,181,308) harboring the ERBB2 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 17q21.1-q21.2** (chr17:38,323,741-38,818,030) harboring the TOP2A gene region.
- ZyBlue (excitation at 418 nm/emission 467 nm) labeled polynucleotides (~12 ng/µl), which target sequences mapping in 17p11.1-q11.1 specific for the alpha satellite centromeric region D17Z1 of chromosome 17.
- Formamide based hybridization buffer

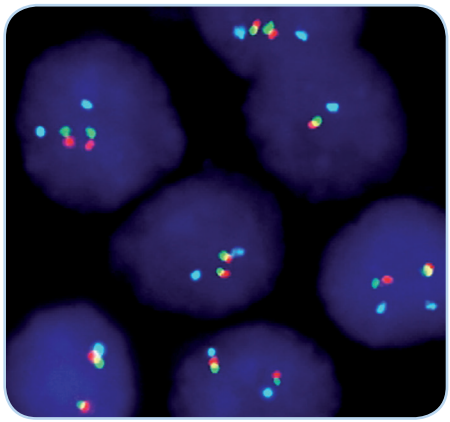
Ideogram of chromosome 17 indicating the hybridization locations.



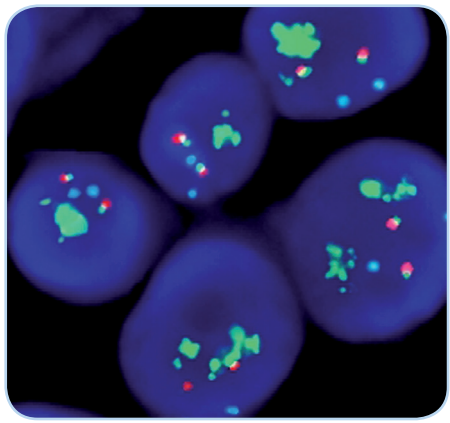
SPEC ERBB2/TOP2A Probe map (not to scale).

Results

In a normal interphase nucleus, two green, two orange, and two blue signals are expected. In a cell with amplification of the ERBB2 gene locus, multiple copies of the green signal or large green signal clusters will be observed. Amplification of TOP2A will result in multiple copies of the orange signal or large orange signal clusters. Deletion of the TOP2A gene results in a reduced number of orange signals.



SPEC ERBB2/TOP2A/CEN 17 Triple Color Probe hybridized to normal interphase cells as indicated by two green, two orange, and two blue signals per nucleus.



Example of an aberrant signal pattern: Breast cancer tissue section with two copies of chromosome 17 (blue) and TOP2A (orange) and ERBB2 gene clusters (green) in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2093-50	ZytoLight SPEC ERBB2/TOP2A/CEN 17 Triple Color Probe CE IVD	●/●/●	5 (50 µl)
Z-2093-200	ZytoLight SPEC ERBB2/TOP2A/CEN 17 Triple Color Probe CE IVD	●/●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC COL1A1 Dual Color Break Apart Probe

CE IVD

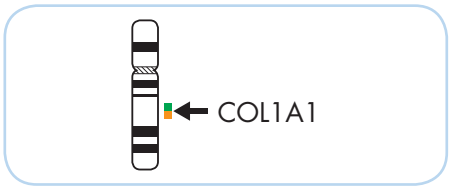
Background

The ZytoLight® SPEC COL1A1 Dual Color Break Apart Probe (PL78) is intended to be used for the qualitative detection of translocations involving the human COL1A1 gene at 17q21.33 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

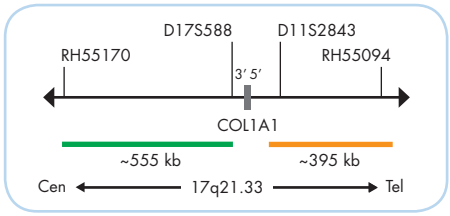
Probe Description

The ZytoLight® SPEC COL1A1 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 17q21.33** (chr17:47,669,218-48,223,465) proximal to the COL1A1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 17q21.33** (chr17:48,347,800-48,744,021) distal to the COL1A1 breakpoint region.
- Formamide based hybridization buffer



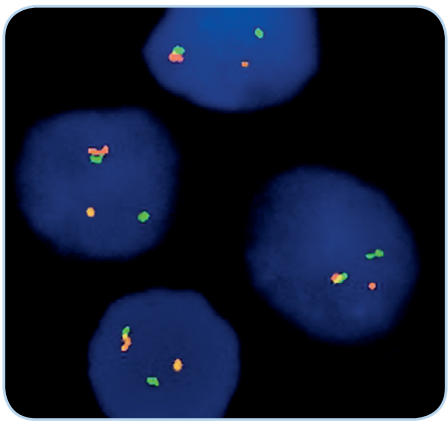
Ideograms of chromosome 17 indicating the hybridization locations.



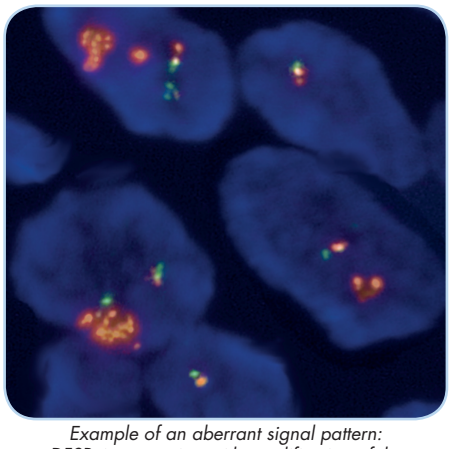
SPEC COL1A1 Probe map (not to scale).

Results

In a normal interphase nucleus lacking a translocation involving the 17q21.33 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 17q21.33 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 17q21.33 locus and one 17q21.33 locus affected by a 17q21.33 translocation.



Example of an aberrant signal pattern: DFSP tissue section with translocation affecting the 17q21.33 locus as indicated by one non-rearranged orange/green fusion signal, one orange signal, and one separate green signal.



Example of an aberrant signal pattern: DFSP tissue section with amplification of the 17q21-qter and 22q10–q13.1 sequences probably due to a COL1A1-PDGFB fusion product on the ring chromosome.

Image kindly provided by Dr. Schildhaus, Essen, Germany.

Prod. No.	Product	Label	Tests* (Volume)
Z-2121-200	ZytoLight SPEC COL1A1 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC COL1A1/PDGFB Dual Color Dual Fusion Probe

CE IVD

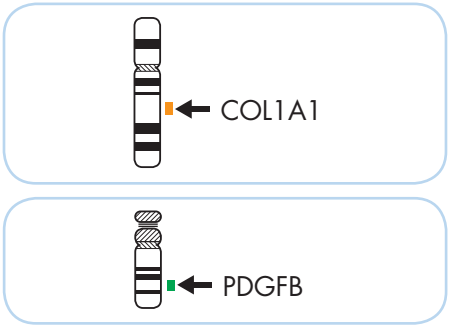
Background

The ZytoLight® SPEC COL1A1/PDGFB Dual Color Dual Fusion Probe (PL73) is intended to be used for the qualitative detection of the translocation t(17;22)(q21.3;q13.1) involving the human COL1A1 and PDGFB genes in formalin-fixed, paraffin-embedded specimens, such as dermatofibrosarcoma protuberans (DFSP), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of DFSP and therapeutic measures should not be initiated based on the test result alone.

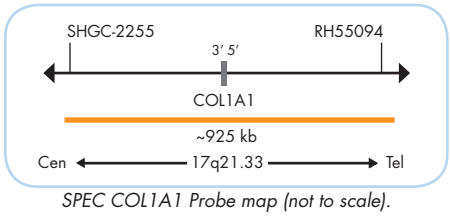
Probe Description

The ZytoLight® SPEC COL1A1/PDGFB Dual Color Dual Fusion Probe is composed of:

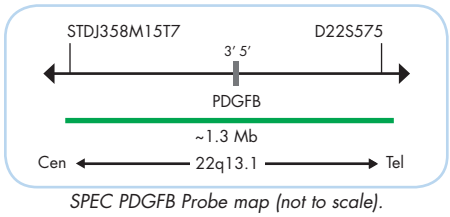
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~6 ng/µl), which target sequences mapping in 17q21.33** (chr17:47,820,343-48,744,021) harboring the COL1A1 gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~12 ng/µl), which target sequences mapping in 22q13.1** (chr22:38,928,973-40,267,687) harboring the PDGFB gene region.
- Formamide based hybridization buffer



Ideograms of chromosomes 17 (above) and 22 (below) indicating the hybridization locations.



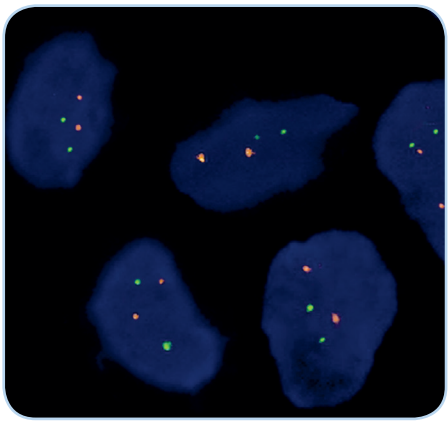
SPEC COL1A1 Probe map (not to scale).



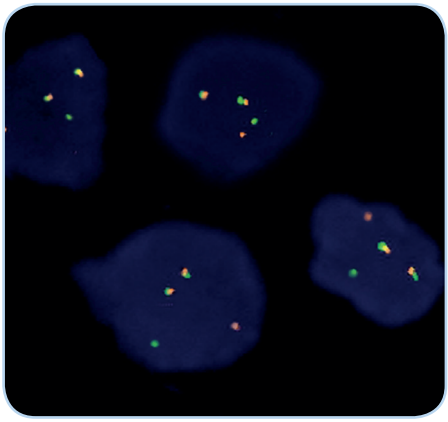
SPEC PDGFB Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. A reciprocal translocation involving two breakpoints splits the two signals and generates a fusion signal on each of the chromosomes involved. The chromosomal regions which are not translocated are indicated by the single orange and green signal, respectively.



SPEC COL1A1/PDGFB Dual Color Dual Fusion Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



DFSP tissue section with translocation affecting the COL1A1/PDGFB loci as indicated by one separate orange signal, one separate green signal, and two orange/green fusion signals.

Prod. No.	Product	Label	Tests* (Volume)
Z-2116-50	ZytoLight SPEC COL1A1/PDGFB Dual Color Dual Fusion Probe CE IVD	🟠/🟢	5 (50 µl)
Z-2116-200	ZytoLight SPEC COL1A1/PDGFB Dual Color Dual Fusion Probe CE IVD	🟠/🟢	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC SS18 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC SS18 Dual Color Break Apart Probe (PL56) is intended to be used for the qualitative detection of translocations involving the human SS18 gene at 18q11.2 in formalin-fixed, paraffin-embedded specimens, such as synovial sarcoma, by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

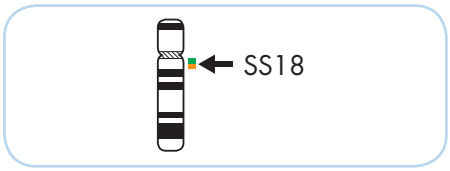
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of synovial sarcoma and therapeutic measures should not be initiated based on the test result alone.

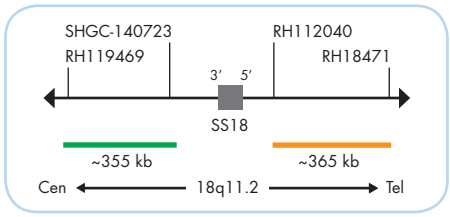
Probe Description

The ZytoLight® SPEC SS18 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 18q11.2** (chr18:23,109,942-23,466,217) proximal to the SS18 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 18q11.2** (chr18:23,772,255-24,137,169) distal to the SS18 breakpoint region.
- Formamide based hybridization buffer



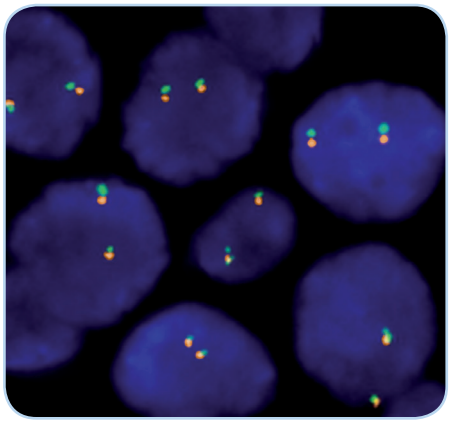
Ideogram of chromosome 18 indicating the hybridization locations.



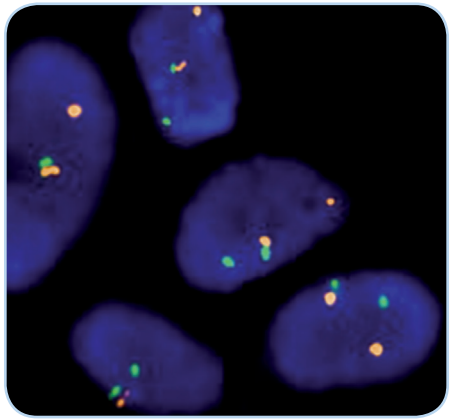
SPEC SS18 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 18q11.2 band two orange/green fusion signals are expected representing two normal (non-rearranged) 18q11.2 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 18q11.2 locus and one 18q11.2 locus affected by an 18q11.2 translocation.



SPEC SS18 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Synovial sarcoma tissue section with translocation affecting the 18q11.2 locus as indicated by one non-rearranged orange/green fusion signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2097-50	ZytoLight SPEC SS18 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2097-200	ZytoLight SPEC SS18 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC SS18/SSX1 TriCheck™ Probe

CE IVD

Background

The ZytoLight® SPEC SS18/SSX1 TriCheck™ Probe is designed to detect translocations involving the chromosomal region 18q11.2 harboring the SS18 (SS18, nBAF chromatin remodeling complex subunit, a.k.a. SYT) gene and the chromosomal region Xp11.23 harboring the SSX1 (SSX family member 1) gene.

Synovial sarcoma is characterized by the t(X;18) found in more than 95% of these tumors and juxtaposing the SS18 gene in 18q11.2 either next to the SSX1 or the SSX2 gene, or very rarely to the SSX4 locus.

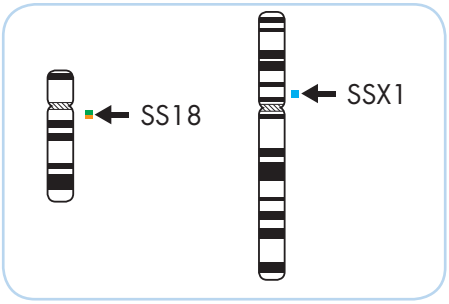
Synovial sarcoma is one of the most common soft tissue tumors that typically occurs in the extremities of young adults with greater prevalence in males, even though, the occurrence of synovial sarcoma has also been described in a wide variety of anatomical locations and in all ages.

In combination with histopathological diagnosis, detection of SS18 rearrangements via FISH is a valuable tool to confirm the diagnosis of synovial sarcoma. Moreover, patients with SS18-SSX1 fusions were shown to have a higher risk of developing metastases compared to those with SS18-SSX2 fusions. Hence, detection of the SS18 fusion gene variant by FISH may also be of prognostic significance.

Probe Description

The ZytoLight® SPEC SS18/SSX1 TriCheck™ Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 18q11.2** (chr18:23,109,942-23,466,217) proximal to the SS18 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 18q11.2** (chr18:23,772,255-24,137,169) distal to the SS18 breakpoint region.
- ZyBlue (excitation 418 nm/emission 467 nm) labeled polynucleotides (~37 ng/µl), which target sequences mapping in Xp11.23** (chrX:48,265,856-48,792,674) proximal to the SSX1 breakpoint region.
- Formamide based hybridization buffer



Ideograms of chromosomes 18 (left) and X (right) indicating the hybridization locations.

Results

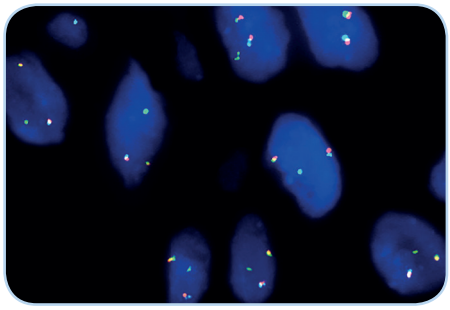
In an interphase nucleus of a normal female cell without SS18-SSX1 rearrangement, two green/orange fusion signals and two blue signals are expected.

In an interphase nucleus of a normal male cell without SS18-SSX1 rearrangement, two green/orange fusion signals and one blue signal are expected.

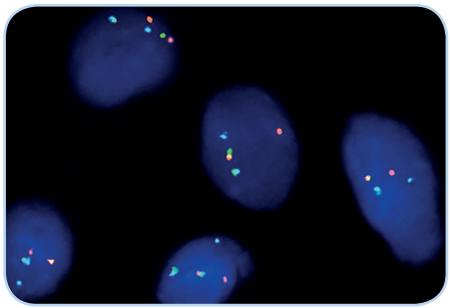
An SS18-SSX1 or an SS18-SSX4 fusion is indicated by one separate orange signal co-localizing with one blue signal and one separate green signal.

An SS18-SSX2 fusion is indicated by one separate green signal, one separate orange signal, and a blue signal in close proximity of the separated green signal.

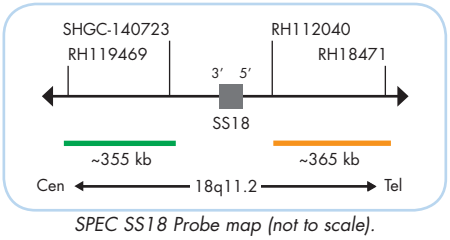
An SS18 translocation without involvement of SSX1, SSX2, or SSX4 is indicated by the split of one green/orange fusion signal without co-localization of the separated orange or green signal with one blue signal.



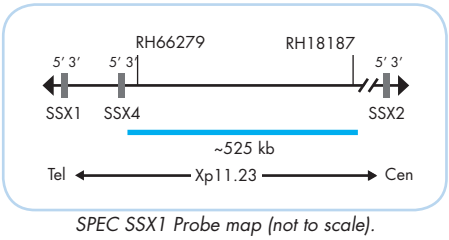
Male synovial sarcoma tissue section with SS18-SSX1 or SS18-SSX4 fusion as indicated by orange/blue fusion signals.



Female synovial sarcoma tissue section with SS18-SSX2 fusion as indicated by green/blue fusion signals.



SPEC SS18 Probe map (not to scale).



SPEC SSX1 Probe map (not to scale).

References
Amary MF, et al. (2007) Mod Pathol 20: 482-96.
Clark J, et al. (1994) Nat Genet 7: 502-8.
Kawai A, et al. (1998) N Engl J Med 338: 153-60.
Panagopoulos I, et al. (2001) Genes Chromosomes Cancer 31: 362-72.
Surace C, et al. (2004) Lab Invest 84: 1185-92.
Torres L, et al. (2008) Cancer Genet Cytogenet 187: 45-9.

Prod. No.	Product	Label	Tests* (Volume)
Z-2184-50	ZytoLight SPEC SS18/SSX1 TriCheck Probe CE IVD	●/●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC BCL2 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC BCL2 Dual Color Break Apart Probe (PL150) is intended to be used for the qualitative detection of translocations involving the human BCL2 gene at 18q21.33 in formalin-fixed, paraffin-embedded specimens, such as B-cell lymphoma, by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

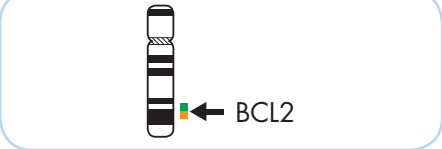
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of B-cell lymphoma and therapeutic measures should not be initiated based on the test result alone.

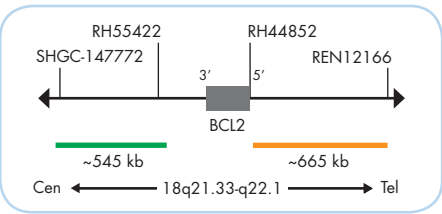
Probe Description

The ZytoLight® SPEC BCL2 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 18q21.33** (chr18:60,046,152-60,589,273) proximal to the BCL2 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 18q21.33-q22.1** (chr18:60,994,528-61,658,503) distal to the BCL2 breakpoint region.
- Formamide based hybridization buffer



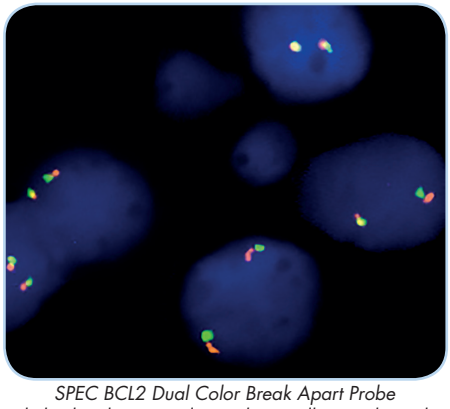
Ideogram of chromosome 18 indicating the hybridization locations.



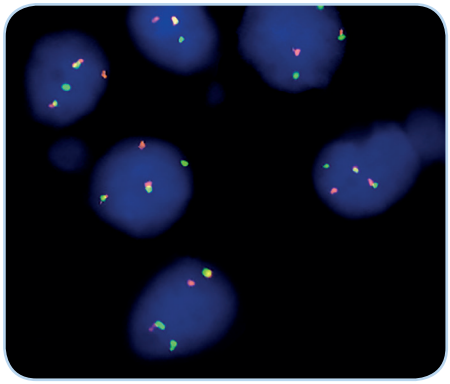
SPEC BCL2 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 18q21.33-q22.1 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 18q21.33-q22.1 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 18q21.33-q22.1 locus and one 18q21.33-q22.1 locus affected by a translocation.



SPEC BCL2 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Neck lymph node tissue section with translocation of the BCL2 gene as indicated by two non-rearranged orange/green fusion signals, one orange and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2192-50	ZytoLight SPEC BCL2 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2192-200	ZytoLight SPEC BCL2 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC BCL2/CEN 18 Dual Color Probe

RUO

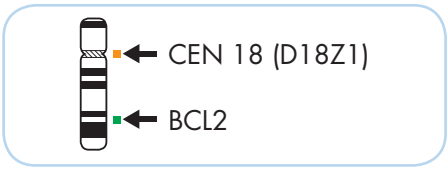
Background

The ZytoLight® SPEC BCL2/CEN 18 Dual Color Probe (PL130) is intended to be used for the qualitative detection of human BCL2 gene amplifications as well as the detection of chromosome 18 alpha satellites in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

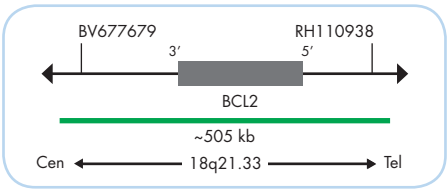
Probe Description

The ZytoLight® SPEC BCL2/CEN 18 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 18q21.33** (chr18:60,610,473-61,116,910) harboring the BCL2 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in 18p11.1-q11.1 specific for the alpha satellite centromeric region D18Z1 of chromosome 18.
- Formamide based hybridization buffer



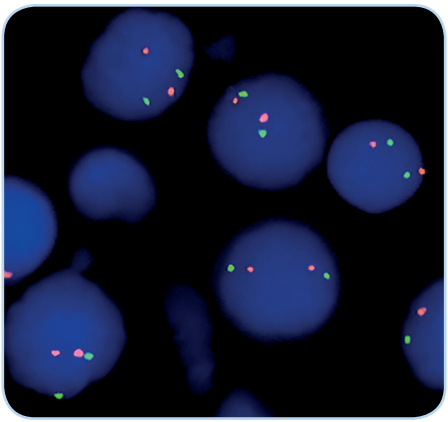
Ideogram of chromosome 18 indicating the hybridization locations.



SPEC BCL2 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the BCL2 gene locus, multiple copies of the green signal or green signal clusters will be observed.



SPEC BCL2/CEN 18 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2174-50	ZytoLight SPEC BCL2/CEN 18 Dual Color Probe RUO	●/●	5 (50 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoLight® SPEC BCL2/IGH Dual Color Dual Fusion Probe

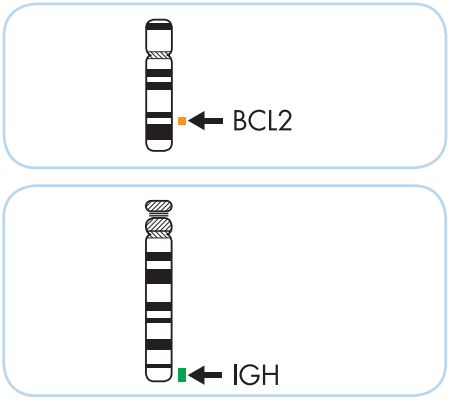
CE IVD

Background

The ZytoLight® SPEC BCL2/IGH Dual Color Dual Fusion Probe (PL71) is intended to be used for the qualitative detection of the translocation t(14;18)(q32.3;q21.3) involving the human IGH and BCL2 genes in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

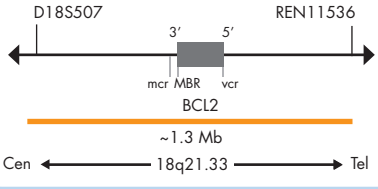


Ideograms of chromosomes 18 (above) and 14 (below) indicating the hybridization locations.

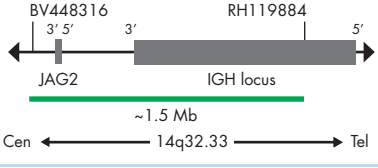
Probe Description

The ZytoLight® SPEC BCL2/IGH Dual Color Dual Fusion Probe is composed of:

- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~6 ng/µl), which target sequences mapping in 18q21.33** (chr18:60,180,078-61,507,691) harboring the BCL2 gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~12 ng/µl), which target sequences mapping in 14q32.33** (chr14:105,462,169-106,995,000) harboring the IGH locus.
- Formamide based hybridization buffer



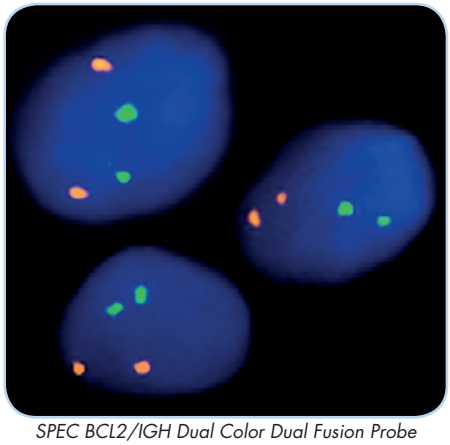
SPEC BCL2 Probe map (not to scale).



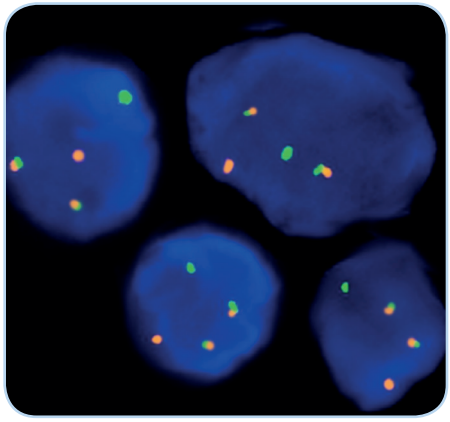
SPEC IGH Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. A reciprocal translocation involving two breakpoints splits the two signals and generates a fusion signal on each of the chromosomes involved. The chromosomal regions which are not translocated are indicated by the single orange and green signal, respectively.



SPEC BCL2/IGH Dual Color Dual Fusion Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Example of an aberrant signal pattern: Bone marrow biopsy section with translocation affecting the BCL2/IGH loci as indicated by one separate orange signal, one separate green signal, and two orange/green fusion signals.

Prod. No.	Product	Label	Tests* (Volume)
Z-2114-50	ZytoLight SPEC BCL2/IGH Dual Color Dual Fusion Probe CE IVD	●/●	5 (50 µl)
Z-2114-200	ZytoLight SPEC BCL2/IGH Dual Color Dual Fusion Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC MALT1 Dual Color Break Apart Probe

CE IVD

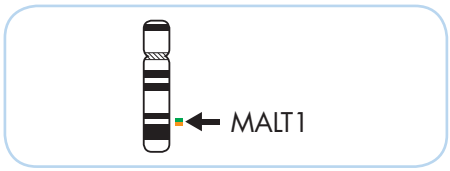
Background

The ZytoLight® SPEC MALT1 Dual Color Break Apart Probe (PL154) is intended to be used for the qualitative detection of translocations involving the human MALT1 gene at 18q21.32 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

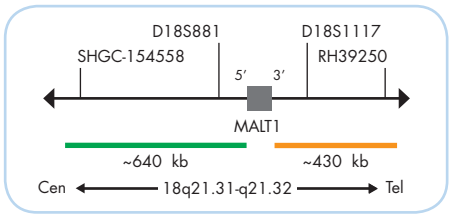
Probe Description

The ZytoLight® SPEC MALT1 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 18q21.31-q21.32** (chr18:55,690,725-56,330,582) proximal to the MALT1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 18q21.32** (chr18:56,427,386-56,859,755) distal to the MALT1 breakpoint region.
- Formamide based hybridization buffer



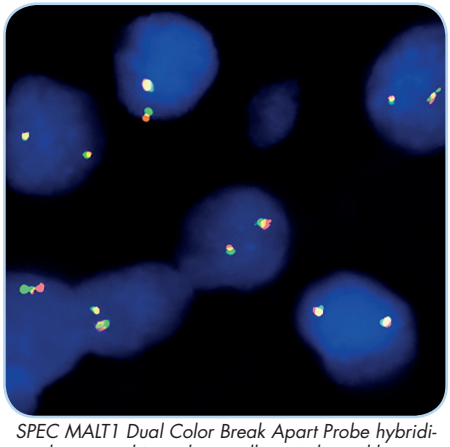
Ideogram of chromosome 18 indicating the hybridization locations.



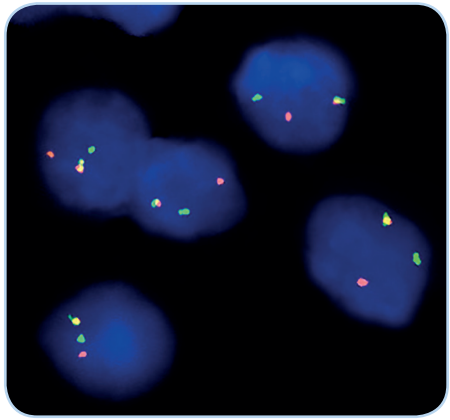
SPEC MALT1 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 18q21.31-q21.32 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 18q21.31-q21.32 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 18q21.31-q21.32 locus and one 18q21.31-q21.32 locus affected by a translocation.



SPEC MALT1 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: Lymphoma tissue section with translocation of the MALT1 gene as indicated by one non-rearranged orange/green fusion signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2196-50	ZytoLight SPEC MALT1 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2196-200	ZytoLight SPEC MALT1 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC CIC Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC CIC Dual Color Break Apart Probe (PL240) is intended to be used for the qualitative detection of translocations involving the human CIC gene at 19q13.2 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

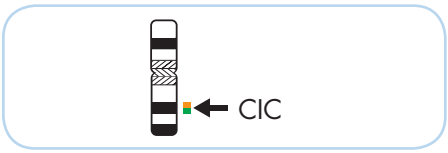
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

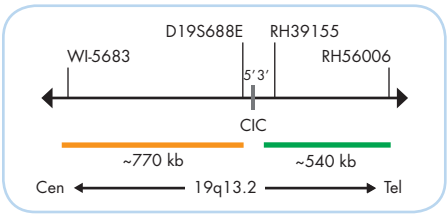
Probe Description

The ZytoLight® SPEC CIC Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 19q13.2** (chr19:42,835,047-43,374,575) distal to the CIC breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 19q13.2** (chr19:41,980,301-42,751,339) proximal to the CIC breakpoint region.
- Formamide based hybridization buffer



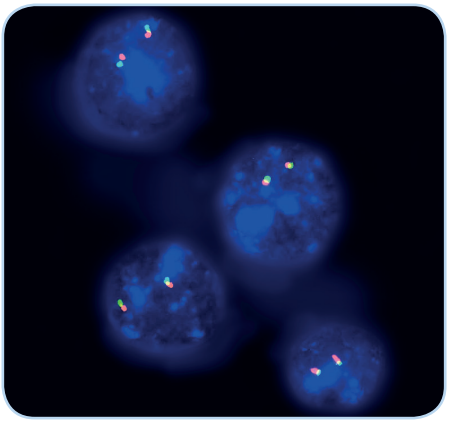
Ideogram of chromosome 19 indicating the hybridization locations.



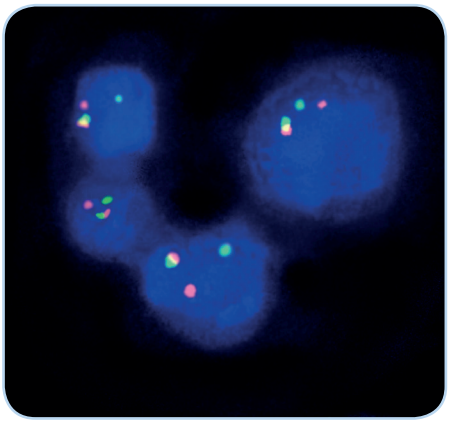
SPEC CIC Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 19q13.2 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 19q13.2 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 19q13.2 locus and one 19q13.2 locus affected by a translocation.



SPEC CIC Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: Undifferentiated round cell sarcoma ‚Ewing-like' tissue section with translocation of the 19q13.2 locus as indicated by one non-rearranged orange/green fusion signal, one orange and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2285-50	ZytoLight SPEC CIC Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC C19MC/19p13 Dual Color Probe

CE IVD

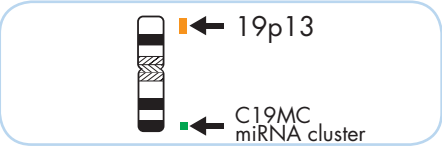
Background

The ZytoLight® SPEC C19MC/19p13 Dual Color Probe (PL230) is intended to be used for the qualitative detection of amplifications involving the C19MC locus as well as the detection of chromosome 19p13 specific sequences in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH).
The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

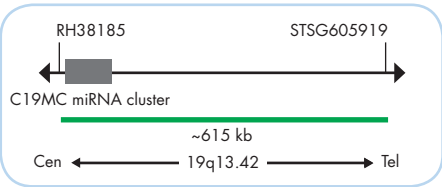
Probe Description

The ZytoLight® SPEC C19MC/19p13 Dual Color Probe is composed of:

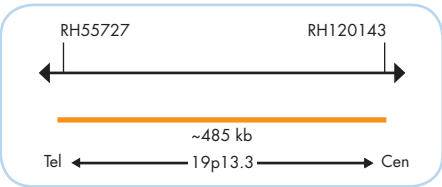
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 19q13.42** (chr19:54,156,239-54,768,983) harboring the C19MC locus.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 19p13.3** (chr19:658,555-1,144,465).
- Formamide based hybridization buffer



Ideogram of chromosome 19 indicating the hybridization locations.



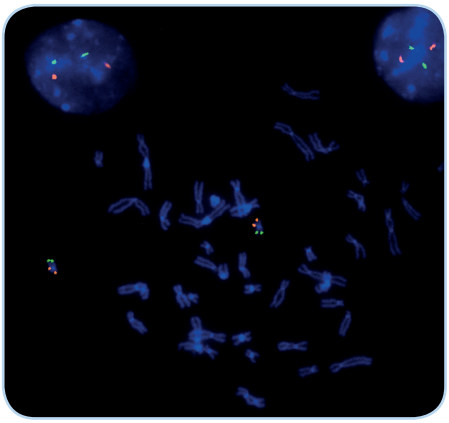
SPEC C19MC Probe map (not to scale).



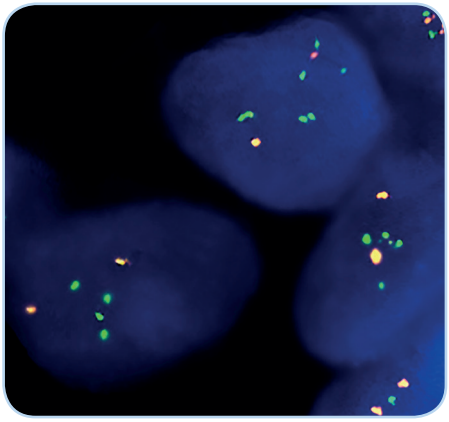
SPEC 19p13 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the C19MC region, multiple copies of the green signal or green signal clusters will be observed.



SPEC C19MC/19p13 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals per nucleus and to metaphase chromosomes of a normal cell.



Example of an aberrant signal pattern: Primitive neuroectodermal tumor tissue section with amplification of the C19MC miRNA cluster as indicated by multiple green signals.

Specimen kindly provided by Hannu Haapasalo, MD, PhD, Fimlab Laboratories, Finland.

Prod. No.	Product	Label	Tests* (Volume)
Z-2274-50	ZytoLight SPEC C19MC/19p13 Dual Color Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC BCL2L1/CEN 20 Dual Color Probe

RUO

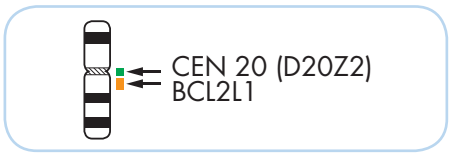
Background

The ZytoLight® SPEC BCL2L1/CEN 20 Dual Color Probe (PL127) is intended to be used for the qualitative detection of human BCL2L1 gene amplifications as well as the detection of chromosome 20 alpha satellites in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

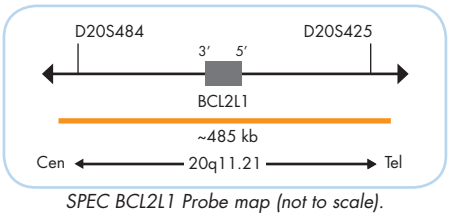
Probe Description

The ZytoLight® SPEC BCL2L1/CEN 20 Dual Color Probe is composed of:

- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 20q11.21** (chr20:30,035,357-30,522,009) harboring the BCL2L1 gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 20p11.1-q11.1 specific for the alpha satellite centromeric region D20Z2 of chromosome 20.
- Formamide based hybridization buffer



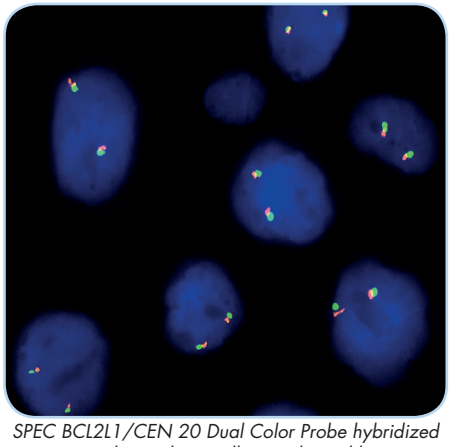
Ideogram of chromosome 20 indicating the hybridization locations.



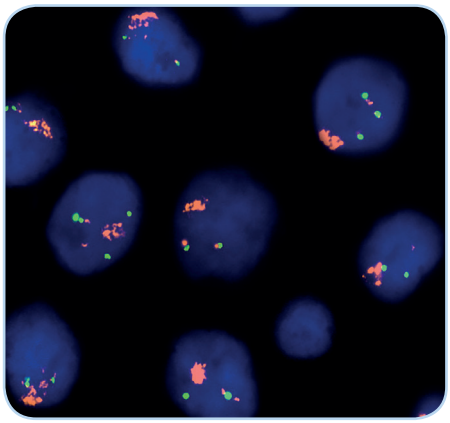
SPEC BCL2L1 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the BCL2L1 gene locus, multiple copies of the orange signal or orange signal clusters will be observed.



SPEC BCL2L1/CEN 20 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Example of an aberrant signal pattern: SK-LU-1 cell line with interphase cells showing amplification of the BCL2L1 gene locus as indicated by orange signal clusters in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2171-200	ZytoLight SPEC BCL2L1/CEN 20 Dual Color Probe RUO	●/●	20 (200 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoLight® SPEC PTPRT/20q11 Dual Color Probe

CE IVD

Background

The ZytoLight® SPEC PTPRT/20q11 Dual Color Probe (PL171) is intended to be used for the detection of deletions involving the human PTPRT gene as well as the detection of chromosome 20q11 specific sequences in cytologic specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Cytology Implementation Kit (Prod. No. Z-2099-20).

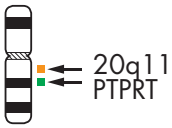
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

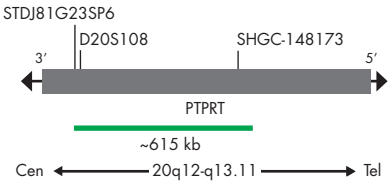
Probe Description

The ZytoLight® SPEC PTPRT/20q11 Dual Color Probe is composed of:

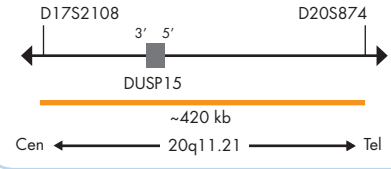
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 20q12** (chr20:40,807,040-41,419,634) harboring the PTPRT gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 20q11.21** (chr20:30,301,019-30,719,110).
- Formamide based hybridization buffer



Ideogram of chromosome 20 indicating the hybridization locations.



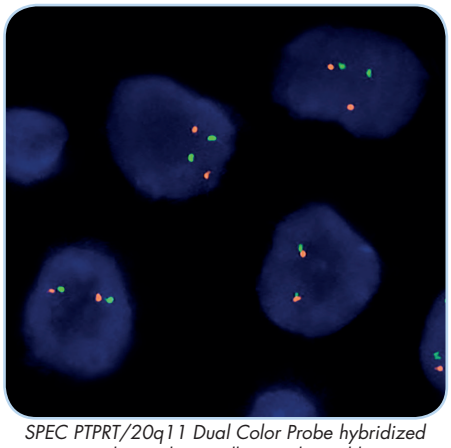
SPEC PTPRT Probe map (not to scale).



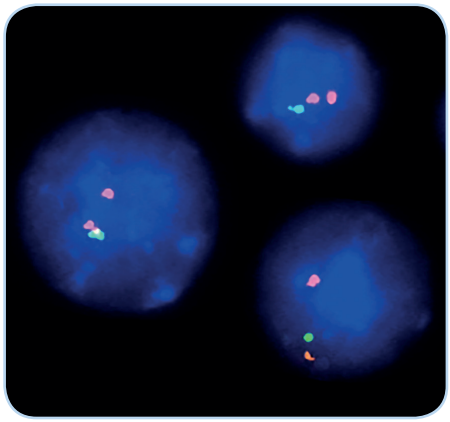
SPEC 20q11 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletions affecting the 20q12 locus, one or no copy of the green signal will be observed.



SPEC PTPRT/20q11 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Example of an aberrant signal pattern: Lymphocytes of a myelodysplastic syndrome showing a 20q deletion indicated by one single green and two orange signals in each nucleus.

Material kindly provided from Dr. Saurabh Bhattacharya, Lal PathLabs, India.

Prod. No.	Product	Label	Tests* (Volume)
Z-2213-50	ZytoLight SPEC PTPRT/20q11 Dual Color Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC ERG Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC ERG Dual Color Break Apart Probe (PL95) is intended to be used for the qualitative detection of translocations involving the human ERG gene at 21q22.2 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

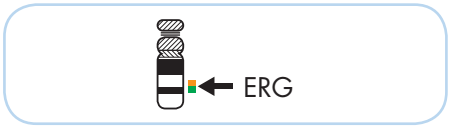
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

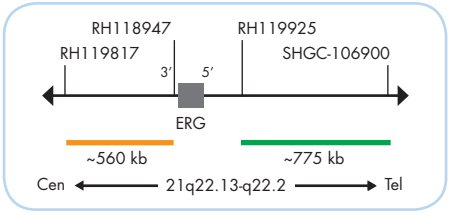
Probe Description

The ZytoLight® SPEC ERG Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 21q22.2** (chr21:40,078,039-40,850,582) distal to the ERG breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 21q22.13-q22.2** (chr21:39,171,790-39,733,849) proximal to the ERG breakpoint region.
- Formamide based hybridization buffer



Ideogram of chromosome 21 indicating the hybridization locations.



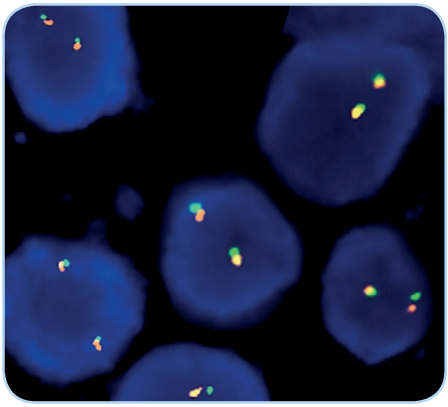
SPEC ERG Probe map (not to scale).

Results

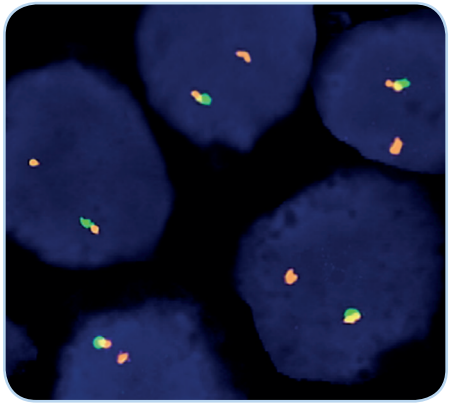
In an interphase nucleus of a normal cell lacking an aberration involving the 21q22.13-q22.2 band, two orange/green fusion signals are expected representing the two normal (non-rearranged) 21q22.13-q22.2 loci.

One 21q22.13-q22.2 locus affected by a 21q22.2 deletion resulting in the TMPRSS2-ERG fusion is indicated by the loss of one green signal.

A signal pattern consisting of one orange/green fusion signal, a separate green, and a separate orange signal indicates an ERG translocation without involvement of TMPRSS2 (e.g. SLC45A3-ERG).



SPEC ERG Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Example of an aberrant signal pattern: Prostate cancer tissue section with interstitial deletion of the chromosomal region 21q22.2 resulting in the TMPRSS2-ERG fusion as indicated by the loss of one green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2138-200	ZytoLight SPEC ERG Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC ERG/TMPRSS2 TriCheck™ Probe

CE IVD

Background

The ZytoLight® SPEC ERG/TMPRSS2 TriCheck™ Probe (PL92) is intended to be used for the qualitative detection of rearrangements involving the human ERG gene at 21q22.2 and the human TMPRSS2 gene at 21q22.3 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

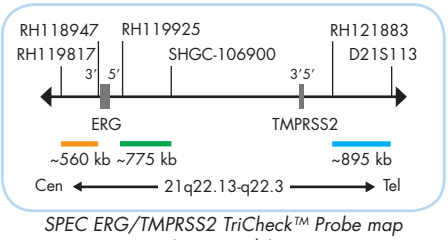
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

Ideogram of chromosome 21 indicating the hybridization locations.

Probe Description

The ZytoLight® SPEC ERG/TMPRSS2 TriCheck™ Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 21q22.2** (chr21:40,078,039-40,850,582) distal to the ERG breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 21q22.13-q22.2** (chr21:39,171,790-39,733,849) proximal to the ERG breakpoint region.
- ZyBlue (excitation 418 nm/emission 467 nm) labeled polynucleotides (~37.0 ng/µl), which target sequences mapping in 21q22.3** (chr21:43,301,411-44,195,531) distal to the TMPRSS2 breakpoint region.
- Formamide based hybridization buffer



SPEC ERG/TMPRSS2 TriCheck™ Probe map (not to scale).

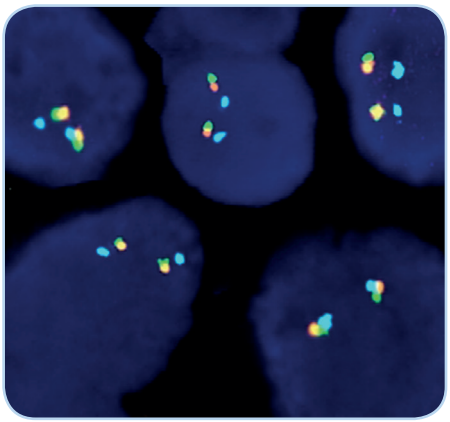
Results

In a normal interphase nucleus, two orange/green fusion signals and two blue signals in close proximity of the respective fusion signals are expected representing two normal (non-rearranged) 21q22.13-q22.3 loci.

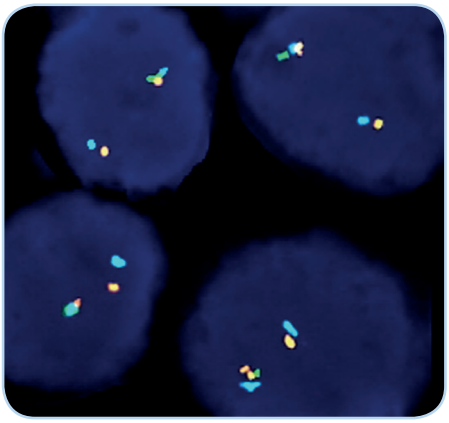
One 21q22 locus affected by a 21q22.2 deletion resulting in the TMPRSS2-ERG fusion is indicated by one separate orange signal co-localizing with one blue signal, and the loss of one green signal.

An ERG translocation without involvement of TMPRSS2 is indicated by a separated orange signal and a blue signal co-localizing with the separate green signal.

A non-ERG translocation affecting TMPRSS2 is indicated by a separated blue signal not co-localizing with the ERG fusion signal.



SPEC ERG/TMPRSS2 TriCheck™ Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals and two blue signals in close proximity of the respective fusion signals.



Example of an aberrant signal pattern: Prostate cancer tissue section with one 21q22 locus affected by an interstitial deletion of the chromosomal region 21q22.2 resulting in the TMPRSS2-ERG fusion as indicated by one separate orange signal co-localizing with one blue signal, and the loss of one green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2135-200	ZytoLight SPEC ERG/TMPRSS2 TriCheck Probe CE IVD	●/●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC DiGeorge/Phelan McDermid Dual Color Probe

CE IVD

Background

The ZytoLight® SPEC DiGeorge/Phelan McDermid Dual Color Probe is designed to detect deletions affecting the chromosomal regions 22q11.21 harboring the HIRA (a.k.a. TUPLE1) gene and 22q13.33 harboring the SHANK3 (a.k.a. prosap2) gene, respectively.

The 22q11.2 deletion syndrome (22q11.2DS), also known as velocardiofacial syndrome (VCFS) and DiGeorge syndrome, is a genetic disorder caused by hemizygous microdeletions on chromosome 22q11.2, with population prevalence of about 1 to 4,000 births. The characteristic phenotype of 22q11.2DS includes cardiac defects, velopharyngeal insufficiency, immune deficiency due to thymic aplasia, growth restriction, and deficits in cognitive abilities.

The 22q11.2 deletion usually occurs by meiotic non-allelic homologous recombination events between low copy repeats on chromosome 22q11.2 termed LCR22. There are eight LCR22s that span the 22q11.2 region termed LCR22A through LCR22H. The majority (90%) of 22q11.2DS patients show a recurrent 3 Mb deletion between LCR22A and LCR22D harboring the HIRA gene.

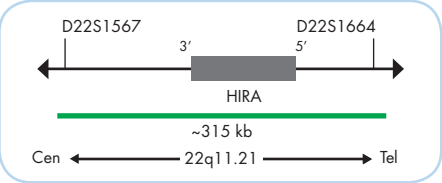
The 22q13.3 deletion syndrome (Phelan-McDermid syndrome) typically results from deletions of 100 kb to 9 Mb involving the distal long arm of chromosome 22. Almost all of these deletions include the gene SHANK3 that encodes a scaffold protein in the postsynaptic densities of excitatory synapses, connecting membrane-bound receptors to the actin cytoskeleton. This syndrome is characterized by neurological deficits, which include global developmental delay, moderate to severe intellectual impairment, absent or severely delayed speech, and neonatal hypotonia.

Probe Description

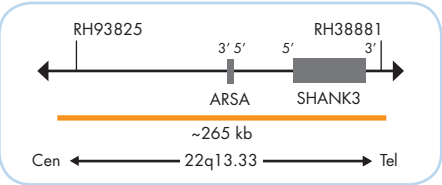
The ZytoLight® SPEC DiGeorge/Phelan McDermid Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl),which target sequences mapping in 22q11.21** (chr22:19,191,435-19,506,869) harboring the HIRA gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 22q13.33** (chr22:50,924,766-51,188,029) harboring the SHANK3 gene region.
- Formamide based hybridization buffer

Ideogram of chromosome 22 indicating the hybridization locations.



SPEC HIRA Probe map (not to scale).

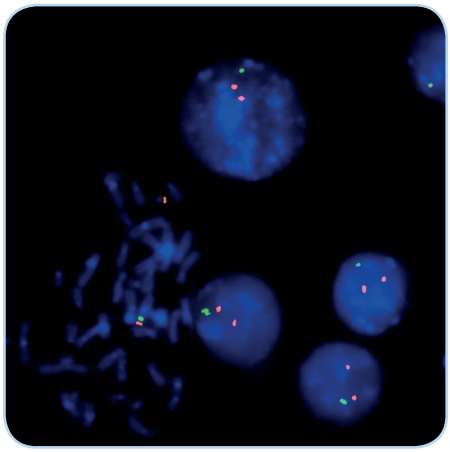


SPEC SHANK3 Probe map (not to scale).

References
Burnside RD (2015) Cytogenet Genome Res 146: 89-99.
Morrow BE, et al. (2018) Am J Med Genet A 176: 2070-81.
Phelan K & McDermid HE (2012) Mol Syndromol 2: 186-201.
Scambler PJ, et al. (1991) Genomics 10: 201-6.
Watt JL, et al. (1985) J Med Genet 22: 283-7.

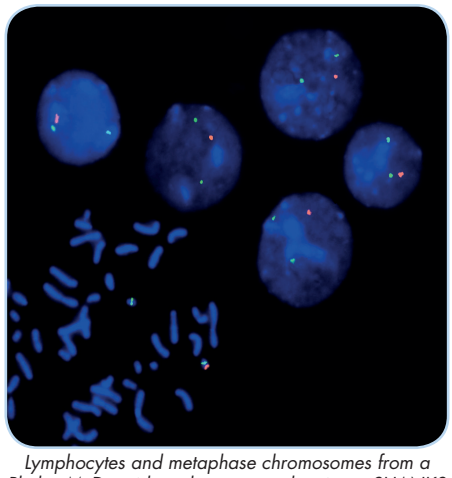
Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletion of the HIRA gene locus, a reduced number of green signals will be observed. In a cell with deletion of the SHANK3 gene locus, a reduced number of orange signals will be observed.



Lymphocytes and metaphase chromosomes from a DiGeorge syndrome case showing a HIRA deletion as indicated by the loss of one green signal.

Kindly provided by Dr. Liehr, Jena, Germany.



Lymphocytes and metaphase chromosomes from a Phelan-McDermid syndrome case showing a SHANK3 deletion as indicated by the loss of one orange signal.

Kindly provided by Dr. Kazmierczak, Bremen, Germany.

Prod. No.	Product	Label	Tests* (Volume)
Z-2299-50	ZytoLight SPEC DiGeorge/Phelan McDermid Dual Color Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC DiGeorge Triple Color Probe

CE IVD

Background

The ZytoLight® SPEC DiGeorge Triple Color Probe is designed to detect deletions affecting the chromosomal regions 22q11.21 harboring the genes HIRA (a.k.a. TUPLE1) and CRKL as well as 22q11.21-q11.22 harboring the MAPK1 (a.k.a. PRKM2, ERK) gene.

The 22q11.2 deletion syndrome (22q11.2DS), also known as velocardiofacial syndrome (VCFS) and DiGeorge syndrome, is a genetic disorder caused by hemizygous microdeletions on chromosome 22q11.2, with population prevalence of about 1 in 4,000 births. The characteristic phenotype of 22q11.2DS includes cardiac defects, immune deficiency, growth restriction, and deficits in cognitive abilities.

The 22q11.2 deletion usually occurs by meiotic non-allelic homologous recombination events between low copy repeats on chromosome 22q11.2 termed LCR22. There are eight LCR22s that span the 22q11.2 region termed LCR22A through LCR22H. The majority (90%) of 22q11.2DS patients show a recurrent 3 Mb deletion between LCR22A and LCR22D while 8% harbor a nested 1.5 Mb deletion (LCR22A-B). Some rare atypical deletions of shorter size and in variable locations have also been reported (e.g., LCR22B-D and LCR22C-D). Classic FISH probes for the detection of 22q11.2DS target the HIRA gene mapping to the LCR22A-B region, and thus, miss deletions that occur outside this region. The DiGeorge Triple Color Probe additionally targets CRKL that maps to the LCR22C-D region allowing the detection of rare deletions.

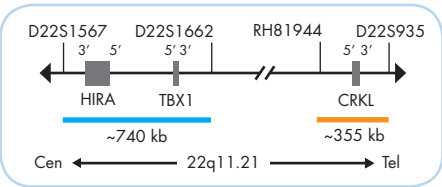
References
Ben-Shachar S, et al. (2008) Am J Hum Genet 82: 214-21.
Burnside RD (2015) Cytogenet Genome Res 146: 89-99.
Michaelovsky E, et al. (2012) BMC Med Genet 13: 122.
Morrow BE, et al. (2018) Am J Med Genet A 176: 2070-81.
Scambler PJ, et al. (1991) Genomics 10: 201-6.

Probe Description

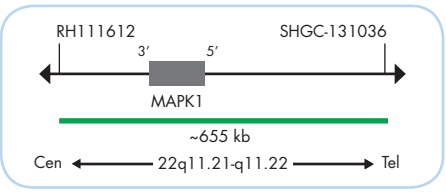
The ZytoLight® SPEC DiGeorge Triple Color Probe is composed of:

- ZyBlue (excitation 418 nm/emission 467 nm) labeled polynucleotides (~37 ng/µl), which target sequences mapping in 22q11.21** (chr22:19,191,435-19,932,689) harboring the HIRA gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 22q11.21** (chr22:21,096,895-21,454,102) harboring the CRKL gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 22q11.21-q11.22** (chr22:21,931,816-22,587,439) harboring the MAPK1 gene region.
- Formamide based hybridization buffer

Ideogram of chromosome 22 indicating the hybridization locations.



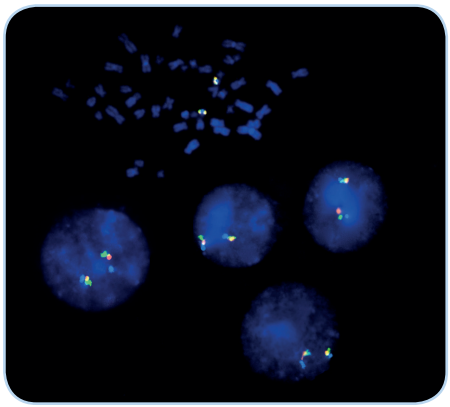
SPEC HIRA/SPEC CRKL Probe map (not to scale).



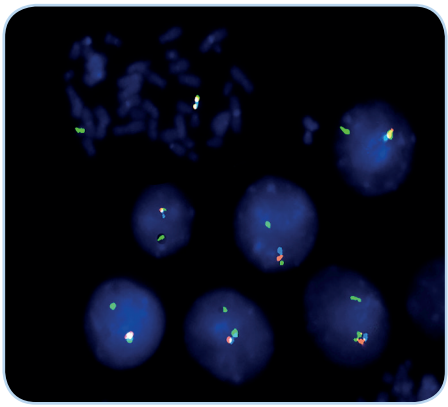
SPEC MAPK1 Probe map (not to scale).

Results

In a normal interphase nucleus, two blue, two orange, and two green signals are expected. In a cell with deletion of the HIRA and/or the CRKL gene locus, a reduced number of blue and/or orange signals will be observed, respectively. In a cell with deletion of the MAPK1 gene locus, a reduced number of green signals will be observed.



SPEC DiGeorge Triple Color Probe hybridized to normal interphase cells as indicated by two orange, two green, and two blue signals and to metaphase chromosomes of a normal cell.



Lymphocytes and metaphase chromosomes from a DiGeorge syndrome case showing a HIRA/CRKL deletion as indicated by the loss of one blue and one orange signal.

Kindly provided by Dr. Liehr, Jena, Germany.

Prod. No.	Product	Label	Tests* (Volume)
Z-2289-50	ZytoLight SPEC DiGeorge Triple Color Probe CE IVD	●/●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC IGL Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC IGL Dual Color Break Apart Probe (PL241) is intended to be used for the qualitative detection of translocations involving the human IGL locus at 22q11.22 in cytologic or formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with ZytoLight® FISH Implementation Kits (Prod. No. Z-2028-5/-20, or Z-2099-20).

The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

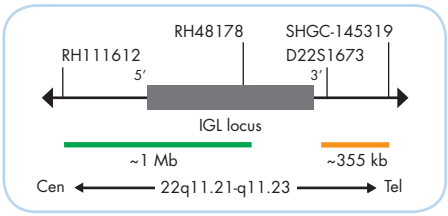
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

Probe Description

The ZytoLight® SPEC IGL Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 22q11.21-q11.22** (chr22:21,931,816-22,942,402) proximal to the IGL breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 22q11.22-q11.23** (chr22:23,324,781-23,679,042) distal to the IGL breakpoint region.
- Formamide based hybridization buffer

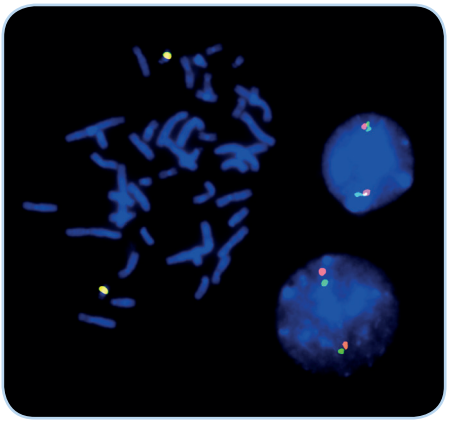
Ideogram of chromosome 22 indicating the hybridization locations.



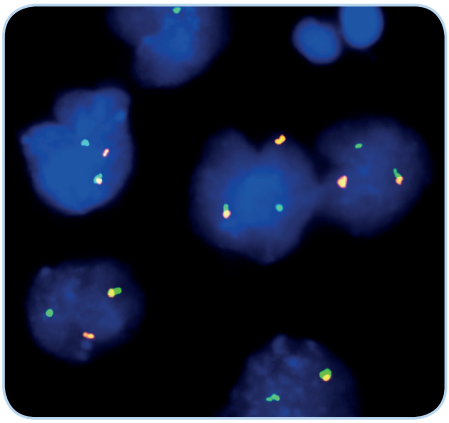
SPEC IGL Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the IGL locus at 22q11.22, two orange/green fusion signals are expected. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal IGL locus and one IGL locus affected by a translocation.



SPEC IGL Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals in each nucleus and to metaphase chromosomes of a normal cell.



Example of an aberrant signal pattern: Cell line with an IGL translocation affecting the 22q11.21-q11.23 locus as indicated by one non-rearranged orange/green fusion signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2286-50	ZytoLight SPEC IGL Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC SMARCB1/22q12 Dual Color Probe

CE IVD

Background

The ZytoLight® SPEC SMARCB1/22q12 Dual Color Probe (PL137) is intended to be used for the qualitative detection of deletions involving the human SMARCB1 gene as well as the detection of chromosome 22q12 specific sequences in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

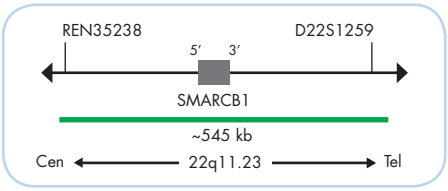
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

Probe Description

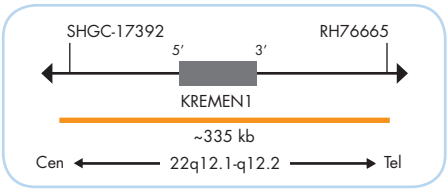
The ZytoLight® SPEC SMARCB1/22q12 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 22q11.23** (chr22:23,887,951-24,431,064) harboring the SMARCB1 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 22q12.1-22q12.2** (chr22:29,340,078-29,673,440).
- Formamide based hybridization buffer

Ideogram of chromosome 22 indicating the hybridization locations.



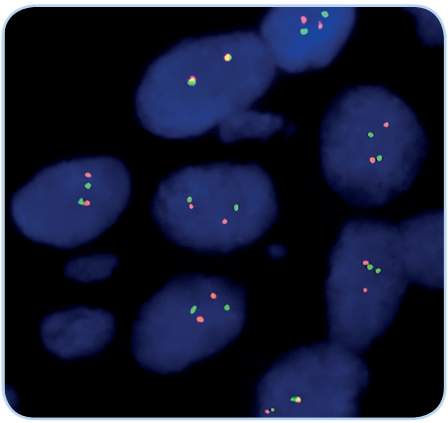
SPEC SMARCB1 Probe map (not to scale).



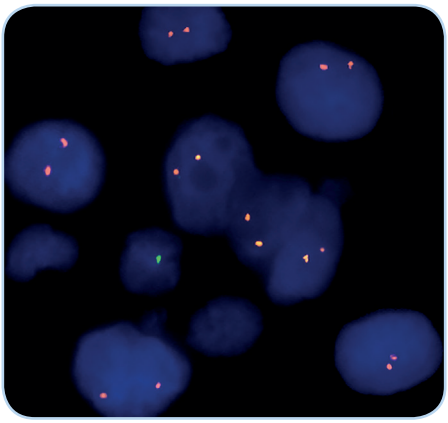
SPEC 22q12 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with deletion of the SMARCB1 gene locus, a reduced number of green signals will be observed. Deletions affecting only parts of the SMARCB1 gene might result in a normal signal pattern with green signals of reduced size.



SPEC SMARCB1/22q12 Dual Color Probe hybridized to normal interphase cells as indicated by two orange and two green signals per nucleus.



Example of an aberrant signal pattern: SPEC SMARCB1/22q12 Dual Color Probe hybridized to epithelioid sarcoma tissue section with biallelic deletion of the SMARCB1 gene as indicated by missing green signals in the nuclei.

Prod. No.	Product	Label	Tests* (Volume)
Z-2178-50	ZytoLight SPEC SMARCB1/22q12 Dual Color Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC EWSR1 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC EWSR1 Dual Color Break Apart Probe (PL55) is intended to be used for the qualitative detection of translocations involving the human EWSR1 gene at 22q12.2 in formalin-fixed, paraffin-embedded specimens, such as Ewing sarcoma, by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).

The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

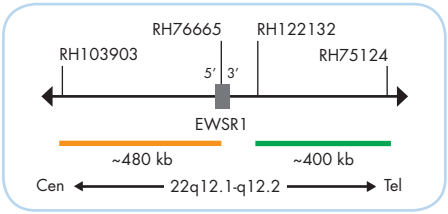
The probe is intended to be used as an aid to the differential diagnosis of Ewing sarcoma and therapeutic measures should not be initiated based on the test result alone.

Probe Description

The ZytoLight® SPEC EWSR1 Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 22q12.2** (chr22:29,779,841-30,179,900) distal to the EWSR1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 22q12.1-q12.2** (chr22:29,191,431-29,673,440) proximal to the EWSR1 breakpoint region.
- Formamide based hybridization buffer

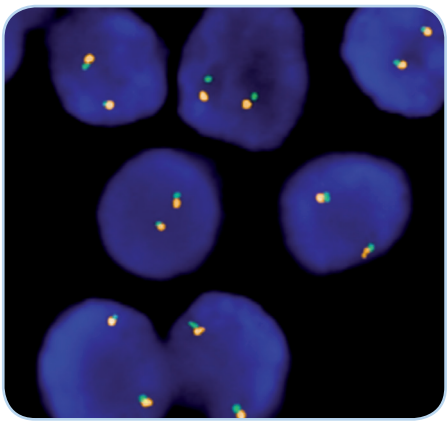
Ideogram of chromosome 22 indicating the hybridization locations.



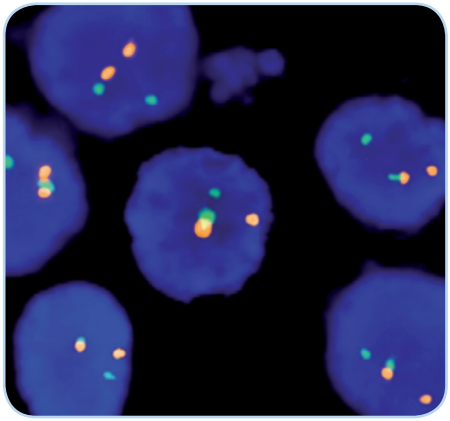
SPEC EWSR1 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 22q12.1-q12.2 band two orange/green fusion signals are expected representing two normal (non-rearranged) 22q12.1-q12.2 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 22q12.1-q12.2 locus and one 22q12.1-q12.2 locus affected by a 22q12.1-q12.2 translocation.



SPEC EWSR1 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Ewing sarcoma tissue section with translocation affecting the 22q12.1-q12.2 locus as indicated by one non-rearranged orange/green fusion signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2096-50	ZytoLight SPEC EWSR1 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2096-200	ZytoLight SPEC EWSR1 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

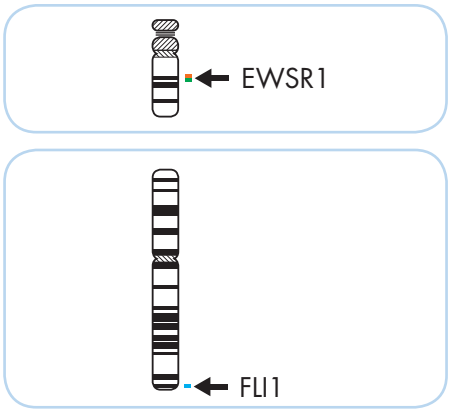
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC EWSR1/FLI1 TriCheck™ Probe

CE IVD

Background

The ZytoLight® SPEC EWSR1/FLI1 TriCheck™ Probe (PL141) is intended to be used for the qualitative detection of rearrangements involving the human EWSR1 gene at 22q12.2 and the human FLI1 gene at 11q24.3 in formalin-fixed, paraffin-embedded specimens, such as Ewing sarcoma, by fluorescence *in situ* hybridization (FISH).
The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of Ewing sarcoma and therapeutic measures should not be initiated based on the test result alone.

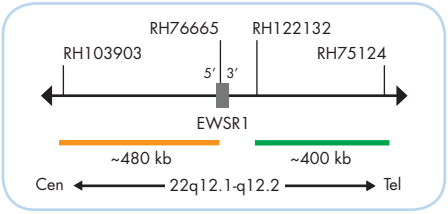


Ideograms of chromosomes 22 (above) and 11 (below) indicating the hybridization locations.

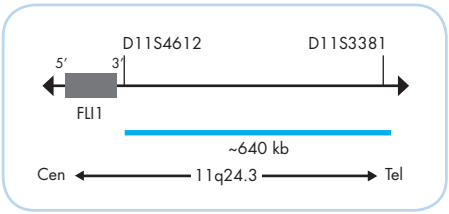
Probe Description

The ZytoLight® SPEC EWSR1/FLI1 TriCheck™ Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 22q12.2** (chr22:29,779,841-30,179,900) distal to the EWSR1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 22q12.1-q12.2** (chr22:29,191,431-29,673,440) proximal to the EWSR1 breakpoint region.
- ZyBlue (excitation at 418 nm and emission 467 nm) labeled polynucleotides (~37 ng/µl), which target sequences mapping in 11q24.3** (chr11:128,707,454-129,346,602) distal to the FLI1 breakpoint region.
- Formamide based hybridization buffer



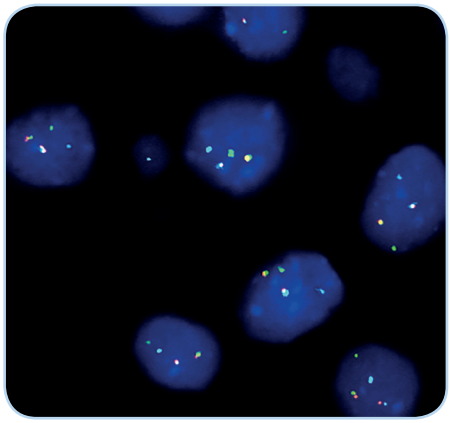
SPEC EWSR1 Probe map (not to scale).



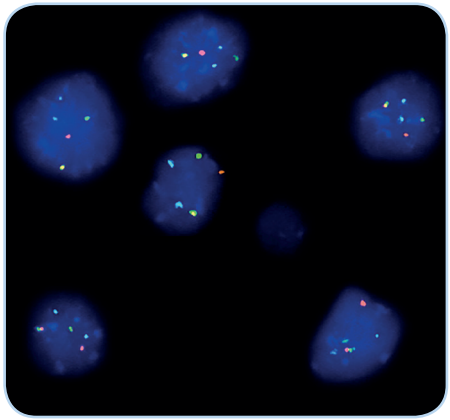
SPEC FLI1 Probe map (not to scale).

Results

In an interphase nucleus without FLI1-EWSR1 rearrangement, two green/orange fusion signals and two blue signals are expected.
A FLI1-EWSR1 fusion is indicated by one separate orange signal co-localizing with one blue signal and one separate green signal.
An EWSR1 translocation without involvement of FLI1 is indicated by the split of one green/orange fusion signal without co-localization of the separated orange signal with one blue signal.



Ewing sarcoma tissue section with FLI1-EWSR1 fusion as indicated by orange/blue fusion signals.



Ewing sarcoma tissue section with a non-FLI1 EWSR1 rearrangement as indicated by the lack of co-localization of the separated orange signal with one blue signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2183-50	ZytoLight SPEC EWSR1/FLI1 TriCheck Probe CE IVD	●/●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC PDGFB Dual Color Break Apart Probe

CE IVD

Background

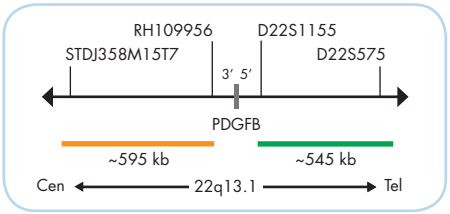
The ZytoLight® SPEC PDGFB Dual Color Break Apart Probe (PL76) is intended to be used for the qualitative detection of translocations involving the human PDGFB gene at 22q13.1 in formalin-fixed, paraffin-embedded specimens, such as dermatofibrosarcoma protuberans (DFSP), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of DFSP and therapeutic measures should not be initiated based on the test result alone.

Probe Description

The ZytoLight® SPEC PDGFB Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 22q13.1** (chr22:39,720,415-40,267,687) distal to the PDGFB breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 22q13.1** (chr22:38,928,973-39,526,228) proximal to the PDGFB breakpoint region.
- Formamide based hybridization buffer

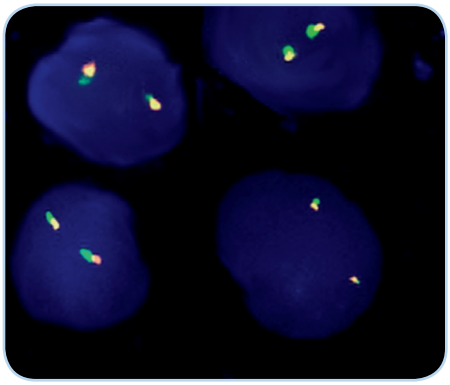
Ideogram of chromosome 22 indicating the hybridization locations.



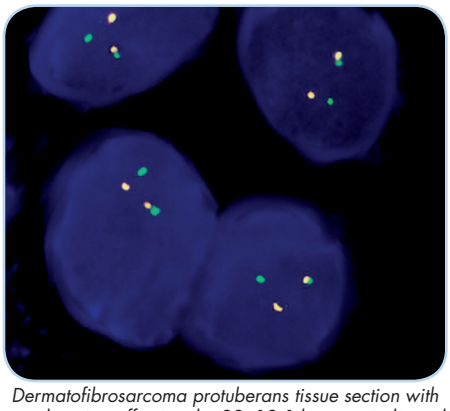
SPEC PDGFB Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 22q13.1 band two orange/green fusion signals are expected representing two normal (non-rearranged) 22q13.1 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 22q13.1 locus and one 22q13.1 locus affected by a 22q13.1 translocation.



SPEC PDGFB Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Dermatofibrosarcoma protuberans tissue section with translocation affecting the 22q13.1 locus as indicated by one non-rearranged orange/green fusion signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2119-50	ZytoLight SPEC PDGFB Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2119-200	ZytoLight SPEC PDGFB Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC CRLF2 Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC CRLF2 Dual Color Break Apart Probe is designed to detect rearrangements involving the chromosomal regions Xp22.33 and Yp11.32 harboring the CRLF2 (cytokine receptor-like factor 2, a.k.a. CRL2, TSLPR) gene.

The CRLF2 protein interacts with IL7R to form a receptor for TSLP, binding of which activates cell signaling through JAK/STAT pathways.

Approximately 7% of patients with B-cell precursor ALL (B-ALL) and more than 50% of B-ALL in children with Down syndrome harbor alterations involving the CRLF2 gene. These include the translocations t(X;14)(p22.33;q32.3) or t(Y;14)(p11.32;q32.3) which fuse the entire CRLF2 gene to the immunoglobulin heavy chain enhancer region (IGH-CRLF2).

Another common alteration is an interstitial deletion involving the pseudoautosomal region (PAR1) of the sex chromosomes upstream of CRLF2, juxtaposing the first non-coding exon of P2RY8 to the entire coding region of CRLF2 (P2RY8-CRLF2).

These rearrangements, which are often accompanied by JAK mutations, result in overexpression of CRLF2 and were shown to contribute to lymphoid transformation.

Patients with CRLF2 rearrangements and JAK mutations have a poor event-free and overall survival.

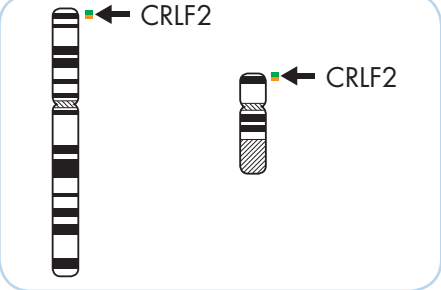
Moreover, the detection of CRLF2 rearrangements by FISH may help in selecting B-ALL patients eligible for therapy with inhibitors of the JAK/STAT pathway.

References
Harvey RC, et al. (2010) Blood 115: 5312-21.
Mullighan CG, et al. (2009) Nat Genet 41: 1243-6.
Roberts KG, et al. (2014) N Engl J Med 371: 1005-15.
Russell LJ, et al. (2009) Blood 114: 2688-98.
Tasian SK, et al. (2012) Blood 120: 833-42.

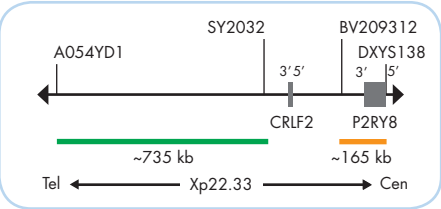
Probe Description

The ZytoLight® SPEC CRLF2 Dual Color Break Apart Probe is composed of:

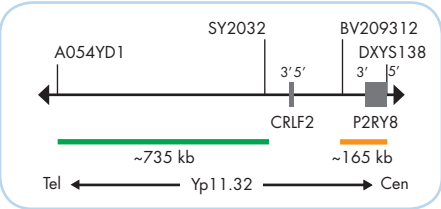
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in Xp22.33 (chrX:513,125-1,245,395), and Yp11.32** (chrY:463,125-1,195,395) distal to the CRLF2 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in Xp22.33 (chrX:1,497,976-1,660,328), and Yp11.32** (chrY:1,498,976-1,657,328) proximal to the CRLF2 breakpoint region.
- Formamide based hybridization buffer



Ideogram of chromosome X (left) and X (right) indicating the hybridization locations.



SPEC CRLF2 Probe map (not to scale).



SPEC CRLF2 Probe map (not to scale).

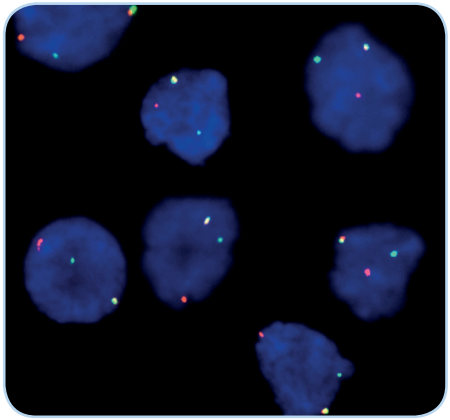
Results

In an interphase nucleus of a normal female cell lacking a translocation involving the Xp22.33 band, two orange/green fusion signals are expected representing normal (non-rearranged) Xp22.33 loci.

In an interphase nucleus of a normal male cell lacking a translocation involving the Xp22.33 or Yp11.32 band, two orange/green fusion signals are expected representing normal (non-rearranged) Xp22.33 and Yp11.32 loci.

A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal Xp22.33 or Yp11.32 locus and one Xp22.33 or Yp11.32 locus affected by a translocation.

Loss of the orange signals or orange signals of reduced size are the result of deletions proximal to the CRLF2 breakpoint region.



Bone marrow smear with translocation affecting the CRLF2 gene locus as indicated by one non-rearranged orange/green fusion signal, one orange signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2201-50	ZytoLight SPEC CRLF2 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC BCOR Dual Color Break Apart Probe

CE IVD

Background

The ZytoLight® SPEC BCOR Dual Color Break Apart Probe is designed to detect rearrangements involving the chromosomal region Xp11.4 harboring the BCOR (BCL6 corepressor, a.k.a. KIAA1575) gene.

In the 2020 WHO classification of soft tissue and bone tumors, BCOR-rearranged sarcoma is recognized as a distinct entity due to particular morphological, immunohistochemical, and molecular features and differing clinical outcomes compared to other undifferentiated sarcomas.

A fusion between BCOR and CCNB3 can be found in about 60% of all BCOR-rearranged sarcomas. The BCOR-CCNB3 fusion results from an X–chromosomal paracentric inversion. In vitro studies suggest that the BCOR-CCNB3 fusion protein is oncogenic and drives proliferation in these sarcomas. In addition, alternative fusion partners have been identified, including MAML3 and ZC3H7B.

BCOR-rearranged sarcoma usually occurs in bone or soft tissue of predominantly male children with a median age in the second decade of life.

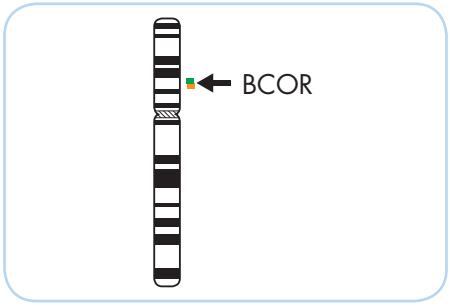
There are considerable overlapping morphological and immunohistochemical features with classical Ewing sarcoma, other subtypes of small round cell tumors, as well as lymphomas and carcinomas. Therefore, the evaluation of the BCOR rearrangement status by FISH may be of diagnostic relevance.

References
Antonescu CR, et al. (ed.) (2020) WHO Classification of Tumours Soft Tissue and Bone Tumours (5th Edition).
Pierron G, et al. (2012) Nat Genet 44: 461-6.
Renzi S, et al. (2019) J Cell Physiol 234: 7999-8007.
Sirisena UDN, et al. (2021) Skeletal Radiol [Epub ahead of print].
Specht K, et al. (2016) Am J Surg Pathol 40: 433-42.

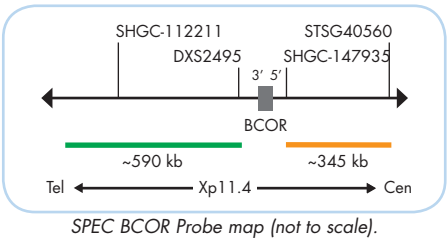
Probe Description

The ZytoLight® SPEC BCOR Dual Color Break Apart Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in Xp11.4** (chrX:39,262,996-39,850,787) distal to the BCOR breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in Xp11.4** (chrX:39,998,508-40,345,270) proximal to the BCOR breakpoint region.
- Formamide based hybridization buffer



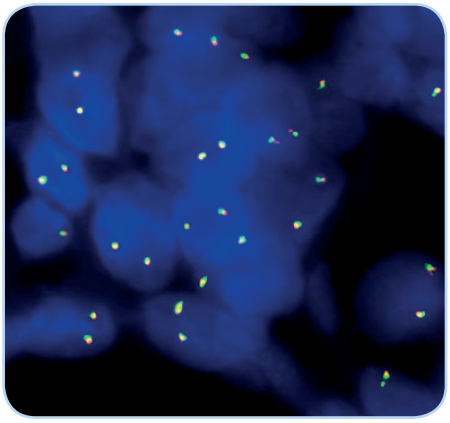
Ideogram of chromosome X indicating the hybridization locations.



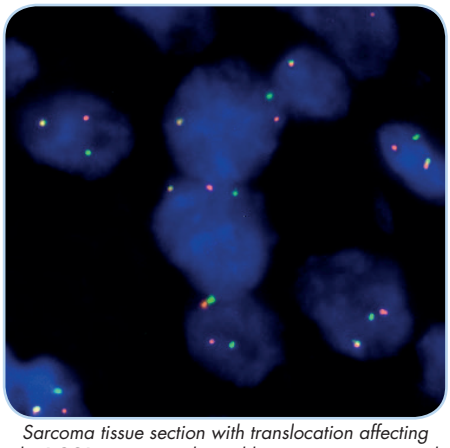
SPEC BCOR Probe map (not to scale).

Results

In a female interphase nucleus lacking a translocation involving the Xp11.4 band, two orange/green fusion signals are expected representing two normal (non-rearranged) Xp11.4 loci. In a normal male interphase nucleus one orange/green fusion signal is expected representing one normal (non-rearranged) Xp11.4 locus. One separate green and separate orange signal indicate one Xp11.4 locus affected by a translocation or inversion.



SPEC BCOR Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Sarcoma tissue section with translocation affecting the BCOR gene as indicated by one non-rearranged orange/green fusion signal, one orange and one separate green signal indicating the translocation.

Prod. No.	Product	Label	Tests* (Volume)
Z-2310-50	ZytoLight SPEC BCOR Dual Color Break Apart Probet CE IVD	●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® SPEC TFE3 Dual Color Break Apart Probe

CE IVD

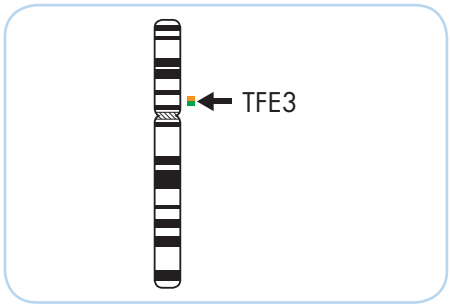
Background

The ZytoLight® SPEC TFE3 Dual Color Break Apart Probe (PL66) is intended to be used for the qualitative detection of translocations involving the human TFE3 gene at Xp11.23 in formalin-fixed, paraffin-embedded specimens, such as renal cell carcinomas (RCC), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the ZytoLight® FISH-Tissue Implementation Kit (Prod. No. Z-2028-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of RCC and therapeutic measures should not be initiated based on the test result alone.

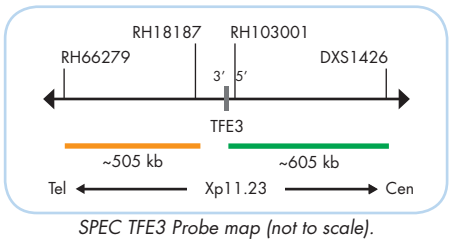
Probe Description

The ZytoLight® SPEC TFE3 Dual Color Break Apart Probe is composed of:

- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in Xp11.23** (chrX:48,287,169-48,792,674) distal to the TFE3 breakpoint region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in Xp11.23** (chrX:48,906,685-49,509,699) proximal to the TFE3 breakpoint region.
- Formamide based hybridization buffer



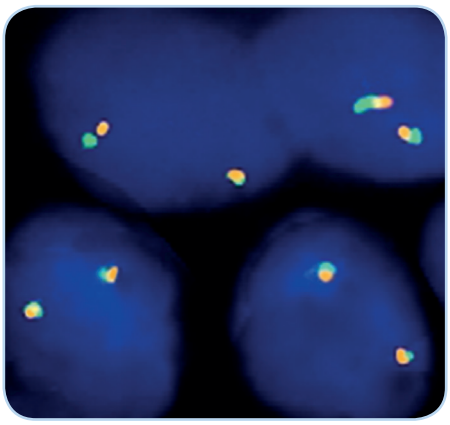
Ideogram of chromosome X indicating the hybridization locations.



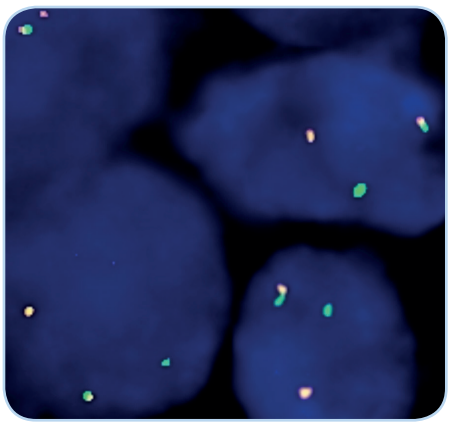
SPEC TFE3 Probe map (not to scale).

Results

In a female interphase nucleus lacking a translocation involving the Xp11.23 band two orange/green fusion signals are expected representing two normal (non-rearranged) Xp11.23 loci. In a normal male interphase nucleus one orange/green fusion signal is expected representing one normal (non-rearranged) Xp11.23 locus. One separate green and separate orange signal indicate one Xp11.23 locus affected by a translocation.



SPEC TFE3 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Renal cell carcinoma section with translocation affecting the Xp11.23 locus as indicated by one non-rearranged green/orange fusion signal, one separate green signal, and one separate orange signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2109-50	ZytoLight SPEC TFE3 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2109-200	ZytoLight SPEC TFE3 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoLight® Probes for Chromosome Enumeration

CE
IVD

Background

The ZytoLight® Chromosome Enumeration Probes are designed for identification and enumeration of human chromosomes in interphase cells and as an adjunct to standard karyotyping in metaphases. These probes will produce sharp, bright signals specific for each individual chromosome.

CEN Probe Description

For most chromosomes, direct labeled ZytoLight® CEN™ Probes hybridizing to highly repetitive human satellite DNA sequences mainly located at the centromeric regions of chromosomes are applicable.

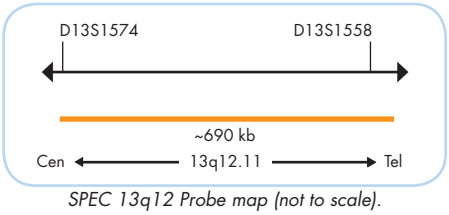
SPEC Probe Description

As several chromosomes share the same repetitive sequences resulting in cross-hybridization signals, they cannot be differentiated by centromere specific probes. Instead, these chromosomes can be identified by direct labeled ZytoLight® SPEC™ Probes hybridizing in close proximity to the respective satellite DNA sequences or to other chromosome specific loci.

ZytoLight® SPEC Probe Maps

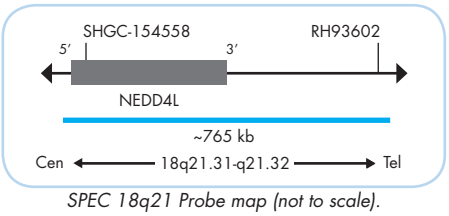
The ZytoLight® SPEC 13q12 Probe is composed of:

- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 13q12.11** (chr13:20,200,365-20,892,494).
- Formamide based hybridization buffer



SPEC 13q12 Probe map (not to scale).

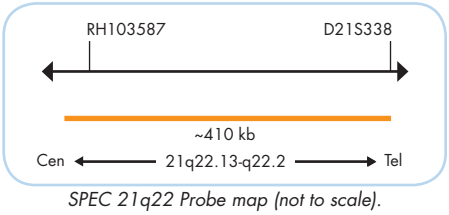
The SPEC 18q21 Probe, included in the ZytoLight® SPEC 18/CEN X/Y Triple Color Probe, is composed of:
ZyBlue (excitation 418 nm/emission 467 nm) labeled polynucleotides (~37 ng/µl), which target sequences mapping in 18q21.31-q21.32** (chr18:55,690,725-56,455,119



SPEC 18q21 Probe map (not to scale).

The ZytoLight® SPEC 21q22 Probe is composed of:

- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 21q22.13-q22.2** (chr21:39,372,983-39,784,773).
- Formamide based hybridization buffer



SPEC 21q22 Probe map (not to scale).

Results

In a normal interphase nucleus, two signals are expected using Chromosome Enumeration Probes specific for autosomes. Using chromosome Y specific probes will result in normal male cells in one signal and in normal female cells in no signal. Using chromosome X specific probes will result in normal male cells in one signal and in normal female cells in two signals per nucleus. Other signal patterns indicate numerical aberrations of the respective chromosome.

***According to Human Genome Assembly GRCh37/hg19*

Prod. No.	Product	Alpha/Class. Sat.	Chr. Band	Label	Tests* (Volume)
Z-2004-50/-200	ZytoLight CEN 8 Probe CE IVD	D8Z2	8p11.1-q11.1	●	5/20 (50/200 µl)
Z-2005-200	ZytoLight CEN 11 Probe CE IVD	D11Z1	11p11.11-q11	●	20 (200 µl)
Z-2050-200	ZytoLight CEN 12 Probe CE IVD	D12Z3	12p11.1-q11	●	20 (200 µl)
Z-2095-50/-200	ZytoLight SPEC 13/CEN 18/SPEC 21 Triple Color Probe CE IVD	D18Z1	13q12.11/18p11.1/21q22.13-q22.2	●/●/●	5/20 (50/200 µl)
Z-2164-200	ZytoLight SPEC 13/21 Dual Color Probe CE IVD	-	13q12.11/21q22.13-q22.2	●/●	20 (200 µl)
Z-2163-200	ZytoLight SPEC 18/CEN X/Y Triple Color Probe CE IVD	DXZ1/DYZ3	18q21.31-q21.32/Xp11.1-q11.1/Yp11.1-q11.1	●/●/●	20 (200 µl)
Z-2180-200	ZytoLight SPEC 21/CEN X/Yq12 Triple Color Probe CE IVD	DXZ1/ III DYZ1	21q22.13-q22.2/Xp11.1-q11.1/Yq12	●/●/●	20 (200 µl)
Z-2016-50/-200	ZytoLight CEN X/Yq12 Dual Color Probe CE IVD	DXZ1/III DYZ1	Xp11.1-q11.1/Yq12	●/●	5/20 (50/200 µl)
Z-2120-200	ZytoLight CEN X/Y Dual Color Probe CE IVD	DXZ1/ DYZ3	Xp11.1-q11.1/Yp11.1-q11.1	●/●	20 (200 µl)
Related Products					
Z-2279-20	ZytoLight Aneuploidy Panel 18/X/Y and 13/21 CE IVD Incl. ZytoLight SPEC 18/CEN X/Y Triple Color Probe, 0.2 ml (Z-2163-200); ZytoLight SPEC 13/21 Dual Color Probe, 0.2 ml (Z-2164-200)				20
Z-2104-5	ZytoLight Aneuploidy Panel X/Y and 13/18/21 CE IVD Incl. ZytoLight CEN X/Yq12 Dual Color Probe, 0.05 ml (Z-2016-50); ZytoLight SPEC 13/CEN 18/SPEC 21 Triple Color Probe, 0.05 ml (Z-2095-50)				5
Z-2104-20	ZytoLight Aneuploidy Panel X/Y and 13/18/21 CE IVD Incl. ZytoLight CEN X/Yq12 Dual Color Probe, 0.2 ml (Z-2016-200); ZytoLight SPEC 13/CEN 18/SPEC 21 Triple Color Probe, 0.2 ml (Z-2095-200)				20
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml				5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml				20
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml				20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

ZytoLight® Probes for Chromosome Enumeration

RUO

Background

The ZytoLight® Chromosome Enumeration Probes are designed for identification and enumeration of human chromosomes in interphase cells and as an adjunct to standard karyotyping in metaphases. These probes will produce sharp, bright signals specific for each individual chromosome.

CEN Probe Description

For most chromosomes, direct labeled ZytoLight® CEN™ Probes hybridizing to highly repetitive human satellite DNA sequences mainly located at the centromeric regions of chromosomes are applicable.

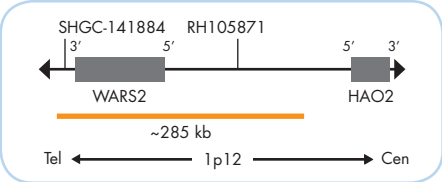
SPEC Probe Description

As several chromosomes share the same repetitive sequences resulting in cross-hybridization signals, they cannot be differentiated by centromere specific probes. Instead, these chromosomes can be identified by direct labeled ZytoLight® SPEC™ Probes hybridizing in close proximity to the respective satellite DNA sequences or to other chromosome specific loci.

ZytoLight® SPEC Probe Maps

The ZytoLight® SPEC 1p12 Probe is composed of:

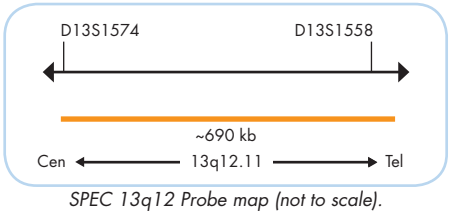
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 1p12** (chr1:119,537,102-119,823,147).
- Formamide based hybridization buffer



SPEC 1p12 Probe map (not to scale).

The ZytoLight® SPEC 13q12 Probe is composed of:

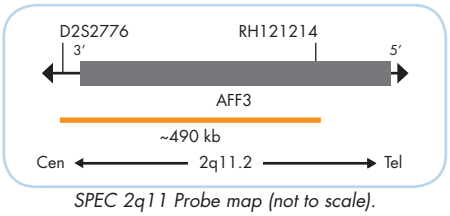
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 13q12.11** (chr13:20,200,365-20,892,494).
- Formamide based hybridization buffer



SPEC 13q12 Probe map (not to scale).

The ZytoLight® SPEC 2q11 Probe is composed of:

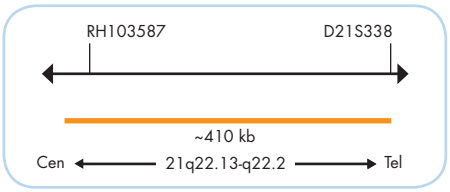
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 2q11.2** (chr2:100,132,806-100,621,725).
- Formamide based hybridization buffer



SPEC 2q11 Probe map (not to scale).

The ZytoLight® SPEC 21q22 Probe is composed of:

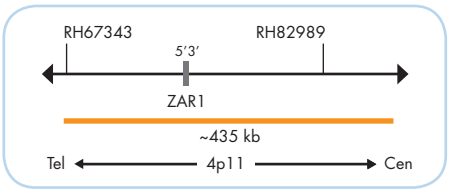
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 21q22.13-q22.2** (chr21:39,372,983-39,784,773).
- Formamide based hybridization buffer



SPEC 21q22 Probe map (not to scale).

The ZytoLight® SPEC 4p11 Probe is composed of:

- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 4p11** (chr4:48,329,914-48,762,386).
- Formamide based hybridization buffer



SPEC 4p11 Probe map (not to scale).

Results

In a normal interphase nucleus, two signals are expected using Chromosome Enumeration Probes specific for autosomes. Using chromosome Y specific probes will result in normal male cells in one signal and in normal female cells in no signal. Using chromosome X specific probes will result in normal male cells in one signal and in normal female cells in two signals per nucleus. Other signal patterns indicate numerical aberrations of the respective chromosome.

***According to Human Genome Assembly GRCh37/hg19*

Prod. No.	Product	Alpha/Class. Sat.	Chr. Band	Label	Tests* (Volume)
Z-2101-200	ZytoLight SPEC 1p12 Probe RUO	-	1p12	●	20 (200 µl)
Z-2049-200	ZytoLight SPEC 2q11 Probe RUO	-	2q11.2	●	20 (200 µl)
Z-2001-200	ZytoLight CEN 3 Probe RUO	D3Z1	3p11.1-q11.1	●	20 (200 µl)
Z-2083-200	ZytoLight SPEC 4p11 Probe RUO	-	4p11	●	20 (200 µl)
Z-2002-200	ZytoLight CEN 6 Probe RUO	D6Z1	6p11.1-q11	●	20 (200 µl)
Z-2003-200	ZytoLight CEN 7 Probe RUO	D7Z1	7p11.1-q11.1	●	20 (200 µl)
Z-2067-200	ZytoLight CEN 9 Probe RUO	III D9Z3	9q12	●	20 (200 µl)
Z-2079-200	ZytoLight CEN 10 Probe RUO	D10Z1	10p11.1-q11.1	●	20 (200 µl)
Z-2085-200	ZytoLight SPEC 13q12 Probe RUO	-	13q12.11	●	20 (200 µl)
Z-2006-200	ZytoLight CEN 17 Probe RUO	D17Z1	17p11.1-q11.1	●	20 (200 µl)
Z-2007-200	ZytoLight CEN 18 Probe RUO	D18Z1	18p11.1-q11.1	●	20 (200 µl)
Z-2086-200	ZytoLight SPEC 21q22 Probe RUO	-	21q22.13-q22.2	●	20 (200 µl)
Z-2008-200	ZytoLight CEN X Probe RUO	DXZ1	Xp11.1-q11.1	●	20 (200 µl)
Z-2010-200	ZytoLight CEN Yq12 Probe RUO	III DYZ1	Yq12	●	20 (200 µl)
Z-2123-200	ZytoLight CEN Y (DYZ3) Probe RUO	DYZ3	Yp11.1-q11.1	●	20 (200 µl)

** Using 10 µl probe solution per test.*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoLight® Aneuploidy Panel 18/X/Y and 13/21

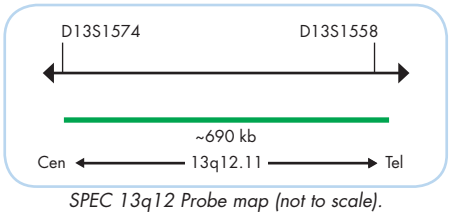
CE IVD

Background

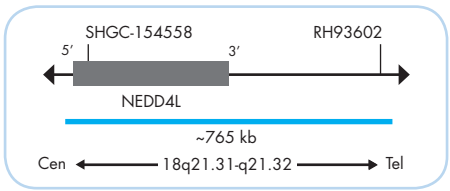
The ZytoLight® Aneuploidy Panel 18/X/Y and 13/21 is designed for chromosome enumeration of the chromosomes 13, 18, 21, X, and Y.

Trisomies of the autosomes 13, 18, or 21 (Down Syndrome) are common genomic aberrations. Aberrant numbers of the gonosomes X and Y are resulting in disorders of sex development (DSD). Diseases such as Ulrich-Turner-Syndrome (45, X) or Triple X Syndrome (47, XXX) may cause severe developmental and metabolic disorders. The prevalence of chromosomal abnormalities detectable in the newborn, including chromosome 13, 18, 21, X, and Y, is about 0.92%.

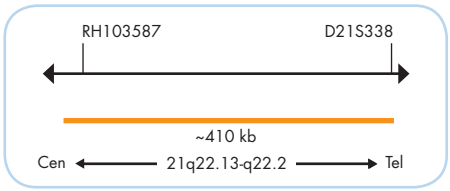
References
Gillenberg C, (1998) J Autism Dev Disord 28: 415-25.
Jacobs PA, et al. (1992) J Med Genet 29: 103-8.



SPEC 13q12 Probe map (not to scale).



SPEC 18q21 Probe map (not to scale).



SPEC 21q22 Probe map (not to scale).

Probe Description

The ZytoLight® Aneuploidy Panel 18/X/Y and 13/21 is a set comprising two separate probes:

- ZytoLight® SPEC 18/CEN X/Y Triple Color Probe (Prod. No. Z-2163-200)
- ZytoLight® SPEC 13/21 Dual Color Probe (Prod. No. Z-2164-200)

The ZytoLight® SPEC 18/CEN X/Y Triple Color Probe (PL119) is composed of:

- ZyBlue (excitation 418 nm/emission 467 nm) labeled polynucleotides (~37.0 ng/µl), which target sequences mapping in 18q21.31-q21.32** (chr18:55,690,725-56,455,119).
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in Xp11.1-q11.1 specific for the alpha satellite centromeric region DXZ1 of chromosome X.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in Yp11.1-q11.1 specific for the alpha satellite centromeric region DYZ3 of chromosome Y.
- Formamide based hybridization buffer

The ZytoLight® SPEC 13/21 Dual Color Probe (PL120) is composed of:

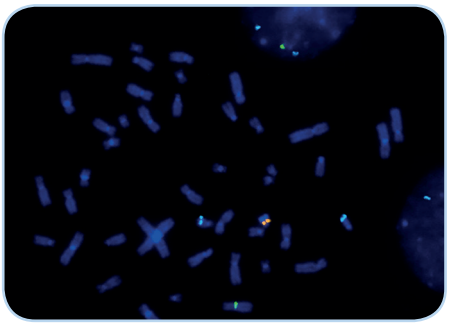
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 13q12.11** (chr13:20,200,365-20,892,494).
- ZyOrange (excitation 547 nm/emission at 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 21q22.13-q22.2** (chr21:39,372,983-39,784,773).
- Formamide based hybridization buffer

Results

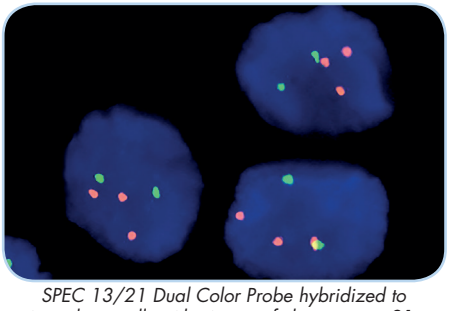
In an interphase nucleus of a normal cell using the ZytoLight® SPEC 13/21 Dual Color Probe, two green and two orange signals are expected.

In an interphase nucleus of a normal cell, using the ZytoLight® SPEC 18/CEN X/Y Triple Color Probe, two blue signals are expected. Two green signals are expected in a normal female cell, or one single green and one single orange signal is expected in a normal male cell.

Other signal patterns indicate numerical aberration of the respective chromosomes.



SPEC 18/CEN X/Y Triple Color Probe hybridized to interphase nuclei of normal male cells and to chromosomes of a metaphase spread.



SPEC 13/21 Dual Color Probe hybridized to interphase cells with trisomy of chromosome 21.

Prod. No.	Product	Label	Tests* (Volume)
Z-2279-20	ZytoLight Aneuploidy Panel 18/X/Y and 13/21 CE IVD Incl. ZytoLight SPEC 18/CEN X/Y Triple Color Probe, 0.2 ml (Z-2163-200); ZytoLight SPEC 13/21 Dual Color Probe, 0.2 ml (Z-2164-200)		20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

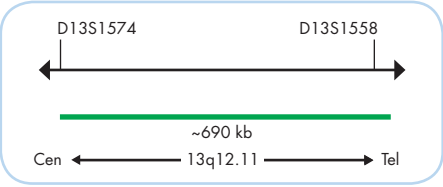
ZytoLight® Aneuploidy Panel X/Y and 13/18/21

CE IVD

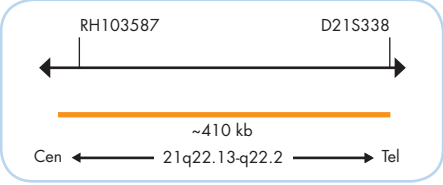
Background

The ZytoLight® Aneuploidy Panel X/Y and 13/18/21 is designed for enumeration of the chromosomes 13, 18, 21, X, and Y. Trisomies of the autosomes 13, 18, or 21 (Down Syndrome) are common genomic aberrations. Aberrant numbers of the gonosomes X and Y are resulting in disorders of sex development (DSD). Diseases such as Ulrich-Turner-Syndrome (45, X) or Triple X Syndrome (47, XXX) may cause severe developmental and metabolic disorders. The prevalence of chromosomal abnormalities detectable in the newborn including chromosomes 13, 18, 21, X, and Y, is about 0.92%.

References
Gillenberg C, (1998) J Autism Dev Disord 28: 415-25.
Jacobs PA, et al. (1992) J Med Genet 29: 103-8.



SPEC 13q12 Probe map (not to scale).



SPEC 21q22 Probe map (not to scale).

Probe Description

The ZytoLight® Aneuploidy Panel X/Y and 13/18/21 is a set comprising two separate probes:

- ZytoLight® CEN X/Yq12 Dual Color Probe (Prod. No. Z-2016-50/200)
- ZytoLight® SPEC 13/CEN 18/SPEC 21 Triple Color Probe (Prod. No. Z-2095-50/200)

The ZytoLight® CEN X/Yq12 Dual Color Probe (PL3) is composed of:

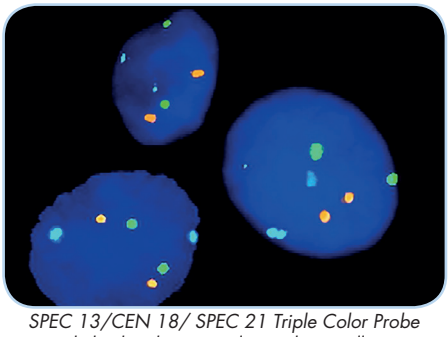
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.5 ng/µl), which target sequences mapping in Xp11.1-q11.1 specific in the alpha satellite centromeric region DXZ1 of chromosome X.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in Yq12 specific in the classical satellite III centromeric region DYZ1 of chromosome Y.
- Formamide based hybridization buffer

The ZytoLight® SPEC 13/CEN 18/SPEC 21 Triple Color Probe (PL54) is composed of:

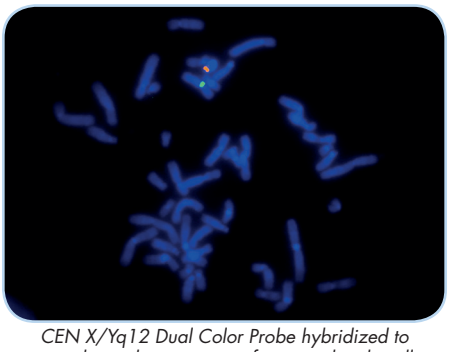
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 13q12.11** (chr13:20,200,365-20,892,494).
- ZyBlue (excitation at 418 nm and emission 467 nm) labeled polynucleotides (~12.0 ng/µl), which target sequences mapping in 18p11.1-q11.1 specific in the alpha satellite centromeric region D18Z1.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.5 ng/µl), which target sequences mapping in 21q22.13-q22.2** (chr21:39,372,983-39,784,773).
- Formamide based hybridization buffer

Results

In an interphase nucleus, using the ZytoLight® CEN X/Yq12 Dual Color Probe, two orange signals are expected in a normal female cell whereas one single orange and one single green signal is expected in a normal male cell.
In an interphase nucleus of a normal cell, using the ZytoLight® SPEC 13/CEN 18/SPEC 21 Triple Color Probe, two green, two blue, and two orange signals are expected. Other signal patterns indicate numerical aberrations of the respective chromosomes.



SPEC 13/CEN 18/ SPEC 21 Triple Color Probe hybridized to normal interphase cells.



CEN X/Yq12 Dual Color Probe hybridized to metaphase chromosomes of a normal male cell.

Prod. No.	Product	Label	Tests* (Volume)
Z-2104-5/20	ZytoLight Aneuploidy Panel X/Y and 13/18/21 CE IVD Incl. ZytoLight CEN X/Yq12 Dual Color Probe, 0.05/0.2 ml (Z-2016-50/-200); ZytoLight SPEC 13/CEN 18/SPEC 21 Triple Color Probe, 0.05/0.2 ml (Z-2095-50/-200)		5/20 (50/200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

Accessories

ZytoLight® Implementation Kits

For the detection of ZytoLight® Probes

Prod. No.	Product	Tests
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml	5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml	20
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8ml	20

ZytoLight® Pretreatment Reagents

Prod. No.	Product
ES-0001-4	Pepsin Solution, 4 ml CE IVD
ES-0001-50	Pepsin Solution, 50 ml CE IVD
ES-0001-1000	Pepsin Solution, 1000 ml CE IVD
ES-0002-4	Cytology Pepsin Solution, 4 ml CE IVD
ES-0002-50	Cytology Pepsin Solution, 50 ml CE IVD
PT-0001-1000	Heat Pretreatment Solution Citric, 1000 ml CE IVD
PT-0006-100	Formaldehyde Dilution Buffer Set CE IVD Incl. 10x $MgCl_2$, 50 ml; 10x PBS, 50 ml

ZytoLight® Wash Buffers & Ancillary Reagents

Prod. No.	Product
MT-0007-0.8	DAPI/DuraTect™-Solution, 150 ng DAPI/ml, 0.8 ml CE IVD
MT-0008-0.8	DAPI/DuraTect™-Solution (ultra), 1360 ng DAPI/ml, 0.8 ml CE IVD
WB-0001-560	Wash Buffer SSC, 560 ml CE IVD
WB-0002-50	25x Wash Buffer A, 50 ml CE IVD
WB-0005-50	20x Wash Buffer TBS, 50 ml CE IVD
WB-0007-500	Cytology Stringency Wash Buffer SSC, 500 ml CE IVD
WB-0008-500	Cytology Wash Buffer SSC, 500 ml CE IVD

Accessories for Research Use Only

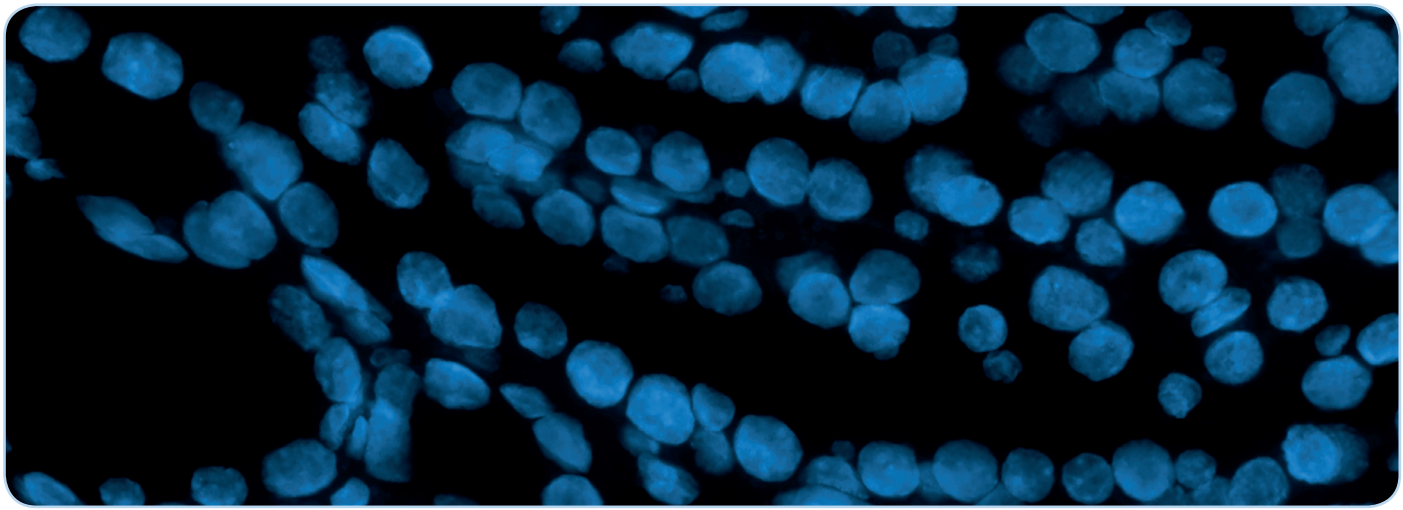
ZytoLight® Wash Buffers & Ancillary Reagents

Prod. No.	Product
WB-0003-50	20x SSC Solution, 50 ml RUO

IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.

RUO For Research Use Only. Not for use in diagnostic procedures.

DAPI/DuraTect™ Solutions



Product Description

ZytoVision's DAPI/Antifade Mounting Solutions are ready-to-use mounting media that are applied directly to fluorescently labeled tissue or cell specimens on microscope slides. They contain the nuclear counterstain DAPI (4', 6-diamidino-2-phenylindole) which produces a blue fluorescence when bound to DNA.

ZytoVision's DAPI/Antifade Mounting Solutions are optimized to be used on tissue or cell specimens that have been hybridized with any available Zyto*Light* ®, F*lex*ISH ®, or Zyto*Mation* ® FISH Probe. They are all particularly compatible with the ZytoVision fluorochromes ZyGreen™, ZyOrange™, ZyBlue™, ZyGold™ and ZyRed™.

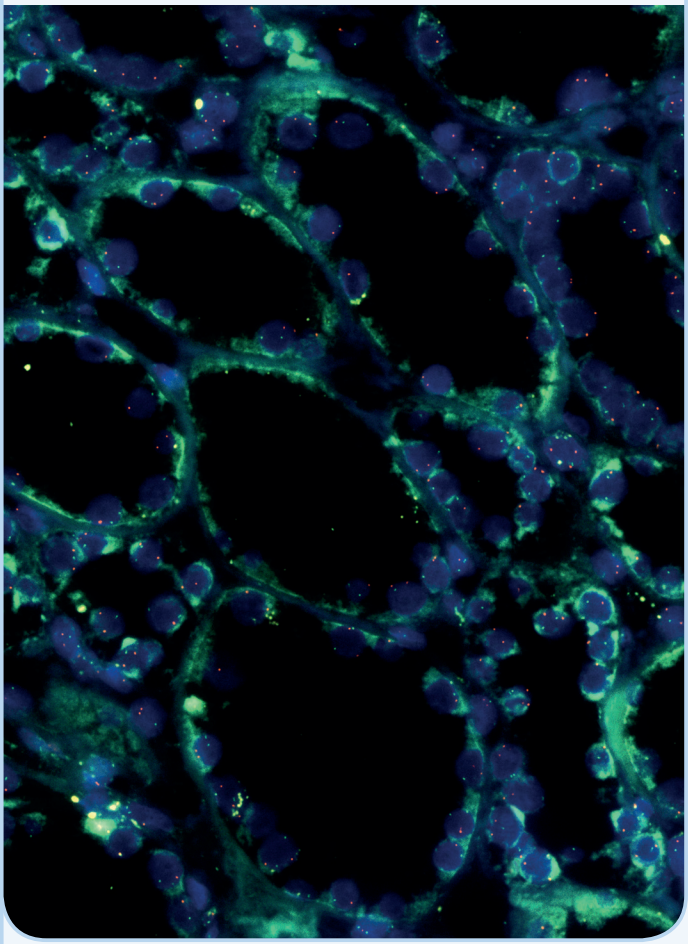
ZytoVision's DAPI/Antifade Mounting Solutions prevent permanent loss of fluorescence and protect fluorescent dyes from photobleaching during fluorescence microscopy.

Prod. No.	Product	Concentration	Storage Temperature	Description
MT-0007-0.8	DAPI/DuraTect-Solution, 0.8 ml CE IVD	150 ng DAPI/ml	2...8°C	· Best overall signal protection · Superior signal stability of mounted tissue sections (≤3 months at 2...21°C)
MT-0008-0.8	DAPI/DuraTect-Solution (ultra), 0.8 ml CE IVD	1360 ng DAPI/ml	2...8°C	· Best overall signal protection · Superior signal stability of mounted tissue sections (≤3 months at 2...21°C) · Recommended when a more intense DAPI stain is desired

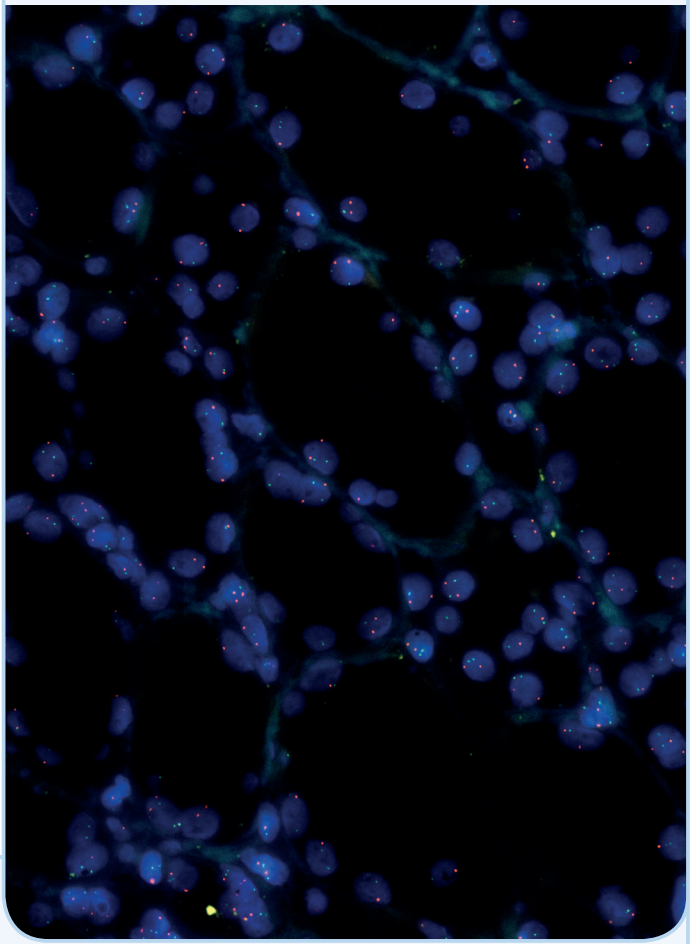
IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

ZyBlack™ Quenching Solution

Without ZyBlack™ Quenching Solution



With ZyBlack™ Quenching Solution



Kidney tissue section hybridized with the Zyto*Light* ® SPEC PTEN/CEN 10 Dual Color Probe.

Product Description

ZyBlack™ Quenching Solution is a ready-to-use solution to reduce autofluorescence on formalin-fixed paraffin-embedded specimens.
It can be easily incorporated into the manual FISH protocol by applying it after the proteolytic pretreatment.

One of the major concerns of Fluorescence *in situ* Hybridization (FISH)-based diagnostic assays is the interference by autofluorescence. Several types of tissue tend to emit intense autofluorescence, including brain, liver, kidney and myocardium, making it difficult to evaluate FISH results.

ZyBlack™ Quenching Solution reduces autofluorescence without adversely affecting tissue integrity or specific fluorescence signals.

Prod. No.	Product	Volume
BS-0002-8	ZyBlack Quenching Solution CE IVD	8 ml

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

FlexISH®

Products for flexible FISH

184

Simply Adapt the Hybridization Time to your Needs!

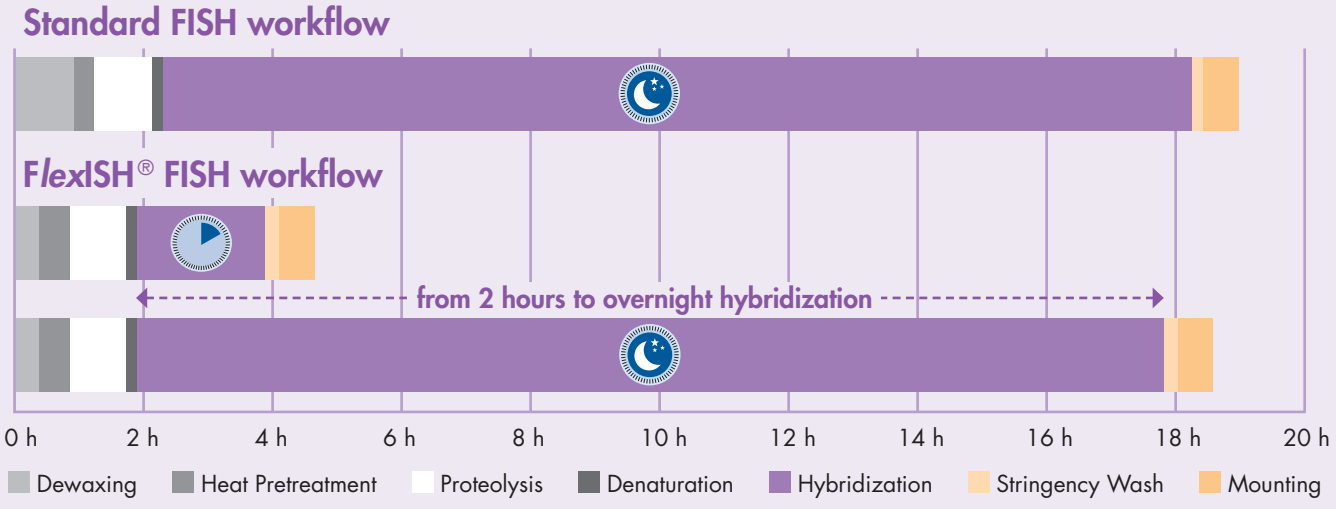
Introduction
F*lex*ISH® products are designed for identification of chromosomal aberrations on formalin-fixed, paraffin-embedded (FFPE) specimens by FISH. Using the F*lex*ISH® products gives you the flexibility to choose between a 1-day (2 h hybridization) or a 2-day (overnight hybridization) protocol by adapting the hybridization time just according to your individual needs!

Advantages of F*lex*ISH®
- Hybridization time can be varied between 2 hours and overnight.
- With a hybridization temperature of 37°C, the F*lex*ISH® protocol is fully compatible with routine workflows in pathology laboratories.

F*lex*ISH® Kit - Convenient Solution
F*lex*ISH® probes can be combined with the F*lex*ISH®-Tissue Implementation Kit to obtain reliable results already within 4.5 hours.
The F*lex*ISH® protocol can also be incorporated into the routine workflow with overnight hybridization providing the highest flexibility.

High-Quality FISH Results with flexible Hybridization Time

The hybridization time can be varied freely between 2 hours and overnight.



Chromosome Index

		Chr. Band	Product Name	Product No.	Quantity	Page
1		1q23.1	FlexISH NTRK1/NTRK3 DistinguISH™ Probe CE IVD	Z-2314-50/-200	50/200 µl	189
2		2p23	FlexISH ALK/ROS1 DistinguISH™ Probe CE IVD	Z-2203-50/-200	50/200 µl	190
		2p11.2	FlexISH IGK/IGL DistinguISH™ Probe CE IVD	Z-2295-50	50 µl	191
3		3q27	FlexISH BCL2/BCL6 DistinguISH™ Probe CE IVD	Z-2283-50/-200	50/200 µl	192
4-5			no probes available yet			
6		6q22.1	FlexISH ALK/ROS1 DistinguISH™ Probe CE IVD	Z-2203-50/-200	50/200 µl	190

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

Chromosome Index

	Chr. Band	Product Name	Product No.	Quantity	Page
7		no probes available yet			
8	8q24.21	FlexISH MYC/IGH TriCheck™ Probe CE IVD	Z-2293-50	50 µl	193
9		no probes available yet			
10	10p11.2	FlexISH RET/KIF5B TriCheck™ Probe CE IVD	Z-2269-50/-200	50/200 µl	194
	10q11.2	FlexISH RET/KIF5B TriCheck™ Probe CE IVD	Z-2269-50/-200	50/200 µl	194
11-13		no probes available yet			
14	14q32.3	FlexISH MYC/IGH TriCheck™ Probe CE IVD	Z-2293-50	50 µl	193
15	15q25	FlexISH NTRK1/NTRK3 DistinguISH™ Probe CE IVD	Z-2314-50/-200	50/200 µl	189
16		no probes available yet			
17	17q12	FlexISH ERBB2/CEN 17 Dual Color Probe CE IVD	Z-2166-50/-200	50/200 µl	195
18	18q21.3	FlexISH BCL2/BCL6 DistinguISH™ Probe CE IVD	Z-2283-50/-200	50/200 µl	192
22	22q11.2	FlexISH IGK/IGL DistinguISH™ Probe CE IVD	Z-2295-50	50 µl	191
X, Y		no probes available yet			

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

Gene Index

HUGO Name	Synonym	Product Name	Product No.	Quantity	Page
ALK	CD246	FlexISH ALK/ROS1 DistinguISH™ Probe CE IVD	Z-2203-50/-200	50/200 µl	190
BCL2	Bcl-2, PPP1R50	FlexISH BCL2/BCL6 DistinguISH™ Probe CE IVD	Z-2283-50/-200	50/200 µl	192
BCL6	ZNF51, LAZ3	FlexISH BCL2/BCL6 DistinguISH™ Probe CE IVD	Z-2283-50/-200	50/200 µl	192
ERBB2	HER2, HER-2, NEU	FlexISH ERBB2/CEN 17 Dual Color Probe CE IVD	Z-2166-50/-200	50/200 µl	195
IGH	IGH@	FlexISH MYC/IGH TriCheck™ Probe CE IVD	Z-2293-50	50 µl	193
IGK	IGK@	FlexISH IGK/IGL DistinguISH™ Probe CE IVD	Z-2295-50	50 µl	191
IGL	IGL@	FlexISH IGK/IGL DistinguISH™ Probe CE IVD	Z-2295-50	50 µl	191
KIF5B	KNS1	FlexISH RET/KIF5B TriCheck™ Probe CE IVD	Z-2269-50/-200	50/200 µl	194
MYC	CMYC, bHLHe39, c-Myc	FlexISH MYC/IGH TriCheck™ Probe CE IVD	Z-2293-50	50 µl	193
NTRK1	MTC, TRK	FlexISH NTRK1/NTRK3 DistinguISH™ Probe CE IVD	Z-2314-50/-200	50/200 µl	189
NTRK3	TRKC	FlexISH NTRK1/NTRK3 DistinguISH™ Probe CE IVD	Z-2314-50/-200	50/200 µl	189
RET	HSCR1, CDHF12	FlexISH RET/KIF5B TriCheck™ Probe CE IVD	Z-2269-50/-200	50/200 µl	194
ROS1	MCF3, ROS	FlexISH ALK/ROS1 DistinguISH™ Probe CE IVD	Z-2203-50/-200	50/200 µl	190

Indication Index

Indication	Product Name	Product No.	Quantity	Page
Solid Tumors Specific Probes				
Breast Cancer				
Breast Cancer	FlexISH ERBB2/CEN 17 Dual Color Probe CE IVD	Z-2166-50/-200	50/200 µl	195
Gastrointestinal Cancer				
Gastric/Gastroesophageal Junction Cancer	FlexISH ERBB2/CEN 17 Dual Color Probe CE IVD	Z-2166-50/-200	50/200 µl	195
Lung Cancer				
Non-Small Cell Lung Cancer (NSCLC)	FlexISH ALK/ROS1 DistinguISH™ Probe CE IVD	Z-2203-50/-200	50/200 µl	190
Hematology Specific Probes				
Lymphoma				
B-Cell Lymphoma	FlexISH BCL2/BCL6 DistinguISH™ Probe CE IVD	Z-2283-50/-200	50/200 µl	192

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

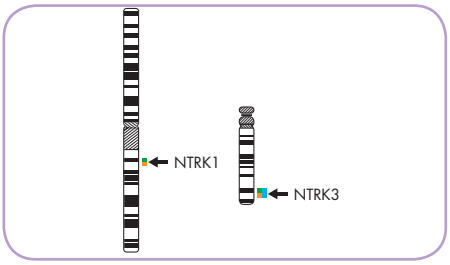
FlexISH® NTRK1/NTRK3 DistinguISH™ Probe

CE IVD

Background

The FlexISH® NTRK1/NTRK3 DistinguISH™ Probe is designed to detect rearrangements affecting the chromosomal region 1q23.1 and 15q25.3 harboring the NTRK1 (neurotrophic receptor tyrosine kinase 1, a.k.a. TRKA, TRK) and NTRK3 (neurotrophic receptor tyrosine kinase 3, a.k.a. TRKC) gene region, respectively.
The neurotrophic tyrosine receptor kinase genes (NTRK1, NTRK2, and NTRK3) encode a family of receptor tyrosine kinases that serve important roles in cell survival, proliferation, and cellular differentiation in healthy human cells.
The tumor types in which NTRK gene fusions have been detected are diverse, and include, e.g., breast cancer, non-small cell lung cancer, sarcoma, melanoma, and thyroid carcinoma. The treatment of patients with NTRK fusion-positive cancers with a NTRK inhibitor, such as the FDA-approved drugs larotrectinib or entrectinib, is associated with high response rates, regardless of NTRK gene, fusion partner, and tumor type.
Hence, detection of NTRK1 and NTRK3 rearrangements by FISH may be of therapeutic significance.

References
Haller F, et al. (2016) J Pathol 238: 700-10.
Hsiao SJ, et al. (2019) J Mol Diagn 21: 553-71.
Knezevich SR, et al. (1998) Nat Genet 18: 184-7.
Martin-Zanca D, et al. (1986) Nature 319: 743-8.
Solomon JP & Hechtman JF (2019) Cancer Res 79: 3163-8.

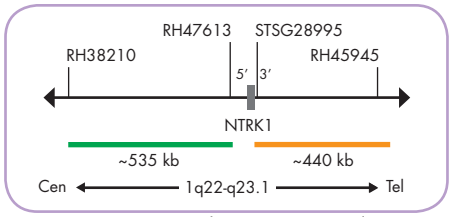


Ideograms of chromosomes 1 (left) and 15 (right) indicating the hybridization locations.

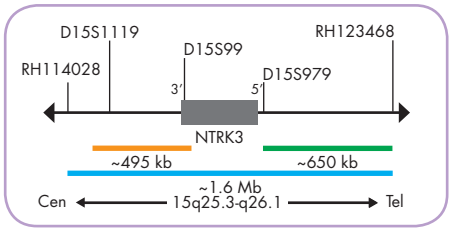
Probe Description

The FlexISH® NTRK1/NTRK3 DistinguISH™ Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 1q22-q23.1** (chr1:156,245,849-156,781,745) proximal to the NTRK1 breakpoint region and in 15q25.3-q26.1** (chr15:88,825,346-89,475,889) distal to the NTRK3 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~2.5 ng/µl), which target sequences mapping in 1q23.1** (chr1:156,854,527-157,296,918) distal to the NTRK1 breakpoint region and in 15q25.3** (chr15:87,976,717-88,471,002) proximal to the NTRK3 breakpoint region.
- ZyBlue (excitation 418 nm/emission 467 nm) labeled polynucleotides, (~70.0 ng/µl), which target sequences mapping in 15q25.3-q26.1** (chr15:87,845,459-89,475,889) harboring the NTRK3 gene region.
- Formamide based hybridization buffer



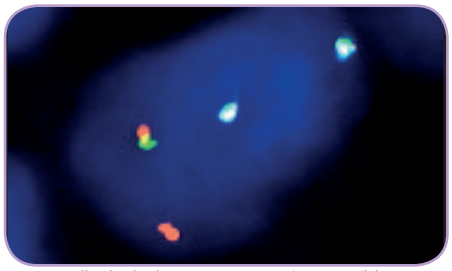
SPEC NTRK1 Probe map (not to scale).



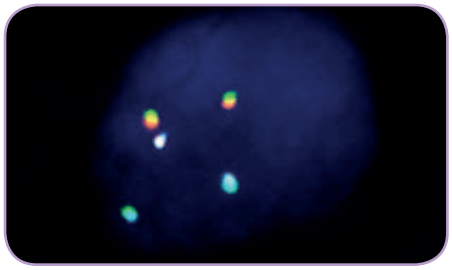
NTRK3 Probe map (not to scale).

Results

In an interphase nucleus without NTRK1 or NTRK3 rearrangements, two NTRK1 specific green/orange fusion signals and two NTRK3 specific green/orange/blue fusion signals are expected. An NTRK1 rearrangement is indicated by one separate green and one separate orange signal, both not co-localizing with blue signals. An NTRK3 rearrangement is indicated by one separate green and one separate orange signal, both co-localizing with blue signals. Isolated orange signals and orange/blue fusion signals are the result of deletions distal to the NTRK1 and NTRK3 breakpoint region, respectively, or are due to unbalanced translocations affecting this chromosomal region.



Cell which shows two green/orange/blue fusion signals (NTRK3) and one green/orange fusion signal (NTRK1). NTRK1 rearrangement is indicated by one isolated orange signal, not co-localizing with a blue signal.



Cell which shows two green/orange fusion signals and one green/orange/blue fusion signal. NTRK3 rearrangement is indicated by one separate orange and one separate green signal, both co-localizing with blue signals.

Prod. No.	Product	Label	Tests* (Volume)
Z-2314-50	FlexISH NTRK1/NTRK3 DistinguISH Probe CE IVD	●/●/●	5 (50 µl)
Z-2314-200	FlexISH NTRK1/NTRK3 DistinguISH Probe CE IVD	●/●/●	20 (200 µl)
Related Products			
Z-2182-5	FlexISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; 5x FlexISH Wash Buffer, 150 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2182-20	FlexISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; 5x FlexISH Wash Buffer, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

FlexISH® ALK/ROS1 DistinguISH™ Probe

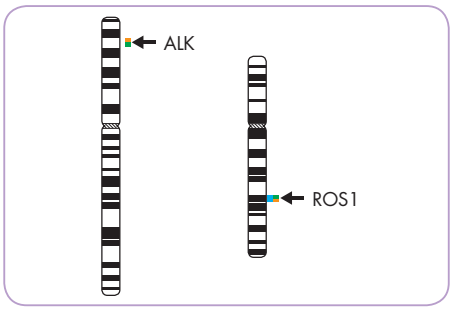
CE IVD

Background

The FlexISH® ALK/ROS1 DistinguISH™ Probe (PL161) is intended to be used for the qualitative detection of translocations involving the human ALK gene at 2p23.1-p23.2 and the human ROS1 gene at 6q22.1 in formalin-fixed, paraffin-embedded specimens, such as non-small cell lung cancer (NSCLC), by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the FlexISH®-Tissue Implementation Kit (Prod. No. Z-2182-5/-20).

The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of NSCLC and therapeutic measures should not be initiated based on the test result alone.



Ideograms of chromosomes 2 (left) and 6 (right) indicating the hybridization locations.

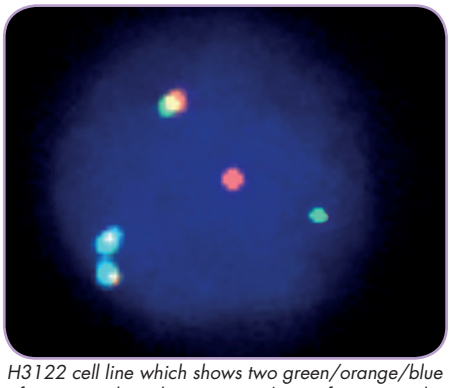
Probe Description

The FlexISH® ALK/ROS1 DistinguISH™ Probe is composed of:

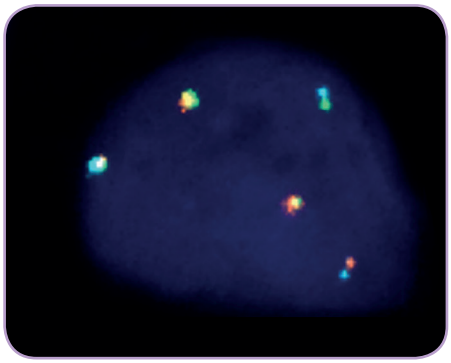
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 2p23.1-p23.2** (chr2:29,460,144-30,095,822) proximal to the ALK breakpoint region and in 6q22.1** (chr6:116,912,298-117,627,255) proximal to the ROS1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~2.5 ng/µl), which target sequences mapping in 2p23.2** (chr2:29,174,204-29,383,335) distal to the ALK breakpoint region and in 6q22.1** (chr6:117,659,135-117,871,701) distal to the ROS1 breakpoint region.
- ZyBlue (excitation 418 nm/emission 467 nm) labeled polynucleotides, (~70.0 ng/µl), which target sequences mapping in 6q22.1** (chr6:116,671,642-117,260,761) proximal to the ROS1 breakpoint region co-localizing with the green-labeled ROS1 polynucleotides and in 6q22.1-q22.2** (chr6:117,765,211-118,444,005) distal to the ROS1 breakpoint region co-localizing with the orange-labeled ROS1 polynucleotides.
- Formamide based hybridization buffer

Results

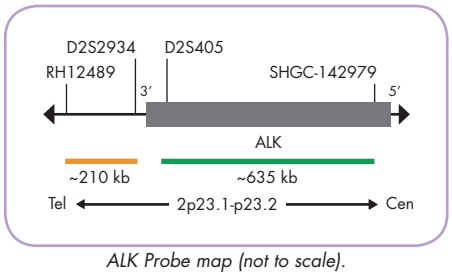
In an interphase nucleus without ALK or ROS1 rearrangements, two ALK specific green/orange fusion signals and two ROS1 specific green/orange/blue fusion signals are expected. An ALK rearrangement is indicated by one separate orange signal and/or one separate green signal, both not co-localizing with blue signals. A ROS1 rearrangement is indicated by one separate green signal, and/or one separate orange signal both co-localizing with blue signals.



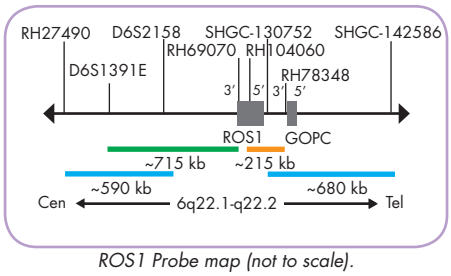
H3122 cell line which shows two green/orange/blue fusion signals and one orange/green fusion signal. An ALK rearrangement is indicated by one separate orange and one separate green signal, both not co-localizing with blue signals.



Paraffin-embedded HCC78 cell line which shows two green/orange fusion signals and one green/orange/blue fusion signal. ROS1 rearrangement is indicated by one separate orange and one separate green signal, both co-localizing with blue signals.



ALK Probe map (not to scale).



ROS1 Probe map (not to scale).

Prod. No.	Product	Label	Tests* (Volume)
Z-2203-50	FlexISH ALK/ROS1 DistinguISH Probe CE IVD	●/●/●	5 (50 µl)
Z-2203-200	FlexISH ALK/ROS1 DistinguISH Probe CE IVD	●/●/●	20 (200 µl)
Related Products			
Z-2182-5	FlexISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; 5x FlexISH Wash Buffer, 150 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2182-20	FlexISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; 5x FlexISH Wash Buffer, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

FlexISH® IGK/IGL DistinguISH™ Probe

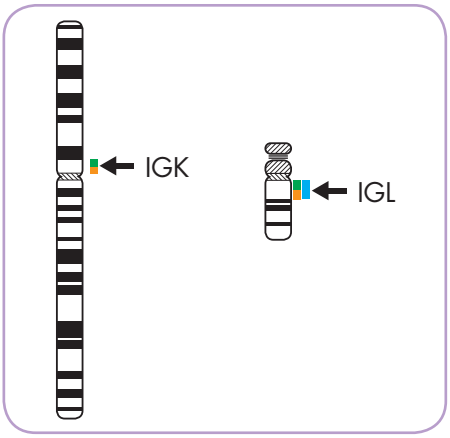
CE
IVD

Background

The FlexISH® IGK/IGL DistinguISH™ Probe (PL249) is intended to be used for the qualitative detection of translocations involving the IGK locus at 2p11.2 and the IGL locus at 22q11.22 in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the FlexISH®-Tissue Implementation Kit (Prod. No. Z-2182-5/-20).

The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

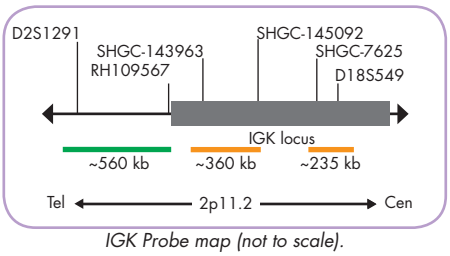


Ideograms of chromosomes 2 (left) and 22 (right) indicating the hybridization locations.

Probe Description

The FlexISH® IGK/IGL DistinguISH™ Probe is composed of:

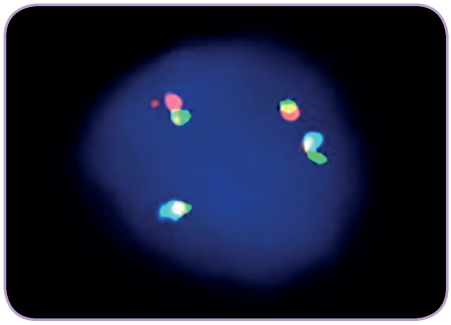
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 22q11.21-q11.22** (chr22:21,807,535-22,942,402) proximal to the IGL breakpoint region and in 2p11.2** (chr2:88,592,864-89,153,517) distal to the IGK breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~2.5 ng/µl), which target sequences mapping in 2p11.2** (chr2:89,246,977-89,609,390 and chr2:89,853,315-90,089,156) proximal to the IGK breakpoint region and in 22q11.22-q11.23** (chr22:23,324,781-23,679,042) distal to the IGL breakpoint region. Due to homologous sequence segments proximal to the IGK breakpoint region, the orange probe has two hybridization regions in close proximity.
- ZyBlue (excitation 418 nm/emission 467 nm) labeled polynucleotides (~70.0 ng/µl), which target sequences mapping in 22q11.21-q11.23** (chr22:22,185,288-23,512,555) harboring the IGL locus
- Formamide based hybridization buffer



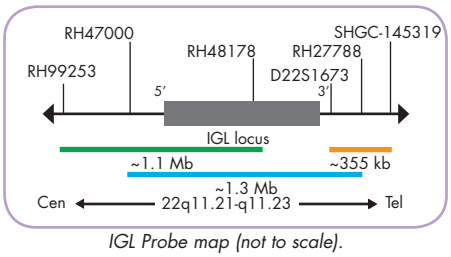
IGK Probe map (not to scale).

Results

In an interphase nucleus without IGK or IGL rearrangements, two IGK specific green/orange fusion signals and two IGL specific green/orange/blue fusion signals are expected. An IGK rearrangement is indicated by one separate green and one separate orange signal, both not co-localizing with blue signals. Due to the two hybridization regions of the orange probe hybridizing to the IGK locus, IGK-specific orange signals may appear as paired signal dots. An IGL rearrangement is indicated by one separate green and one separate orange signal, both co-localizing with blue signals.



FlexISH IGK/IGL DistinguISH™ Probe on a normal interphase cell with non-rearranged IGK loci (two green/orange fusion signals) and non-rearranged IGL loci (two green/orange/blue fusion signals). Orange signals of the IGK locus may appear as paired signal dots.



IGL Probe map (not to scale).

Prod. No.	Product	Label	Tests* (Volume)
Z-2295-50	FlexISH IGK/IGL DistinguISH Probe CE IVD	●/●/●	5 (50 µl)
Related Products			
Z-2182-5	FlexISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; 5x FlexISH Wash Buffer, 150 ml; DAPI/DuraTect-Solution, 0.2 ml		5

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

FlexISH® BCL2/BCL6 DistinguISH™ Probe

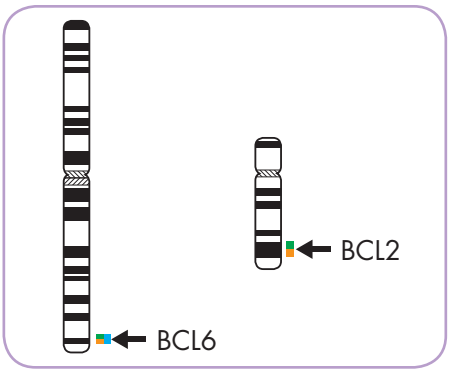
CE IVD

Background

The FlexISH® BCL2/BCL6 DistinguISH™ Probe (PL238) is intended to be used for the qualitative detection of translocations involving the human BCL2 gene at 18q21.33 and the human BCL6 gene at 3q27.3 in formalin-fixed, paraffin-embedded specimens, such as B-cell lymphoma, by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the FlexISH®-Tissue Implementation Kit (Prod. No. Z-2182-5/-20).

The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of B-cell lymphoma and therapeutic measures should not be initiated based on the test result alone.



Ideograms of chromosomes 3 (left) and 18 (right) indicating the hybridization locations.

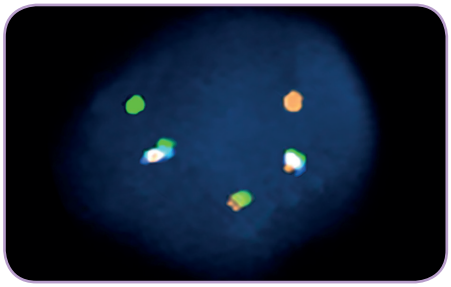
Probe Description

The FlexISH® BCL2/BCL6 DistinguISH™ Probe is composed of:

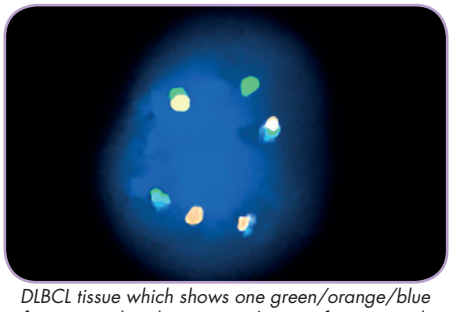
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 18q21.33** (chr18:60,046,152-60,779,138) proximal to the BCL2 breakpoint region and in 3q27.3** (chr3:186,578,337-187,403,834) proximal to the BCL6 breakpoint region
- ZyOrange (excitation 547 nm/emission at 572 nm) labeled polynucleotides (~2.5 ng/µl), which target sequences mapping in 18q21.33-q22.1** (chr18:60,994,528-61,658,503) distal to the BCL2 breakpoint region and in 3q27.3-q28** (chr3:187,744,962-188,411,425) distal to the BCL6 breakpoint region
- ZyBlue (excitation 418 nm/emission 467 nm) labeled polynucleotides, (~70.0 ng/µl), which target sequences mapping in 3q27.3** (chr3:186,578,337-187,403,834) proximal to the BCL6 breakpoint region co-localizing with the green-labeled BCL6 polynucleotides and in 3q27.3-q28** (chr3:187,744,962-188,411,425) distal to the BCL6 breakpoint region co-localizing with the orange-labeled BCL6 polynucleotides
- Formamide based hybridization buffer

Results

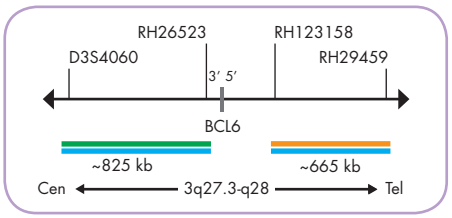
In an interphase nucleus without BCL2 or BCL6 rearrangements, two BCL2 specific green/orange fusion signals and two BCL6 specific green/orange/blue fusion signals are expected. A BCL2 rearrangement is indicated by one separate green and one separate orange signal, both not co-localizing with blue signals. A BCL6 rearrangement is indicated by one separate green and one separate orange signal, both co-localizing with blue signals.



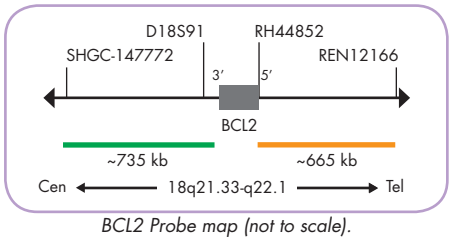
Lymphoma tissue which shows two green/orange/blue fusion signals and one green/orange fusion signal. BCL2 rearrangement is indicated by one separate green and one separate orange signal, both not co-localizing with blue signals.
Specimen kindly provided by Dr. Rontogianni, Athens, Greece.



DLBCL tissue which shows one green/orange/blue fusion signal and one green/orange fusion signal. BCL6 rearrangement is indicated by one separate green and one separate orange signal, both co-localizing with blue signals. Additionally, one separate orange and one separate green signal indicate a further BCL2 positivity, confirming a BCL2/BCL6 co-rearrangement.



BCL6 Probe map (not to scale).



BCL2 Probe map (not to scale).

Prod. No.	Product	Label	Tests* (Volume)
Z-2283-50	FlexISH BCL2/BCL6 DistinguISH Probe CE IVD	●/●/●	5 (50 µl)
Z-2283-200	FlexISH BCL2/BCL6 DistinguISH Probe CE IVD	●/●/●	20 (200 µl)
Related Products			
Z-2182-5	FlexISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; 5x FlexISH Wash Buffer, 150 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2182-20	FlexISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; 5x FlexISH Wash Buffer, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

FlexISH® MYC/IGH TriCheck™ Probe

CE IVD

Background

The FlexISH® MYC/IGH TriCheck™ Probe (PL247) is intended to be used for the qualitative detection of human MYC rearrangements with and without participation of the human IGH locus in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the FlexISH®-Tissue Implementation Kit (Prod. No. Z-2182-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

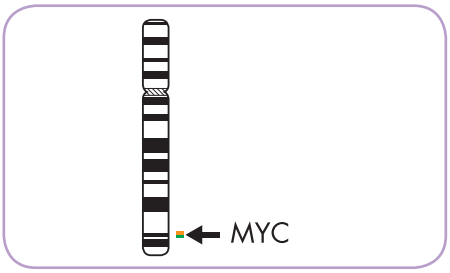
Probe Description

The FlexISH® MYC/IGH TriCheck™ Probe is composed of:

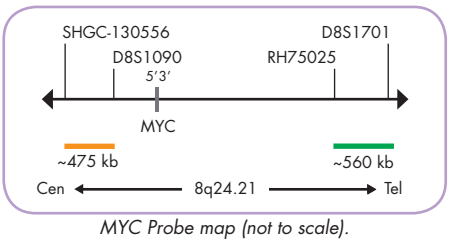
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 8q24.21** (chr8:130,373,051-130,930,673) distal to the MYC breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~2.5 ng/µl), which target sequences mapping in 8q24.21** (chr8:127,888,765-128,363,281) proximal to the MYC breakpoint region.
- ZyBlue (excitation 418 nm/emission 467 nm) labeled polynucleotides (~70 ng/µl), which target sequences mapping in 14q32.33** (chr14:105,462,169-106,995,000) harboring the IGH locus.
- Formamide based hybridization buffer

Results

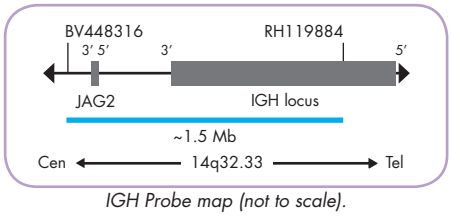
In an interphase nucleus without rearrangements of the MYC/IGH loci, two green/orange fusion signals and two blue signals are expected.
A MYC-IGH fusion is indicated by one separate green signal and one separate orange signal, both co-localizing with blue signals. A MYC translocation without involvement of IGH is indicated by separated orange and green signals without co-localization of the separated signals with blue signals.



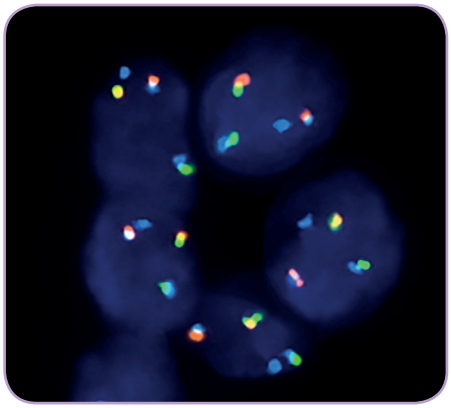
Ideograms of chromosomes 8 (above) and 14 (below) indicating the hybridization locations.



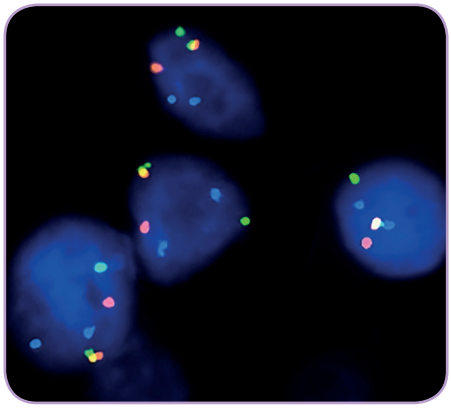
MYC Probe map (not to scale).



IGH Probe map (not to scale).



Example of an aberrant signal pattern: Non-Hodgkin lymphoma tissue section with t(8;14) as indicated by one separate green and one separate orange signal, and one additional blue signal.



Example of an aberrant signal pattern: Non-Hodgkin lymphoma tissue section with translocation of the MYC gene without IGH involvement as indicated by one separate green and one separate orange signal, without an additional blue signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2293-50	FlexISH MYC/IGH TriCheck Probe CE IVD	●/●/●	5 (50 µl)
Related Products			
Z-2182-5	FlexISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; 5x FlexISH Wash Buffer, 150 ml; DAPI/DuraTect-Solution, 0.2 ml		5

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

FlexISH® RET/KIF5B TriCheck™ Probe

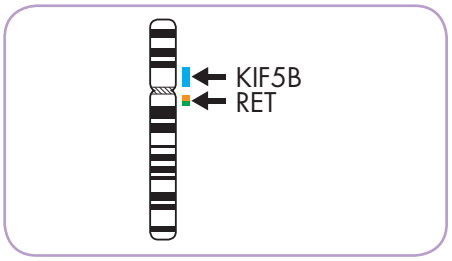
CE IVD

Background

The FlexISH® RET/KIF5B TriCheck™ Probe (PL226) is intended to be used for the qualitative detection of rearrangements involving the human RET gene in with and without participation of the human KIF5B gene in formalin-fixed, paraffin-embedded specimens by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the FlexISH®-Tissue Implementation Kit (Prod. No. Z-2182-5/-20).

The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

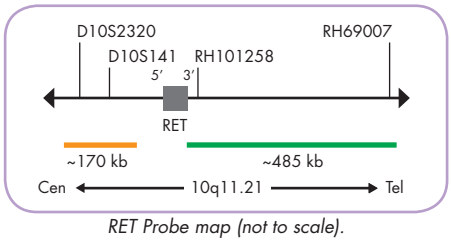


Ideogram of chromosome 10 indicating the hybridization locations.

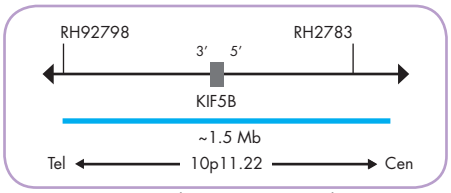
Probe Description

The FlexISH® RET/KIF5B TriCheck™ Probe is composed of:

- ZyOrange (excitation 547 nm/ emission at 572 nm) labeled polynucleotides (~2.5 ng/µl), which target sequences mapping in 10q11.21** (chr10:43,340,888-43,510,171) proximal to the RET breakpoint region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10 ng/µl), which target sequences mapping in 10q11.21** (chr10:43,626,274-44,112,146) distal to the RET breakpoint region.
- ZyBlue (excitation 418 nm/emission at 467 nm) labeled polynucleotides (~70 ng/µl), which target sequences mapping in 10p11.22** (chr10:31,640,467-33,085,804) harboring the KIF5B gene region.
- Formamide based hybridization buffer



RET Probe map (not to scale).



KIF5B Probe map (not to scale).

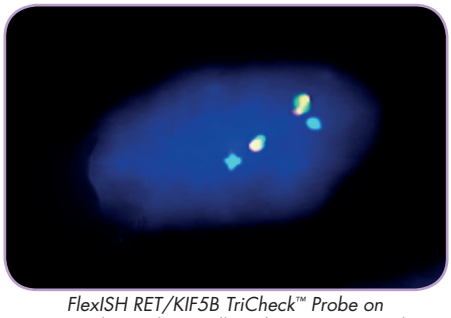
Results

In an interphase nucleus without rearrangements of the KIF5B/RET locus, two green/orange fusion signals and two blue signals are expected.

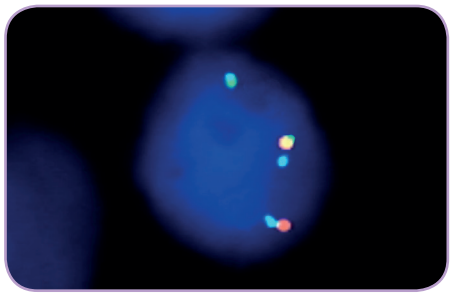
A KIF5B-RET inversion is indicated by one separate green signal, one separate orange signal, and an additional blue signal.

A RET translocation is indicated by separated orange and green signals without an additional blue signal.

KIF5B-RET inversion with deletion of the 5′-RET sequences is indicated by loss of one orange signal and co-localization of the isolated green signal with a blue signal.



FlexISH RET/KIF5B TriCheck™ Probe on normal interphase cells with non-rearranged RET loci (two green/orange fusion signals), and non-rearranged KIF5B loci (two blue signals).



Example of an aberrant signal pattern: NSCLC tissue section with a KIF5B-RET inversion as indicated by one green, one separated orange, and an additional blue signal.

Specimen kindly provided by Dr. Schildhaus, Essen, Germany.

Prod. No.	Product	Label	Tests* (Volume)
Z-2269-50	FlexISH RET/KIF5B TriCheck Probe CE IVD	●/●/●	5 (50 µl)
Z-2269-200	FlexISH RET/KIF5B TriCheck Probe CE IVD	●/●/●	20 (200 µl)
Related Products			
Z-2182-5	FlexISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; 5x FlexISH Wash Buffer, 150 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2182-20	FlexISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; 5x FlexISH Wash Buffer, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

FlexISH® ERBB2/CEN 17 Dual Color Probe

CE
IVD

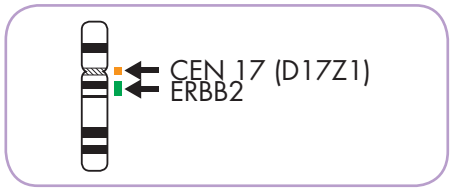
Background

The FlexISH® ERBB2/CEN 17 Dual Color Probe (PL122) is intended to be used for the qualitative detection of amplifications involving the human ERBB2 gene as well as the detection of chromosome 17 alpha satellites in formalin-fixed, paraffin-embedded specimens, such as breast cancer and gastric/gastroesophageal junction cancer, by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the FlexISH®-Tissue Implementation Kit (Prod. No. Z-2182-5/-20).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of breast cancer and gastric/gastroesophageal junction cancer and therapeutic measures should not be initiated based on the test result alone.

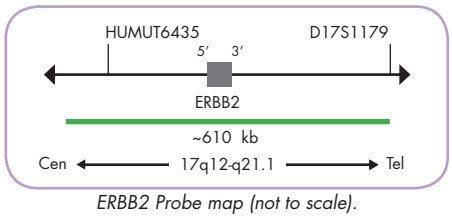
Probe Description

The ERBB2/CEN 17 Dual Color Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~10.0 ng/µl), which target sequences mapping in 17q12-q21.1** (chr17:37,572,531-38,181,308) harboring the ERBB2 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~1.0 ng/µl), which target sequences mapping in 17p11.1-q11.1 specific for the alpha satellite centromeric region D17Z1 of chromosome 17.
- Formamide based hybridization buffer



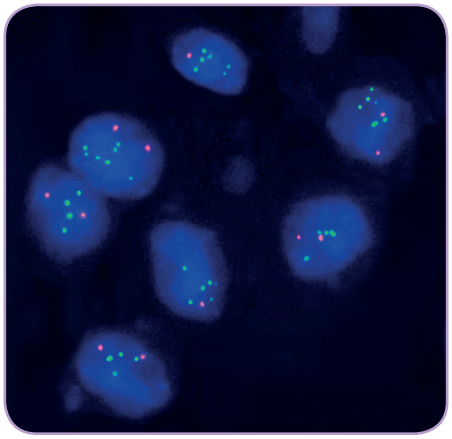
Ideogram of chromosome 17 indicating the hybridization locations.



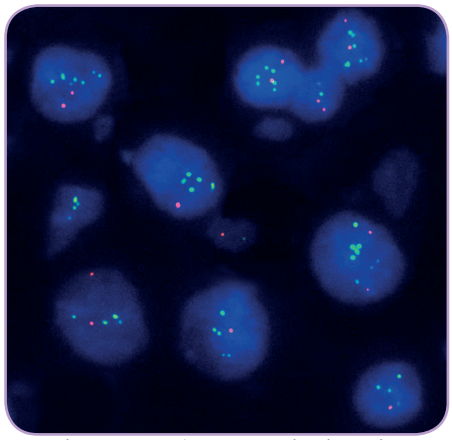
ERBB2 Probe map (not to scale).

Results

In a normal interphase nucleus, two green and two orange signals are expected. In a cell with amplification of the ERBB2 gene locus, multiple copies of the green signal or green signal clusters will be observed.



FlexISH ERBB2/CEN 17 Dual Color Probe hybridized for 2 hours on a breast cancer tissue section with ERBB2 (green) amplification.



FlexISH ERBB2/CEN 17 Dual Color Probe hybridized overnight on a breast cancer tissue section with ERBB2 (green) amplification.

Prod. No.	Product	Label	Tests* (Volume)
Z-2166-50	FlexISH ERBB2/CEN 17 Dual Color Probe CE IVD	●/●	5 (50 µl)
Z-2166-200	FlexISH ERBB2/CEN 17 Dual Color Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2182-5	FlexISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; 5x FlexISH Wash Buffer, 150 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2182-20	FlexISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; 5x FlexISH Wash Buffer, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

Accessories

FlexISH® Implementation Kits

For the detection of FlexISH® Probes

Prod. No.	Product	Tests
Z-2182-5	FlexISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; 5x FlexISH Wash Buffer, 150 ml; DAPI/DuraTect-Solution, 0.2 ml	5
Z-2182-20	FlexISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; 5x FlexISH Wash Buffer, 500 ml; DAPI/DuraTect-Solution, 0.8 m	20

FlexISH® Pretreatment Reagents

Prod. No.	Product
ES-0001-4	Pepsin Solution, 4 ml CE IVD
ES-0001-50	Pepsin Solution, 50 ml CE IVD
ES-0001-1000	Pepsin Solution, 1000 ml CE IVD
PT-0001-1000	Heat Pretreatment Solution Citric, 1000 ml CE IVD

FlexISH® Wash Buffers & Ancillary Reagents

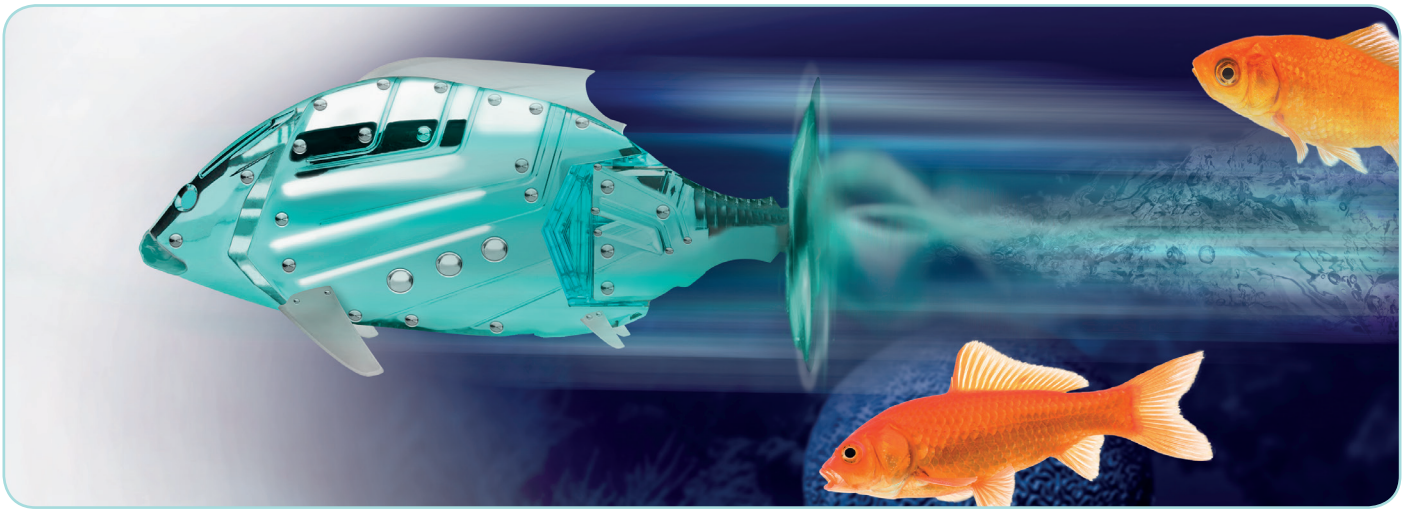
Prod. No.	Product
MT-0007-0.8	DAPI/DuraTect™-Solution, 150 ng DAPI/ml, 0.8 ml CE IVD
MT-0008-0.8	DAPI/DuraTect™-Solution (ultra), 1360 ng DAPI/ml, 0.8 ml CE IVD
WB-0010-500	5x FlexISH Wash Buffer, 500 ml CE IVD

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

ZytoMation® *Products for automated FISH*

197

Fully automated Probes for the BOND™ Systems!



Introduction

The ZytoMation® probes combine the quality of the ZytoVision probes for Fluorescence *in situ* Hybridization (FISH) with an automated workflow. They are designed for fully automated FISH to detect genetic aberrations such as translocations and amplifications in formalin-fixed, paraffin-embedded (FFPE) tissue sections on the BOND™ fully automated systems (BOND™-III, BOND™-MAX, and BOND™ RX™ (RUO)) by Leica Biosystems (ZytoVision is not affiliated or associated with Leica Biosystems).

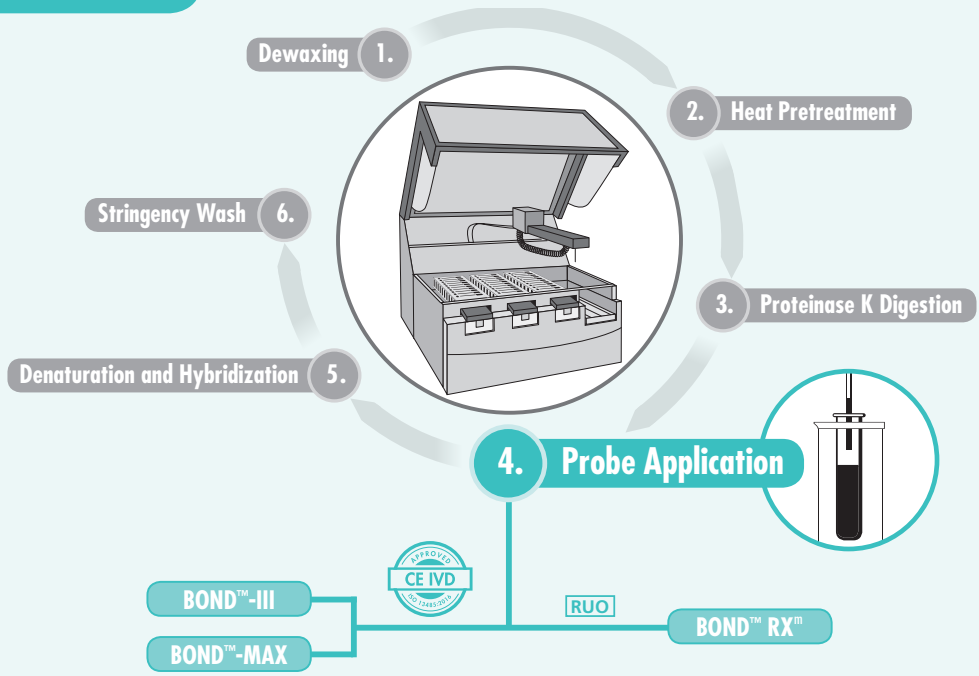
Advantages of ZytoMation®

- 5 h protocol on fully automated BOND™ systems
- Ready-to-use probes
- Reduced hands-on time

Workflow

To successfully use the ZytoMation® probes, the BOND™ FISH Kit (DS9636) is required.
Prior to evaluation, the hybridized slides should be mounted using a DAPI/DuraTect™-Solution (MT-0007-0.8/MT-0008-0.8).

Workflow Schedule



ZytoVision is not affiliated or associated with Leica Biosystems.

Chromosome Index

Chr. Band	Product Name	Product No.	Quantity	Page
1				
	no probes available yet			
2				
	2p23	ZytoMation ALK Dual Color Break Apart FISH Probe CE IVD	Z-2315-5.1ML	5.1 ml	202
3				
	3q27	ZytoMation BCL6 Dual Color Break Apart FISH Probe CE IVD	Z-2313-5.1ML	5.1 ml	203
6				
	6q22.1	ZytoMation ROS1 Dual Color Break Apart FISH Probe CE IVD	Z-2298-5.1ML	5.1 ml	204
7				
	7q31.2	ZytoMation MET/CEN 7 Dual Color FISH Probe CE IVD	Z-2321-5.1ML	5.1 ml	205

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

Chromosome Index

		Chr. Band	Product Name	Product No.	Quantity	Page
8		8q24.21	ZytoMation MYC Dual Color Break Apart FISH Probe CE IVD	Z-2312-5.1ML	5.1 ml	206
9			no probes available yet			
10		10q11.2	ZytoMation RET Dual Color Break Apart FISH Probe CE IVD	Z-2316-5.1ML	5.1 ml	207
11-13			no probes available yet			
14		14q32.3	ZytoMation IGH Dual Color Break Apart FISH Probe CE IVD	Z-2317-5.1ML	5.1 ml	208
15-16			no probes available yet			
17		17q12	ZytoMation ERBB2/CEN 17 Dual Color FISH Probe CE IVD	Z-2292-5.1ML	5.1 ml	209
18		18q21.3	ZytoMation BCL2 Dual Color Break Apart FISH Probe CE IVD	Z-2306-5.1ML	5.1 ml	210
19-22			no probes available yet			
X, Y			no probes available yet			

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

Gene Index

HUGO Name	Synonym	Product Name	Product No.	Quantity	Page
ALK	CD246	ZytoMation ALK Dual Color Break Apart FISH Probe CE IVD	Z-2315-5.1ML	5.1 ml	202
BCL2	Bcl-2, PPP1R50	ZytoMation BCL2 Dual Color Break Apart FISH Probe CE IVD	Z-2306-5.1ML	5.1 ml	210
BCL6	ZNF51, LAZ3	ZytoMation BCL6 Dual Color Break Apart FISH Probe CE IVD	Z-2313-5.1ML	5.1 ml	203
ERBB2	HER2, HER-2, NEU	ZytoMation ERBB2/CEN 17 Dual Color FISH Probe CE IVD	Z-2292-5.1ML	5.1 ml	209
IGH	IGH@	ZytoMation IGH Dual Color Break Apart FISH Probe CE IVD	Z-2317-5.1ML	5.1 ml	208
MET	HGFR, RCCP2	ZytoMation MET/CEN 7 Dual Color FISH Probe CE IVD	Z-2321-5.1ML	5.1 ml	205
MYC	CMYC, bHLHe39, c-Myc	ZytoMation MYC Dual Color Break Apart FISH Probe CE IVD	Z-2312-5.1ML	5.1 ml	206
RET	HSCR1, CDHF12	ZytoMation RET Dual Color Break Apart FISH Probe CE IVD	Z-2316-5.1ML	5.1 ml	207
ROS1	MCF3, ROS	ZytoMation ROS1 Dual Color Break Apart FISH Probe CE IVD	Z-2298-5.1ML	5.1 ml	204

Indication Index

Indication	Product Name	Product No.	Quantity	Page
Solid Tumors Specific Probes				
Breast Cancer				
Breast Cancer	ZytoMation ERBB2/CEN 17 Dual Color FISH Probe CE IVD	Z-2292-5.1ML	5.1 ml	209
Gastrointestinal Cancer				
Gastric/Gastroesophageal Junction Cancer	ZytoMation ERBB2/CEN 17 Dual Color FISH Probe CE IVD	Z-2292-5.1ML	5.1 ml	209
Lung Cancer				
Non-Small Cell Lung Cancer (NSCLC)	ZytoMation ROS1 Dual Color Break Apart FISH Probe CE IVD	Z-2298-5.1ML	5.1 ml	204
Hematology Specific Probes				
Lymphoma				
B-Cell Lymphoma	ZytoMation BCL2 Dual Color Break Apart FISH Probe CE IVD	Z-2306-5.1ML	5.1 ml	210

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

ZytoMation® ALK Dual Color Break Apart FISH Probe

CE IVD

Background

The ZytoMation® ALK Dual Color Break Apart FISH Probe is designed to detect rearrangements involving the chromosomal region 2p23.1-p23.2 harboring the ALK (ALK receptor tyrosine kinase, a.k.a. CD246) gene.

ALK encodes a transmembrane receptor tyrosine kinase. This gene exerts characteristic oncogenic activities through fusion to several gene partners or mutations both in hematopoietic and non-hematopoietic solid tumors.

Translocations affecting the ALK gene locus are frequently found in anaplastic large cell lymphoma (ALCL), an aggressive non-Hodgkin lymphoma arising from T-cells. The most frequent translocation t(2;5) results in a fusion with the NPM1 gene located on chromosome 5q35. This rearrangement results in a NPM1/ALK fusion protein, which is constitutively activated through autophosphorylation, and that in turn mediates malignant cell transformation by activating downstream effectors like e.g. STAT3.

Additionally, inversions affecting the ALK gene located on the short arm of chromosome 2 [inv(2)(p21p23)] have been frequently detected in non-small cell lung cancer (NSCLC) and lead to the formation of EML4-ALK fusion transcripts.

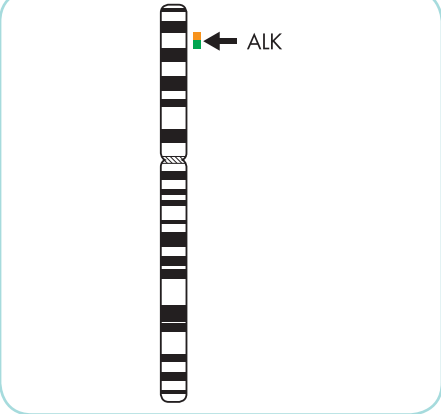
ALK kinase targeted therapies may represent a very effective therapeutic strategy in NSCLC patients carrying EML4-ALK rearrangements.

References
Inamura K, et al. (2009) Mod Pathol 22: 508-15.
Koivunen JP, et al. (2008) Clin Cancer Res 14: 4275-83.
Martelli MP, et al. (2009) Am J Pathol 174: 661-70.
Palmer RH, et al. (2009) Biochem J 420: 345-61.
Perner S, et al. (2008) Neoplasia 10: 298-302.
Rodig SJ, et al. (2009) Clin Cancer Res 15: 5216-23.
Sasaki T, et al. (2010) Eur J Cancer 46: 1773-80.
Von Laffert M, et al. (2013) Lung Cancer 81: 200-6.
Zhang Q, et al. (2007) Nat Med 11: 1341-8

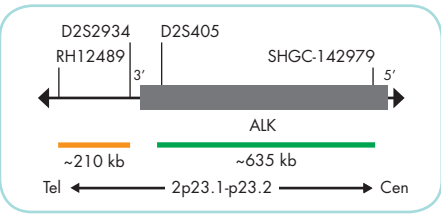
Probe Description

The ZytoMation® ALK Dual Color Break Apart FISH Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~6.0 ng/µl), which target sequences mapping in 2p23.1-p23.2** (chr2:29,460,144-30,095,822) proximal to the ALK breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.0 ng/µl), which target sequences mapping in 2p23.2** (chr2:29,174,204-29,383,335) distal to the ALK breakpoint region.
- Formamide based hybridization buffer



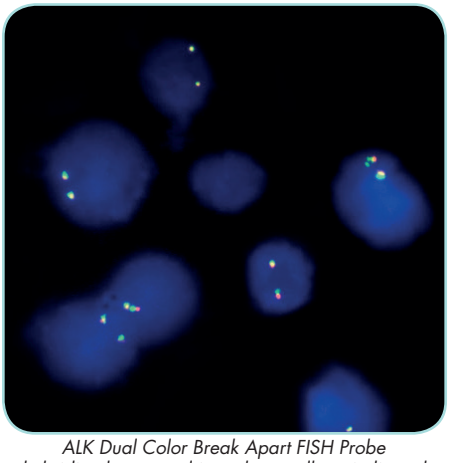
Ideogram of chromosome 2 indicating the hybridization locations.



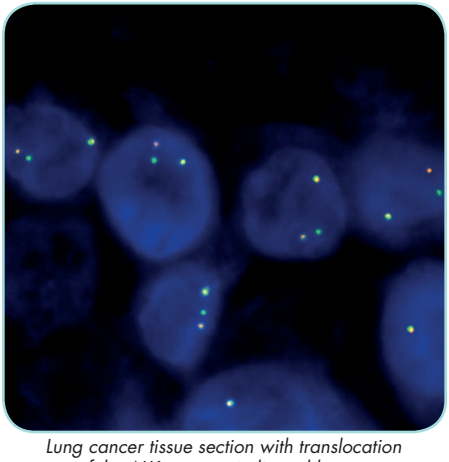
ALK Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 2p23.1-p23.2 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 2p23.1-p23.2 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 2p23.1-p23.2 locus and one 2p23.1-p23.2 locus affected by a translocation or inversion. EML4-ALK inversion with deletion of 5′-ALK sequences is indicated by one or multiple isolated orange signals.



ALK Dual Color Break Apart FISH Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Lung cancer tissue section with translocation of the ALK gene as indicated by one non-rearranged orange/green fusion signal, one orange and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2315-5.1ML	ZytoMation ALK Dual Color Break Apart FISH Probe CE IVD	●/●	up to 20 (5.1 ml)

** Using 240 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoMation® BCL6 Dual Color Break Apart FISH Probe

CE IVD

Background

The ZytoMation® BCL6 Dual Color Break Apart FISH Probe is designed for the detection of translocations involving the chromosomal region 3q27.3 harboring the BCL6 (BCL6 transcription repressor, a.k.a. ZNF51, LAZ3) gene. The BCL6 protein acts as a transcriptional repressor that is involved in the regulation of lymphoid development and function.

Chromosomal rearrangements of the BCL6 gene region were found to occur in different types of non-Hodgkin lymphoma (NHL), including diffuse large B-cell lymphoma (DLBCL) and follicular lymphoma (FL). The most common BCL6 translocation t(3;14)(q27;q32.3) results in the IGH-BCL6 gene fusion. In addition, more than 20 partner loci have been identified including immunoglobulin (Ig) genes but also a number of non-Ig genes. As a result of these translocations, the rearranged BCL6 gene comes under the control of the promoter of the partner gene leading to deregulated expression of BCL6.

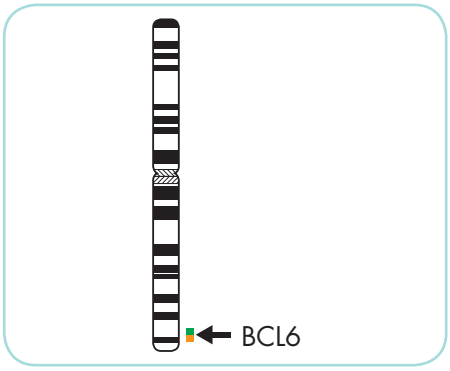
In DLBCL, the most common histologic subtype of NHL, BCL6 translocations represent one of the most frequent cytogenetic abnormality, occurring in 20% to 40% of the cases. Several studies reported a correlation of BCL6 translocation with an inferior overall survival. Moreover, DLBCL, which are positive for both BCL6 and MYC rearrangements, have been shown to have an extremely poor prognosis. Hence, the detection of BCL6 rearrangements by FISH may help in predicting the clinical outcome in patients with NHL.

References
Akyurek N, et al. (2012) Cancer 118: 4173-83.
Cady FM, et al. (2008) J Clin Oncol 26: 4814-9.
Ohno H (2004) Histol Histopathol 19: 637-50.
Ohno H (2006) J Clin Exp Hematop 46: 43-53.

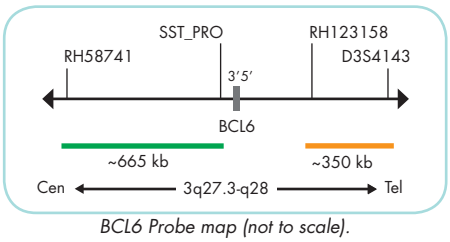
Probe Description

The ZytoMation® BCL6 Dual Color Break Apart FISH Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~6.0 ng/µl), which target sequences mapping in 3q27.3** (chr3:186,737,897-187,403,834) proximal to the BCL6 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~2.5 ng/µl), which target sequences mapping in 3q27.3-q28** (chr3:187,744,962-188,097,195) distal to the BCL6 breakpoint region.
- Formamide based hybridization buffer



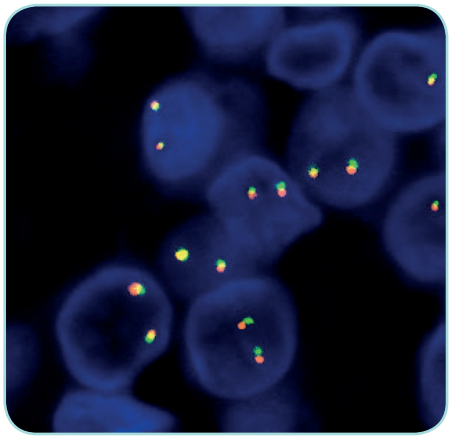
Ideogram of chromosome 3 indicating the hybridization locations.



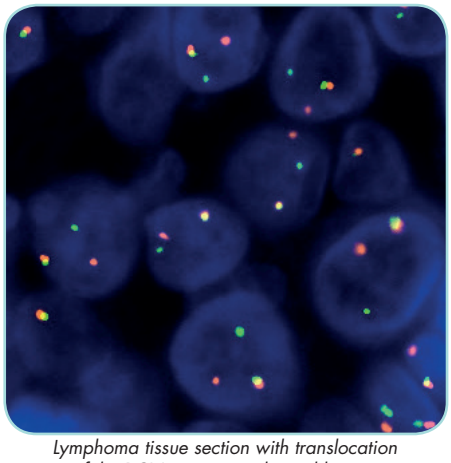
BCL6 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 3q27.3-q28 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 3q27.3-q28 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 3q27.3-q28 locus and one 3q27.3-q28 locus affected by a translocation.



BCL6 Dual Color Break Apart FISH Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Lymphoma tissue section with translocation of the BCL6 gene as indicated by one non-rearranged orange/green fusion signal, one orange and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2313-5.1ML	ZytoMation BCL6 Dual Color Break Apart FISH Probe CE IVD	●/●	up to 20 (5.1 ml)

** Using 240 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoMation® ROS1 Dual Color Break Apart FISH Probe

CE IVD

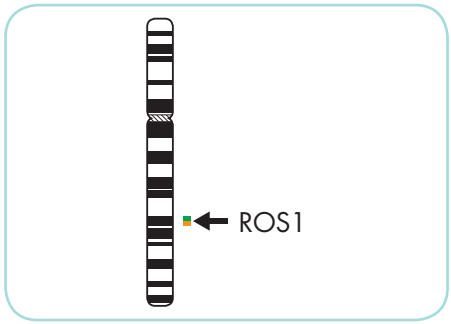
Background

The ZytoMation® ROS1 Dual Color Break Apart FISH Probe (PL251) is intended to be used for the qualitative detection of translocations involving the human ROS1 gene at 6q22.1 in formalin-fixed, paraffin-embedded specimens, such as non-small cell lung cancer (NSCLC), by fluorescence *in situ* hybridization (FISH).
The probe is intended to be used in combination with the Bond FISH Kit (DS9636) on the automated Bond-MAX or Bond III system by Leica Biosystems.
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of NSCLC and therapeutic measures should not be initiated based on the test result alone.

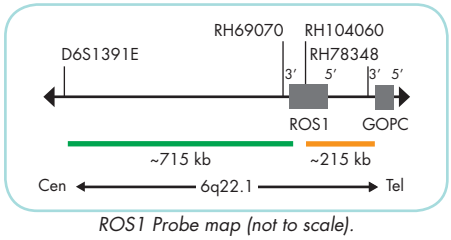
Probe Description

The ZytoMation® ROS1 Dual Color Break Apart FISH Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~6.0 ng/µl), which target sequences mapping in 6q22.1** (chr6:116,912,298-117,627,255) proximal to the ROS1 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~2.5 ng/µl), which target sequences mapping in 6q22.1** (chr6:117,659,135-117,871,701) distal to the ROS1 breakpoint region.
- Formamide based hybridization buffer



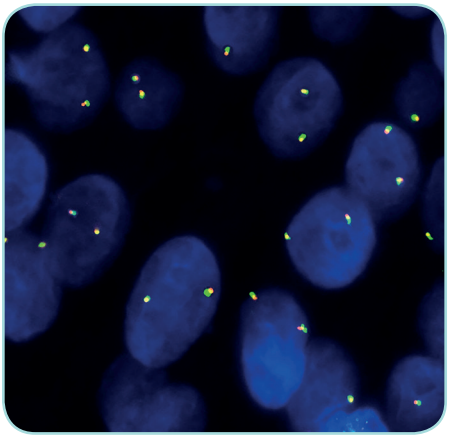
Ideogram of chromosome 6 indicating the hybridization locations.



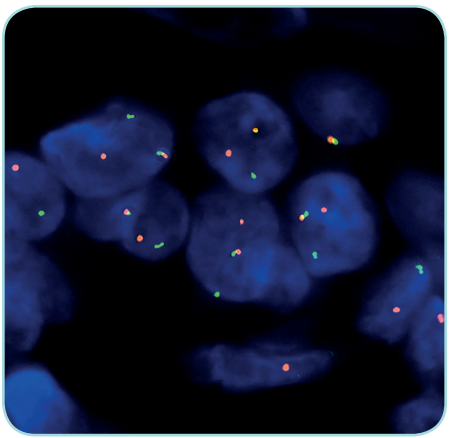
ROS1 Probe map (not to scale).

Results

In an interphase nucleus lacking an aberration involving the 6q22.1 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 6q22.1 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 6q22.1 locus and one 6q22.1 locus affected by a translocation.
Isolated green signals are the result of deletions distal to the ROS1 breakpoint region or are due to unbalanced translocations affecting this chromosomal region.



ROS1 Dual Color Break Apart FISH Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Lung cancer tissue section with translocation of the ROS1 gene as indicated by one non-rearranged orange/green fusion signal, one orange and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2298-5.1ML	ZytoMation ROS1 Dual Color Break Apart FISH Probe CE IVD	●/●	up to 20 (5.1 ml)

** Using 240 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoMation® MET/CEN 7 Dual Color FISH Probe

CE IVD

Background

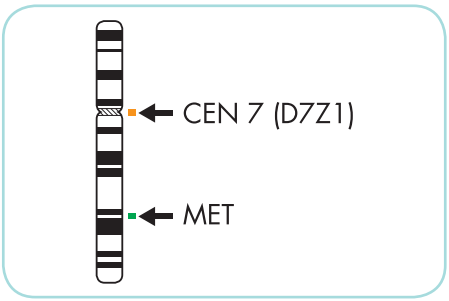
The ZytoMation® MET/CEN 7 Dual Color FISH Probe is designed for the detection of MET gene amplifications found in a variety of human tumors.

The MET gene (a.k.a. c-Met) is located in the chromosomal region 7q31.2 and encodes a transmembrane tyrosine kinase receptor for the hepatocyte growth factor (HGF). HGF and MET play an important role in angiogenesis and tumor growth. Activation or upregulation of MET was found in a number of carcinomas including lung, breast, colorectal, prostate, and gastric carcinomas as well as in gliomas, melanomas and some sarcomas. MET overexpression is known as a negative prognostic indicator in patients with various carcinomas, multiple myeloma, or glioma. Therefore, several inhibitors of the HGF/MET signaling pathway are being studied and developed as potent therapies to inhibit angiogenesis and tumor growth. In addition, it was shown that MET amplification leads to resistance to gefitinib or erlotinib in lung cancer by driving ERBB3-dependent activation of the PI3K pathway.

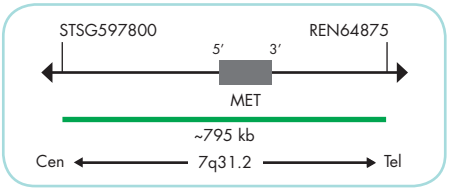
References
Ach T, et al. (2013) Virchows Arch 462: 65-72.
Cooper CS, et al. (1984) Nature 311: 29-32.
Engelman JA, et al. (2007) Science 316: 1039-43.
Ettl T, et al. (2014) Head Neck 36: 517-23.
Garcia S, et al. (2007) Int J Oncol 31: 49-58.
Hara T, et al. (1998) Lab Invest 78: 1143-53.
Lacroix L, et al. (2014) PLoS One 1: e84319.
Lee D, et al. (2015) Cancer Res Treat 47: 120-5.
Preusser M, et al. (2014) Histopathology 65: 684-92.
Schildhaus HU, et al. (2015) Clin Cancer Res 21: 907-15.

Probe Description

- The ZytoMation® MET/CEN 7 Dual Color FISH Probe is composed of:
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~5 ng/µl), which target sequences mapping in 7q31.2** (chr7:115,925,700-116,718,699) harboring the MET gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~0.2 ng/µl), which target sequences mapping in 7p11.1-q11.1 specific for the alpha satellite centromeric region D7Z1 of chromosome 7.
- Formamide based hybridization buffer



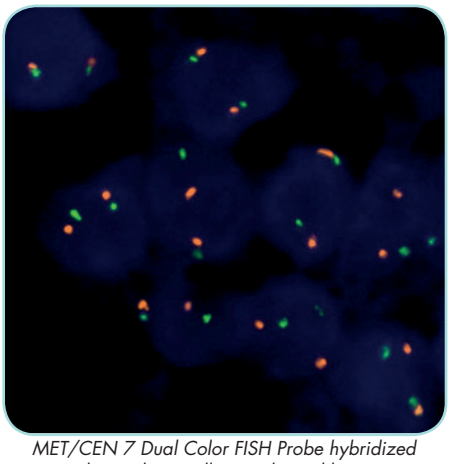
Ideogram of chromosome 7 indicating the hybridization locations.



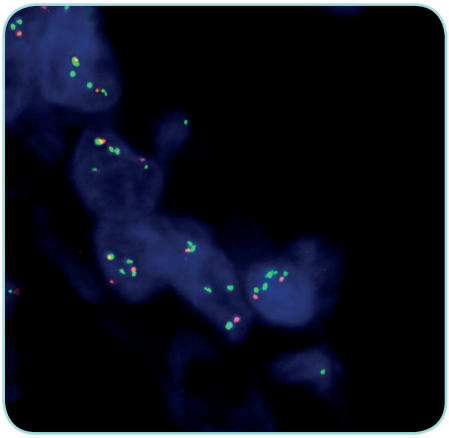
MET Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the MET gene locus, multiple copies of the green signal or green signal clusters will be observed.



MET/CEN 7 Dual Color FISH Probe hybridized to normal interphase cells as indicated by two green and two orange signals in each nucleus.



Lung adenocarcinoma tissue section with amplification of the MET gene locus as indicated by multiple copies of the green signal in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2321-5.1ML	ZytoMation MET/CEN 7 Dual Color FISH Probe CE IVD	●/●	up to 20 (5.1 ml)

** Using 240 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoMation® MYC Dual Color Break Apart FISH Probe

CE IVD

Background

The ZytoMation® MYC Dual Color Break Apart FISH Probe is designed to detect translocations involving the chromosomal region 8q24.21 harboring the MYC gene. The MYC proto-oncogene (MYC proto-oncogene, bHLH transcription factor, a.k.a. CMYC) encodes a transcription factor essential for cell growth and proliferation and is broadly implicated in tumorigenesis. Translocations involving the MYC gene are considered cytogenetic hallmarks for Burkitt lymphoma but are also found in other types of lymphomas.

The most frequent translocation involving the MYC gene region is t(8;14)(q24.21;q32.3) juxtaposing the MYC gene in 8q24.21 next to the IGH (immunoglobulin heavy chain locus) gene in 14q32.33.

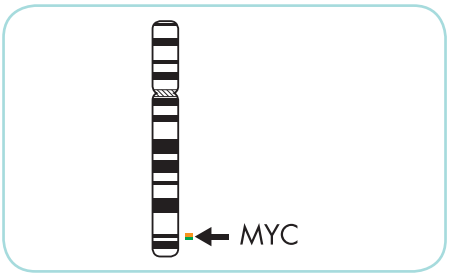
Further translocations affecting the MYC gene are t(8;22)(q24.21;q11.2) and t(2;8)(p11.2;q24.21), both of which involve one of the two immunoglobulin light chain loci. All three translocations bring the MYC gene under the control of a regulatory element from one of the immunoglobulin loci resulting in constitutive overexpression of MYC.

References
Boerma EG, et al. (2009) Leukemia 23: 225-34.
Dalla-Favera R, et al. (1982) Proc Natl Acad Sci U S A 79: 6497-501.
Haralambieva E, et al. (2004) Genes Chromosomes Cancer 40: 10-8.
Veronese ML, et al. (1995) Blood 85: 2132-8.

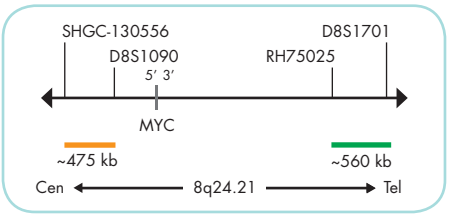
Probe Description

The ZytoMation® MYC Dual Color Break Apart FISH Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~6.0 ng/µl), which target sequences mapping in 8q24.21** (chr8:130,373,051-130,930,673) distal to the MYC breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~2.5 ng/µl), which target sequences mapping in 8q24.21** (chr8:127,888,765-128,363,281) proximal to the MYC breakpoint region.
- Formamide based hybridization buffer



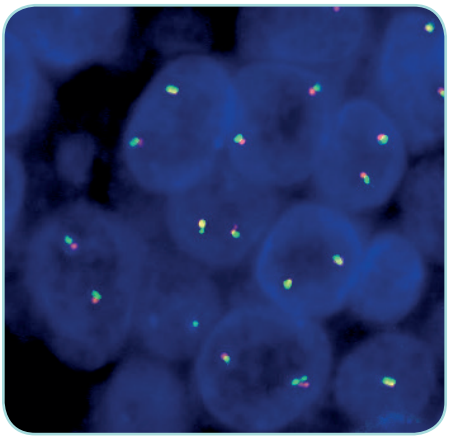
Ideogram of chromosome 8 indicating the hybridization locations.



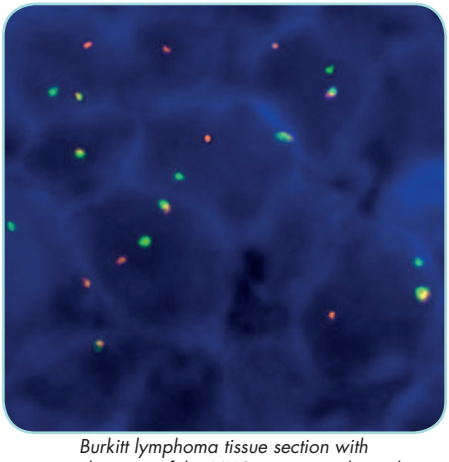
MYC Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 8q24.21 band two orange/green fusion signals are expected representing two normal (non-rearranged) 8q24.21 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 8q24.21 locus and one 8q24.21 locus affected by an 8q24.21 translocation.



MYC Dual Color Break Apart FISH Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Burkitt lymphoma tissue section with translocation of the MYC gene as indicated by one non-rearranged orange/green fusion signal, one orange and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2312-5.1ML	ZytoMation MYC Dual Color Break Apart FISH Probe CE IVD	●/●	up to 20 (5.1 ml)

** Using 240 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoMation® RET Dual Color Break Apart FISH Probe

CE IVD

Background

The ZytoMation® RET Dual Color Break Apart FISH Probe is designed to detect translocations involving the chromosomal region 10q11.21 harboring the RET (ret proto-oncogene) gene. RET encodes a tyrosine kinase (TK) receptor.

Translocations involving RET were first described in papillary thyroid carcinoma (PTC) where somatic rearrangements result in the fusion of its TK catalytic domain with an N-terminal dimerization domain encoded by various fusion partner genes.

In addition, recurrent inversions [inv(10)(p11.2q11.2)] fusing the coiled-coil domains of the kinesin family member 5B (KIF5B) gene to the RET kinase domain have been detected in lung adenocarcinoma.

The resulting KIF5B-RET fusion protein can form homodimers through the coiled-coil domains of KIF5B, causing an aberrant activation of the TK of RET, a mechanism known from KIF5B-ALK fusions which is also found in lung adenocarcinoma.

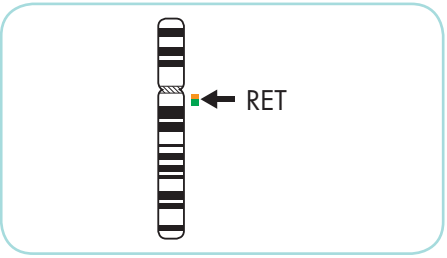
RET translocations are responsible for 1-2% of non-squamous NSCLCs. Similarly to ALK and ROS1, they are more characteristic for young non-smokers and females. This category of cancers is known to be responsive to treatment with RET tyrosine kinase inhibitors.

References
Gautschi O, et al. (2013) J Thorac Oncol 8: e43-4.
Imyanitov EN, et al. (2021) Crit Rev Oncol Hematol 157: 103194.
Ju YS, et al. (2012) Genome Res 22: 436-45.
Kohno T, et al. (2012) Nat Med 18: 375-7.
Lee SE, et al. (2015) Mod Pathol 28: 468-79.
Nikiforov YE (2002) Endocr Pathol 13: 3-16.
Takahashi M, et al. (1985) Cell 42: 581-8.
Takeuchi K, et al. (2012) Nat Med 18: 378-81.

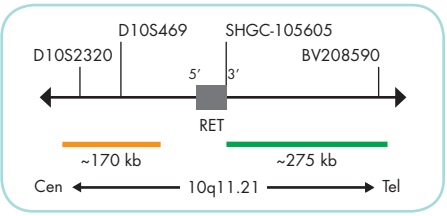
Probe Description

The ZytoMation® RET Dual Color Break Apart FISH Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~6.0 ng/µl), which target sequences mapping in 10q11.21** (chr10:43,626,274-43,902,346) distal to the RET breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.0 ng/µl), which target sequences mapping in 10q11.21** (chr10:43,340,888-43,510,171) proximal to the RET breakpoint region.
- Formamide based hybridization buffer



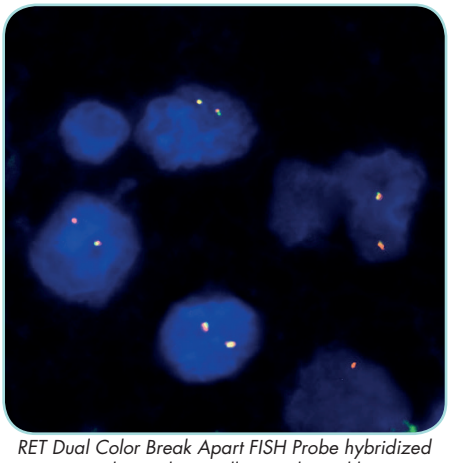
Ideogram of chromosome 10 indicating the hybridization locations.



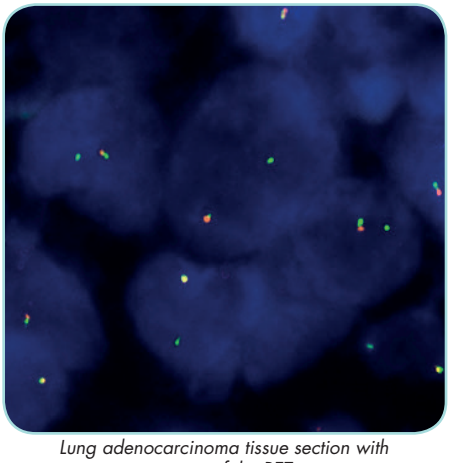
RET Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 10q11.21 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 10q11.21 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 10q11.21 locus and one 10q11.21 locus affected by a translocation or inversion. Isolated green signals are the result of deletions proximal to the RET breakpoint region.



RET Dual Color Break Apart FISH Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Lung adenocarcinoma tissue section with rearrangement of the RET gene as indicated by isolated green signals.

Prod. No.	Product	Label	Tests* (Volume)
Z-2316-5.1ML	ZytoMation RET Dual Color Break Apart FISH Probe CE IVD	●/●	up to 20 (5.1 ml)

** Using 240 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoMation® IGH Dual Color Break Apart FISH Probe

CE IVD

Background

The ZytoMation® IGH Dual Color Break Apart FISH Probe is designed to detect translocations involving the chromosomal region 14q32.33 harboring the IGH locus. Rearrangements involving the IGH (immunoglobulin heavy locus, a.k.a. IGH@) gene locus are considered to be cytogenetic hallmarks for non-Hodgkin lymphoma (NHL). NHLs represent 50% of all hematological malignancies. IGH locus rearrangements have been identified in about 50% of NHLs and are associated with specific subtypes of NHLs. Translocation t(11;14)(q13.3;q32.3) can be found in about 95% of mantle cell lymphoma (MCL), t(14;18)(q32.3;q21.3) in 80% of follicular lymphoma (FL), t(3;14)(q27;q32.3) in diffuse large B-cell lymphoma (DLBCL), and t(8;14)(q24.21;q32.3) in Burkitt lymphoma. In all of these translocations an oncogene located near the breakpoint of the translocation partner is activated by juxtaposing to IGH regulatory sequences.

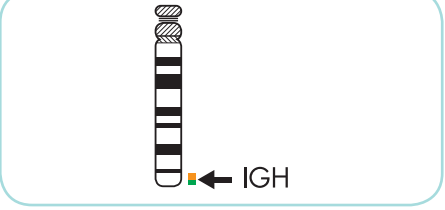
Rearrangements involving 14q32.33 have unique biological characteristics and correlate with clinical, morphological, and immunophenotypic features. Fluorescence *in situ* Hybridization is a helpful tool for the diagnosis, selecting treatment, and giving prognostic information.

References
Bernicot I, et al. (2007) Cytogenet Genome Res 118: 345-52.
Hehne S, et al. (2012) Pathol Res Pract 208: 510-7.
Lu S, et al. (2004) Cancer Genet and Cytogenet 152: 141-5.
Nishida K, et al. (1997) Blood 90: 526-34.
Quintero-Rivera F, et al. (2009) Cancer Genet and Cytogenet 190: 33-9.

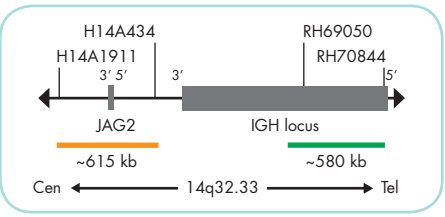
Probe Description

The ZytoMation® IGH Dual Color Break Apart FISH Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~6.0 ng/µl), which target sequences mapping in 14q32.33** (chr14:106,690,778-107,268,412) distal to the IGH breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.0 ng/µl), which target sequences mapping in 14q32.33** (chr14:105,296,741-105,909,611) proximal to the IGH breakpoint region.
- Formamide based hybridization buffer



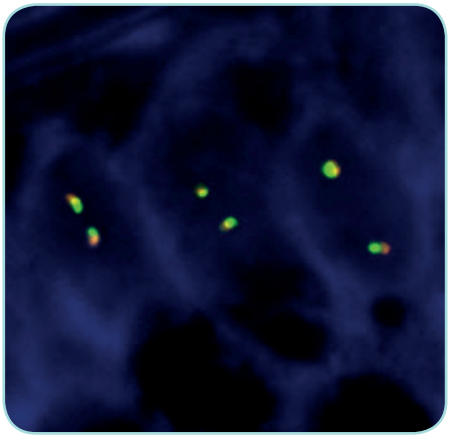
Ideogram of chromosome 14 indicating the hybridization locations.



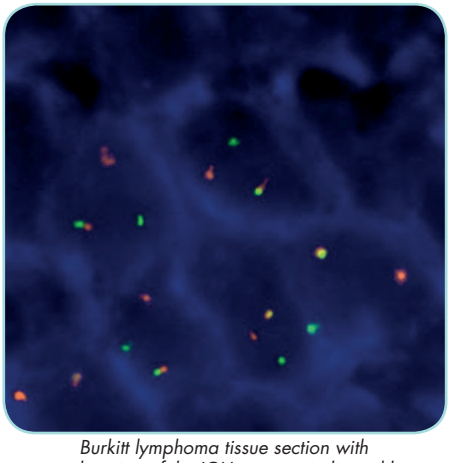
IGH Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 14q32.33 band two orange/green fusion signals are expected representing two normal (non-rearranged) 14q32.33 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 14q32.33 locus and one 14q32.33 locus affected by a translocation.



IGH Dual Color Break Apart FISH Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Burkitt lymphoma tissue section with translocation of the IGH gene as indicated by one non-rearranged orange/green fusion signal, one orange and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2317-5.1ML	ZytoMation IGH Dual Color Break Apart FISH Probe CE IVD	●/●	up to 20 (5.1 ml)

** Using 240 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoMation® ERBB2/CEN 17 Dual Color FISH Probe

CE IVD

Background

The ZytoMation ® ERBB2/CEN 17 Dual Color FISH Probe (PL246) is intended to be used for the qualitative detection of amplifications involving the human ERBB2 gene as well as the detection of chromosome 17 alpha satellites in formalin-fixed, paraffin-embedded specimens, such as breast cancer and gastric/gastroesophageal junction cancer, by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the Bond FISH Kit (DS9636) on the automated Bond-MAX or Bond III system by Leica Biosystems.

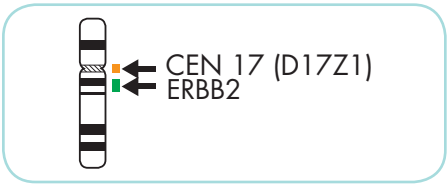
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of breast cancer and gastric/gastroesophageal junction cancer and therapeutic measures should not be initiated based on the test result alone.

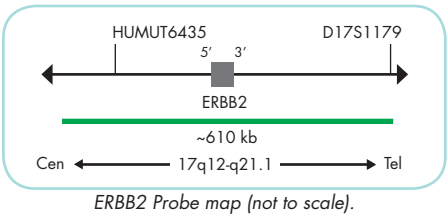
Probe Description

The ZytoMation ® ERBB2/CEN 17 Dual Color FISH Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~5.0 ng/µl), which target sequences mapping in 17q12-q21.1** (chr17:37,572,531-38,181,308) harboring the ERBB2 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~0.2 ng/µl), which target sequences mapping in 17p11.1-q11.1 specific for the alpha satellite centromeric region D17Z1 of chromosome 17.
- Formamide based hybridization buffer



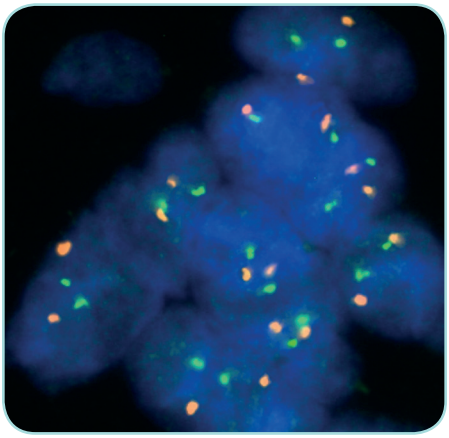
Ideogram of chromosome 17 indicating the hybridization locations.



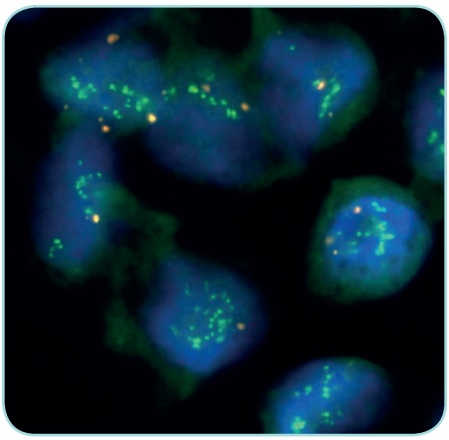
ERBB2 Probe map (not to scale).

Results

In a normal interphase nucleus, two orange and two green signals are expected. In a cell with amplification of the ERBB2 gene locus, multiple copies of the green signal or green signal clusters will be observed.



ERBB2/CEN 17 Dual Color FISH Probe hybridized to normal interphase cells as indicated by two green and two orange signals in each nucleus.



Breast cancer tissue section with amplification of the ERBB2 gene locus as indicated by multiple copies of the green signal in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
Z-2292-5.1ML	ZytoMation ERBB2/CEN 17 Dual Color FISH Probe CE IVD	●/●	up to 20 (5.1 ml)

** Using 240 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoMation® BCL2 Dual Color Break Apart FISH Probe

CE IVD

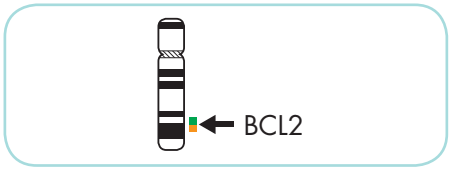
Background

The ZytoMation® BCL2 Dual Color Break Apart FISH Probe (PL260) is intended to be used for the qualitative detection of translocations involving the human BCL2 gene at 18q21.33 in formalin-fixed, paraffin-embedded specimens, such as B-cell lymphoma, by fluorescence *in situ* hybridization (FISH). The probe is intended to be used in combination with the Bond FISH Kit (DS9636) on the automated Bond-MAX or Bond III system by Leica Biosystems. The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of B-cell lymphoma and therapeutic measures should not be initiated based on the test result alone.

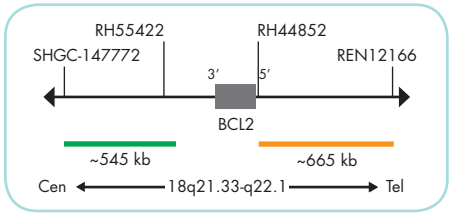
Probe Description

The ZytoMation® BCL2 Dual Color Break Apart FISH Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~6.0 ng/µl), which target sequences mapping in 18q21.33** (chr18:60,046,152-60,589,273) proximal to the BCL2 breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~2.5 ng/µl), which target sequences mapping in 18q21.33-q22.1** (chr18:60,994,528-61,658,503) distal to the BCL2 breakpoint region.
- Formamide based hybridization buffer



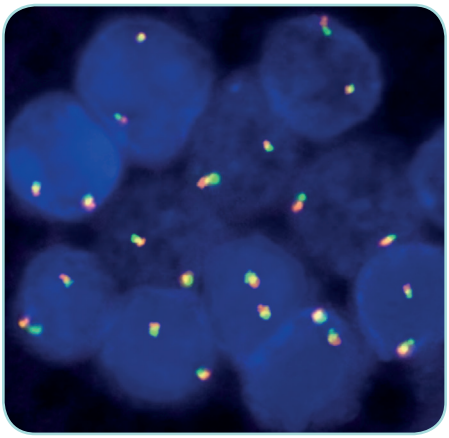
Ideogram of chromosome 18 indicating the hybridization locations.



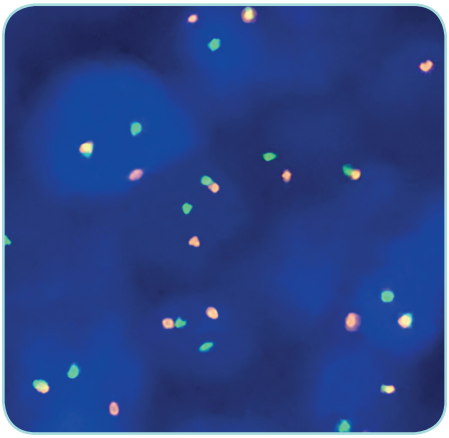
BCL2 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 18q21.33-q22.1 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 18q21.33-q22.1 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 18q21.33-q22.1 locus and one 18q21.33-q22.1 locus affected by a translocation.



BCL2 Dual Color Break Apart FISH Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Follicular lymphoma tissue section with translocation of the BCL2 gene as indicated by one non-rearranged orange/green fusion signal, one orange and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
Z-2306-5.1ML	ZytoMation BCL2 Dual Color Break Apart FISH Probe CE IVD	●/●	up to 20 (5.1 ml)

** Using 240 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

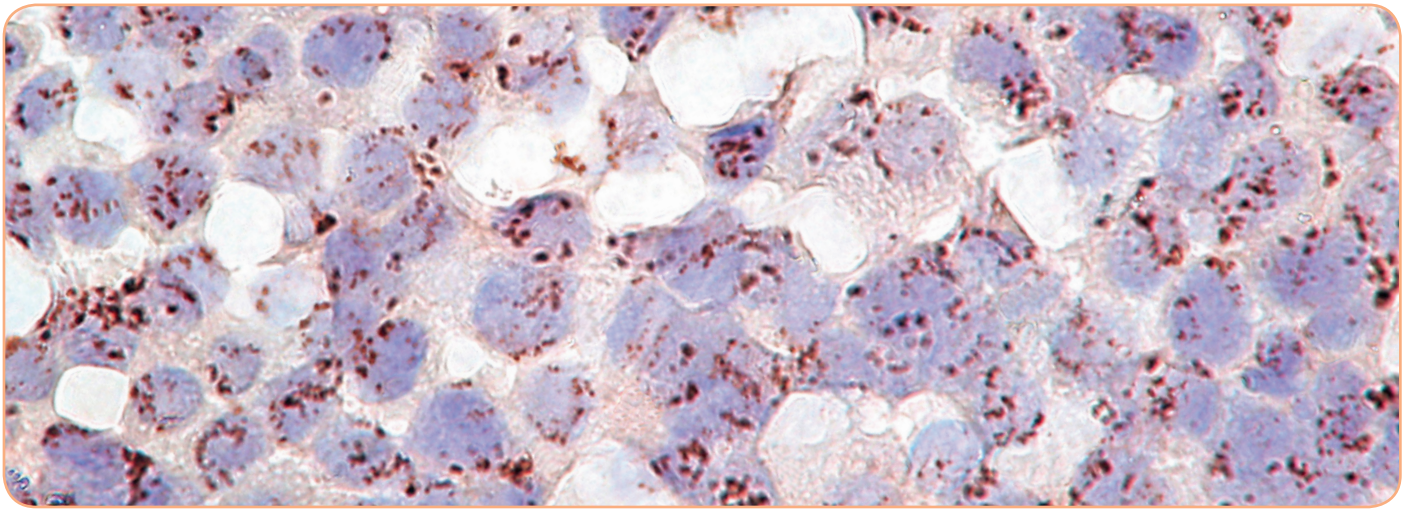
***According to Human Genome Assembly GRCh37/hg19*

ZytoDot ® Products for CISH analysis

ZytoDot ® 2C Products for CISH analysis

211

Reliable and Simple Detection of Genomic Alterations using Light Microscopy!



Introduction

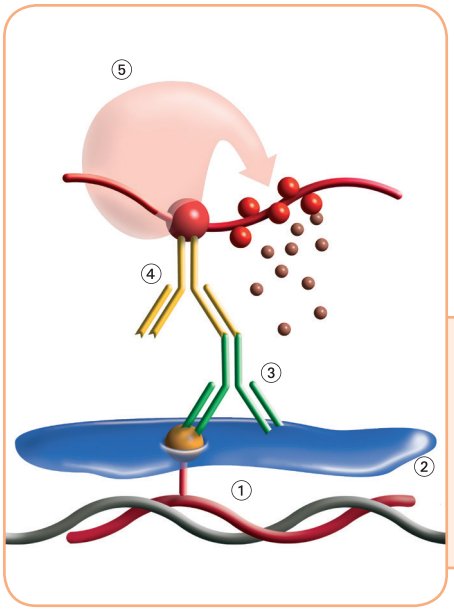
The Zyto*Dot* ® products are designed for the detection of aneuploidies and gene amplifications by Chromogenic *in situ* Hybridization (CISH) in formalin-fixed, paraffin-embedded (FFPE) tissue sections.

Advantages of CISH

- Simultaneous observation of tissue morphology and CISH signals
- Storage of slides at room temperature - CISH signals are permanent
- No costly fluorescent microscope needed

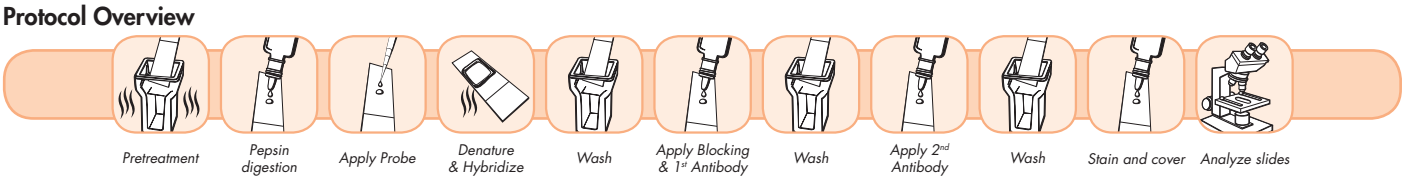
Zyto*Dot* ® Kits – Convenient Solutions

For making CISH analysis reliable and user-friendly, all Zyto*Dot* ® CISH probes can be combined with the Zyto*Dot* ® CISH Implementation Kit (C-3018-40) which includes all necessary pretreatment solutions, wash buffers, antibodies, chromogenic substrates, counterstaining solution, mounting solution and a detailed protocol to perform successful CISH experiments.

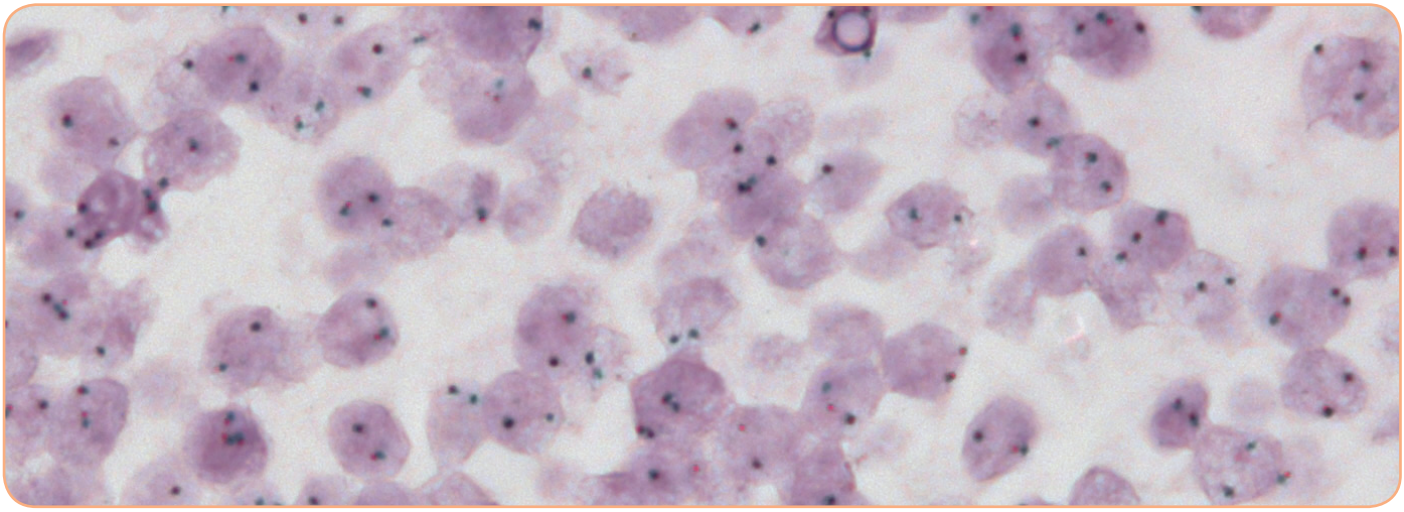


The Zyto*Dot* ® system uses Digoxigenin (DIG)-labeled probes ① which are, after blocking ②, detected using a Mouse-anti-DIG antibody ③. This antibody is detected by a polymerized HRP-Goat-anti-Mouse antibody ④. The enzymatic reaction of DAB ⑤ leads to the formation of strong permanent brown signals that can be visualized by light microscopy using a 40x objective.

Protocol Overview



ZytoDot® 2C™ – 2-Color CISH for the Detection of Genomic Alterations



Introduction

The ZytoDot® 2C™ products are designed for the simultaneous detection of two different genomic targets by Chromogenic *in situ* Hybridization (CISH) in formalin-fixed, paraffin-embedded (FFPE) tissue sections. This two color system is especially useful for the differentiation of aneuploidies from gene amplifications, and the detection of deletions and translocations.

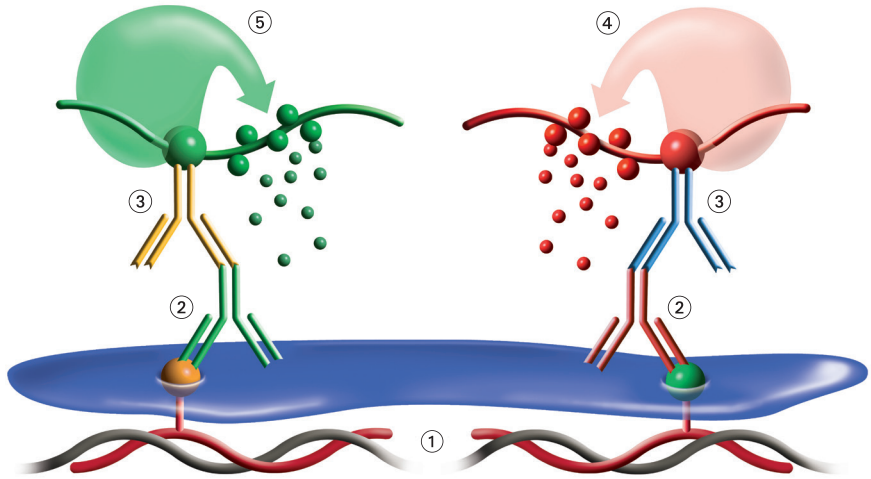
Advantages of ZytoDot® 2C™

- Simultaneous observation of tissue morphology and CISH signals at 40x using light microscopy
- Two targets detected simultaneously
- High contrasting distinct red and green signals
- Standardized and complete kits
- No costly fluorescent microscope needed

ZytoDot® 2C™ Kits – Standardized Solutions

For making CISH analysis reliable and user-friendly, any ZytoDot® 2C™ probe can be combined with the ZytoDot® 2C™ CISH Implementation Kit resulting in target specific kit solutions.

The ZytoDot® 2C™ CISH Implementation Kit includes all necessary pretreatment solutions, wash buffers, antibodies, chromogenic substrates, counterstaining and mounting solution, and a detailed protocol.



The ZytoDot® 2C™ system uses DIG- and DNP-labeled probe cocktails targeting different genomic sections ① which are detected using a Mouse-anti-DIG/Rabbit-anti-DNP cocktail ②. These antibodies are detected by a unique cocktail of polymerized HRP-Goat-anti-Mouse/AP-Goat-anti-Rabbit antibodies ③. The enzymatic reaction of AP-Red ④ and HRP-Green ⑤ leads to the formation of strong permanent red respectively green signals that can be visualized by light microscopy using a 40x objective.

Protocol Overview

Chromosome Index

	Chr. Band	Product Name	Product No.	Quantity	Page
1	1p36.3	ZytoDot 2C Glioma 1p/19q Probe Set CE IVD	C-3076-10/-40	10/40 tests	221
		ZytoDot 2C SPEC 1p36/1q25 Probe CE IVD	C-3036-100/-400	100/400 µl	222
	1p12	ZytoDot SPEC 1p12 Probe RUO	C-3035-400	400 µl	259 f.
	1q23.1	ZytoDot 2C SPEC NTRK1 Break Apart Probe CE IVD	C-3078-100	100 µl	224
	1q25.3	ZytoDot 2C Glioma 1p/19q Probe Set CE IVD	C-3076-10/-40	10/40 tests	221
		ZytoDot 2C SPEC 1p36/1q25 Probe CE IVD	C-3036-100/-400	100/400 µl	222
2	2p24	ZytoDot SPEC MYCN Probe CE IVD	C-3029-400	400 µl	225
	2p23	ZytoDot 2C SPEC ALK Break Apart Probe CE IVD	C-3055-100/-400	100/400 µl	226
	2p21	ZytoDot 2C SPEC EML4 Break Apart Probe RUO	C-3059-400	400 µl	227
	2q11.2	ZytoDot SPEC 2q11 Probe RUO	C-3051-400	400 µl	259 f.
3	3p11.1-q11.1	ZytoDot CEN 3 Probe RUO	C-3045-400	400 µl	259 f.
	3q27	ZytoDot 2C SPEC BCL6 Break Apart Probe CE IVD	C-3074-100	100 µl	228
4-5		no probes available yet			
6	6p11.1-q11	ZytoDot CEN 6 Probe RUO	C-3002-400	400 µl	259 f.
	6q22.1	ZytoDot 2C SPEC ROS1 Break Apart Probe CE IVD	C-3063-100/-400	100/400 µl	229

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

Chromosome Index

	Chr. Band	Product Name	Product No.	Quantity	Page
7	7p11.2	ZytoDot SPEC EGFR Probe RUO	C-3007-400	400 µl	230
		ZytoDot 2C SPEC EGFR/CEN 7 Probe CE IVD	C-3033-100/-400	100/400 µl	231
	7p11.1-q11.1	ZytoDot CEN 7 Probe RUO	C-3008-400	400 µl	259 f.
	7q31.2	ZytoDot 2C SPEC MET/CEN 7 Probe CE IVD	C-3057-400	400 µl	232
8	8p11.2	ZytoDot 2C SPEC FGFR1/CEN 8 Probe RUO	C-3050-400	400 µl	233
	8p11.1-q11.1	ZytoDot CEN 8 Probe RUO	C-3016-400	400 µl	259 f.
	8q24.21	ZytoDot SPEC MYC Probe RUO	C-3013-400	400 µl	234
		ZytoDot 2C SPEC MYC Break Apart Probe CE IVD	C-3066-400	400 µl	235
9	9p21	ZytoDot 2C SPEC CDKN2A/CEN 9 Probe CE IVD	C-3067-400	400 µl	236
10	10q11.2	ZytoDot 2C SPEC RET Break Apart Probe CE IVD	C-3064-100/-400	100/400 µl	237
	10q23.3	ZytoDot 2C SPEC PTEN/CEN 10 Probe RUO	C-3053-400	400 µl	238
	10q26.1	ZytoDot 2C SPEC FGFR2/CEN 10 Probe CE IVD	C-3056-400	400 µl	239
11	11q13.3	ZytoDot 2C SPEC CCND1 Break Apart Probe RUO	C-3075-100	100 µl	240
12	12p11.1-q11	ZytoDot CEN 12 Probe RUO	C-3014-400	400 µl	259 f.
	12q13.3	ZytoDot 2C SPEC DDIT3 Break Apart Probe CE IVD	C-3047-100	100 µl	241
	12q14	ZytoDot 2C SPEC CDK4/CEN 12 Probe CE IVD	C-3062-400	400 µl	242
	12q15	ZytoDot SPEC MDM2 Probe CE IVD	C-3012-400	400 µl	243
		ZytoDot 2C SPEC MDM2/CEN 12 Probe CE IVD	C-3049-100/-400	100/400 µl	244

IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.

RUO For Research Use Only. Not for use in diagnostic procedures.

Chromosome Index

	Chr. Band	Product Name	Product No.	Quantity	Page
13	13q12.1	ZytoDot SPEC 13q12 Probe RUO	C-3052-400	400 µl	259 f.
	13q14.1	ZytoDot 2C SPEC FOXO1 Break Apart Probe RUO	C-3065-100	100 µl	245
14	14q32.3	ZytoDot 2C SPEC IGH Break Apart Probe CE IVD	C-3071-100	100 µl	246
15	15q25	ZytoDot 2C SPEC NTRK3 Break Apart Probe CE IVD	C-3079-100	100 µl	247
16	16p11.2	ZytoDot 2C SPEC FUS Break Apart Probe RUO	C-3054-100	100 µl	248
17	17p13	ZytoDot 2C SPEC USP6 Break Apart Probe CE IVD	C-3077-100	100 µl	249
	17p11.1-q11.1	ZytoDot CEN 17 Probe RUO	C-3006-400	400 µl	259 f.
	17q12	ZytoDot SPEC ERBB2 Probe CE IVD	C-3001-400	400 µl	250
		ZytoDot SPEC ERBB2 Probe Kit CE IVD	C-3003-40	40 tests	250
		ZytoDot 2C SPEC ERBB2/CEN 17 Probe CE IVD	C-3032-100/-400	100/400 µl	251
		ZytoDot 2C SPEC ERBB2/CEN 17 Probe Kit CE IVD	C-3022-10/-40	10/40 tests	251
		ZytoDot 2C SPEC ERBB2/D17S122 Probe RUO	C-3068-100	100 µl	252
	17q21.2	ZytoDot 2C SPEC TOP2A/CEN 17 Probe RUO	C-3040-400	400 µl	253
18	18q11.2	ZytoDot 2C SPEC SS18 Break Apart Probe CE IVD	C-3046-100	100 µl	254
	18q21.3	ZytoDot 2C SPEC BCL2 Break Apart Probe CE IVD	C-3073-100	100 µl	255
		ZytoDot 2C SPEC MALT1 Break Apart Probe RUO	C-3072-100	100 µl	256
19	19p13.3	ZytoDot 2C Glioma 1p/19q Probe Set CE IVD	C-3076-10/-40	10/40 tests	221
		ZytoDot 2C SPEC 19q13/19p13 Probe CE IVD	C-3037-100/-400	100/400 µl	223
	19q13.3	ZytoDot 2C Glioma 1p/19q Probe Set CE IVD	C-3076-10/-40	10/40 tests	221
		ZytoDot 2C SPEC 19q13/19p13 Probe CE IVD	C-3037-100/-400	100/400 µl	223
20		no probes available yet			

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

Chromosome Index

	Chr. Band	Product Name	Product No.	Quantity	Page
21	21q22.1-q22.2	ZytoDot SPEC 21q22 Probe RUO	C-3026-400	400 µl	259 f.
	21q22.2	ZytoDot 2C SPEC ERG Break Apart Probe RUO	C-3058-400	400 µl	257
22	22q12.2	ZytoDot 2C SPEC EWSR1 Break Apart Probe CE IVD	C-3043-100	100 µl	258
X	Xp11.1-q11.1	ZytoDot CEN X Probe RUO	C-3025-400	400 µl	259 f.
		ZytoDot 2C CEN X/Y Probe RUO	C-3048-400	400 µl	259 f.
Y	Yp11.1-q11.1	ZytoDot 2C CEN X/Y Probe RUO	C-3048-400	400 µl	259 f.
	Yq12	ZytoDot CEN Yq12 Probe RUO	C-3020-400	400 µl	259 f.

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

Gene Index

HUGO Name	Synonym	Product Name	Product No.	Quantity	Page
ALK	CD246	ZytoDot 2C SPEC ALK Break Apart Probe CE IVD	C-3055-100/-400	100/400 µl	226
BCL2	Bcl-2, PPP1R50	ZytoDot 2C SPEC BCL2 Break Apart Probe CE IVD	C-3073-100	100 µl	255
BCL6	ZNF51, LAZ3	ZytoDot 2C SPEC BCL6 Break Apart Probe CE IVD	C-3074-100	100 µl	228
CCND1	BCL1, PRAD1	ZytoDot 2C SPEC CCND1 Break Apart Probe RUO	C-3075-100	100 µl	240
CDK4	PSK-J3	ZytoDot 2C SPEC CDK4/CEN 12 Probe CE IVD	C-3062-400	400 µl	242
CDKN2A	p16, ARF, INK4	ZytoDot 2C SPEC CDKN2A/CEN 9 Probe CE IVD	C-3067-400	400 µl	236
DDIT3	CHOP, GADD153	ZytoDot 2C SPEC DDIT3 Break Apart Probe CE IVD	C-3047-100	100 µl	241
EGFR	HER1, ERBB1	ZytoDot SPEC EGFR Probe RUO	C-3007-400	400 µl	230
		ZytoDot 2C SPEC EGFR/CEN 7 Probe CE IVD	C-3033-100/-400	100/400 µl	231
EML4	ROPP120	ZytoDot 2C SPEC EML4 Break Apart Probe RUO	C-3059-400	400 µl	227
ERBB2	HER2, HER-2, NEU	ZytoDot SPEC ERBB2 Probe CE IVD	C-3001-400	400 µl	250
		ZytoDot SPEC ERBB2 Probe Kit CE IVD	C-3003-40	40 tests	250
		ZytoDot 2C SPEC ERBB2/CEN 17 Probe CE IVD	C-3032-100/-400	100/400 µl	251
		ZytoDot 2C SPEC ERBB2/CEN 17 Probe Kit CE IVD	C-3022-10/-40	10/40 tests	251
		ZytoDot 2C SPEC ERBB2/D17S122 Probe RUO	C-3068-100	100 µl	252
ERG	erg-3, p55	ZytoDot 2C SPEC ERG Break Apart Probe RUO	C-3058-400	400 µl	257
EWSR1	EWS	ZytoDot 2C SPEC EWSR1 Break Apart Probe CE IVD	C-3043-100	100 µl	258
FGFR1	FLT2, BFGFR	ZytoDot 2C SPEC FGFR1/CEN 8 Probe RUO	C-3050-400	400 µl	233
FGFR2	BEK, CD332	ZytoDot 2C SPEC FGFR2/CEN 10 Probe CE IVD	C-3056-400	400 µl	239
FOXO1	FKHR, FKH1	ZytoDot 2C SPEC FOXO1 Break Apart Probe RUO	C-3065-100	100 µl	245
FUS	FUS1	ZytoDot 2C SPEC FUS Break Apart Probe RUO	C-3054-100	100 µl	248
IGH	IGH@	ZytoDot 2C SPEC IGH Break Apart Probe CE IVD	C-3071-100	100 µl	246
MALT1	MLT	ZytoDot 2C SPEC MALT1 Break Apart Probe RUO	C-3072-100	100 µl	256
MDM2	HDM2	ZytoDot SPEC MDM2 Probe CE IVD	C-3012-400	400 µl	243
		ZytoDot 2C SPEC MDM2/CEN 12 Probe CE IVD	C-3049-100/-400	100/400 µl	244
MET	HGFR, RCCP2	ZytoDot 2C SPEC MET/CEN 7 Probe CE IVD	C-3057-400	400 µl	232
MYC	CMYC, bHLHe39, c-Myc	ZytoDot SPEC MYC Probe RUO	C-3013-400	400 µl	234
		ZytoDot 2C SPEC MYC Break Apart Probe CE IVD	C-3066-400	400 µl	235

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

Gene Index

HUGO Name	Synonym	Product Name	Product No.	Quantity	Page
MYCN	NMYC, N-myc	ZytoDot SPEC MYCN Probe CE IVD	C-3029-400	400 µl	225
NTRK1	MTC, TRK	ZytoDot 2C SPEC NTRK1 Break Apart Probe CE IVD	C-3078-100	100 µl	224
NTRK3	TRKC	ZytoDot 2C SPEC NTRK3 Break Apart Probe CE IVD	C-3079-100	100 µl	247
PTEN	MMAC1, TEP1	ZytoDot 2C SPEC PTEN/CEN 10 Probe RUO	C-3053-400	400 µl	238
RET	HSCR1, CDHF12	ZytoDot 2C SPEC RET Break Apart Probe CE IVD	C-3064-100/-400	100/400 µl	237
ROS1	MCF3, ROS	ZytoDot 2C SPEC ROS1 Break Apart Probe CE IVD	C-3063-100/-400	100/400 µl	229
SS18	SYT, SSXT	ZytoDot 2C SPEC SS18 Break Apart Probe CE IVD	C-3046-100	100 µl	254
TOP2A	TOP2	ZytoDot 2C SPEC TOP2A/CEN 17 Probe RUO	C-3040-400	400 µl	253
USP6	Tre-2, TRE17	ZytoDot 2C SPEC USP6 Break Apart Probe CE IVD	C-3077-100	100 µl	249

The **Gene Index** list includes only those probes directed against DNA sequences assigned to known genes. It does not contain probes directed against other genomic sequences as e.g. repetitive satellite DNA sequences. For a complete overview of all ZytoDot® probes, please refer to the **Chromosome Index**.

IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.

RUO For Research Use Only. Not for use in diagnostic procedures.

Indication Index

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

ZytoDot® 2C Glioma 1p/19q Probe Set

CE IVD

Background

The ZytoDot® 2C Glioma 1p/19q Probe Set is intended to be used for the qualitative detection of deletions involving the human chromosomal region 1p36.31 as well as deletions involving the human chromosomal region 19q13.32-q13.33 in formalin-fixed, paraffin-embedded specimens, such as glioma, by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C 2C CISH Implementation Kit (Prod. No. C-3044-10/-40). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of glioma and therapeutic measures should not be initiated based on the test result alone.

Probe Description

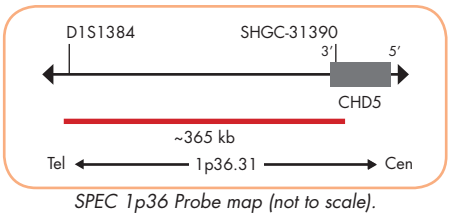
The ZytoDot® 2C Glioma 1p/19q Probe Set is a set comprising two separate probes:

- ZytoDot® 2C SPEC 1p36/1q25 Probe (Prod. No. C-3036-100/-400)
- ZytoDot® 2C SPEC 19q13/19p13 Probe (Prod. No. C-3037-100/-400)
- The ZytoDot® 2C SPEC 1p36/1q25 Probe (PD21) is composed of:
- Dinitrophenyl-labeled polynucleotides (~1.7 ng/µl), which target sequences mapping in 1p36.31** (chr1:5,808,946-6,176,336).
- Digoxigenin-labeled polynucleotides (~1.7 ng/µl), which target sequences mapping in 1q25.3** (chr1:184,562,510-184,752,938).
- Formamide based hybridization buffer

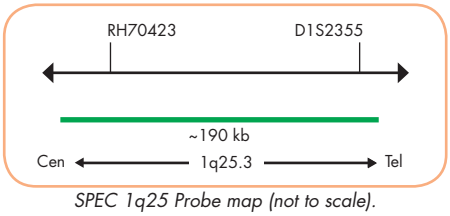
The ZytoDot® 2C SPEC 19q13/19p13 Probe (PD22) is composed of:

- Dinitrophenyl-labeled polynucleotides (~0.8 ng/µl), which target sequences mapping in 19q13.32-q13.33** (chr19:47,857,776-48,339,398).
- Digoxigenin-labeled polynucleotides (~0.8 ng/µl), which target sequences mapping in 19p13.3** (chr19:815,938-962,244).
- Formamide based hybridization buffer

ZytoDot® 2C SPEC 1p36/1q25 Probe

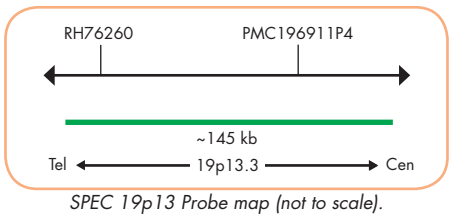


SPEC 1p36 Probe map (not to scale).

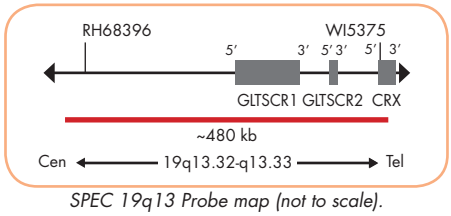


SPEC 1q25 Probe map (not to scale).

ZytoDot® 2C SPEC 19q13/19p13 Probe



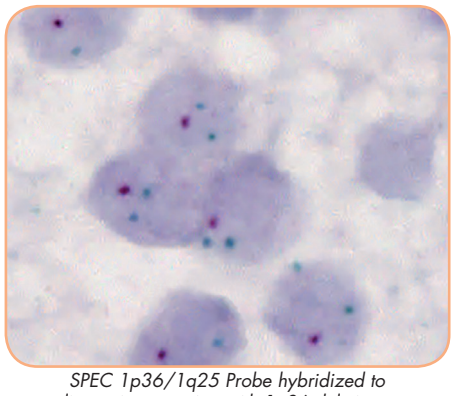
SPEC 19p13 Probe map (not to scale).



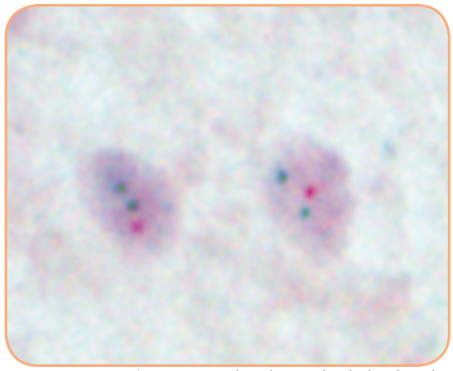
SPEC 19q13 Probe map (not to scale).

Results

Using the SPEC 1p36/1q25 Probe or the SPEC 19q13/19p13 Probe in a normal interphase nucleus, two red and two green signals are expected. In a cell with deletions affecting the 1p36 or 19q13 locus, one or no copy of the red signal will be observed.



SPEC 1p36/1q25 Probe hybridized to glioma tissue section with 1p36 deletion as indicated by one red signal in each nucleus.



SPEC 19q13/19p13 Dual Color Probe hybridized to glioma tissue section with 19q13 deletion as indicated by one red signal in each nucleus.

Images kindly provided by Prof. W. Müller, University Leipzig, Germany.

Prod. No.	Product	Tests* (Volume)
C-3076-10	ZytoDot 2C Glioma 1p/19q Probe Set CE IVD Incl. ZytoDot 2C SPEC 1p36/1q25 Probe, 0.1 ml; ZytoDot 2C SPEC 19q13/19p13 Probe, 0.1 ml	10
C-3076-40	ZytoDot 2C Glioma 1p/19q Probe Set CE IVD Incl. ZytoDot 2C SPEC 1p36/1q25 Probe, 0.4 ml; ZytoDot 2C SPEC 19q13/19p13 Probe, 0.4 ml	40
Related Products		
C-3044-10	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 20x Wash Buffer TBS, 50 ml; Anti-DIG/DNP-Mix, 1 ml; HRP/AP-Polymer-Mix,1 ml; AP-Red Solution A, 0.1 ml; AP-Red Solution B, 4 ml; HRP-Green Solution A, 0.2 ml; HRP-Green Solution B, 4 ml; Nuclear Blue Solution, 4 ml; Mounting Solution (alcoholic), 1 ml	10
C-3044-40	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 20x Wash Buffer TBS, 2x 50 ml; Anti-DIG/DNP-Mix, 4 ml; HRP/AP-Polymer-Mix, 4 ml; AP-Red Solution A, 0.4 ml; AP-Red Solution B, 15 ml; HRP-Green Solution A, 0.8 ml; HRP-Green Solution B, 15 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml	40

** Using 10 µl probe solution per test.* IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoDot® 2C SPEC 1p36/1q25 Probe

CE IVD

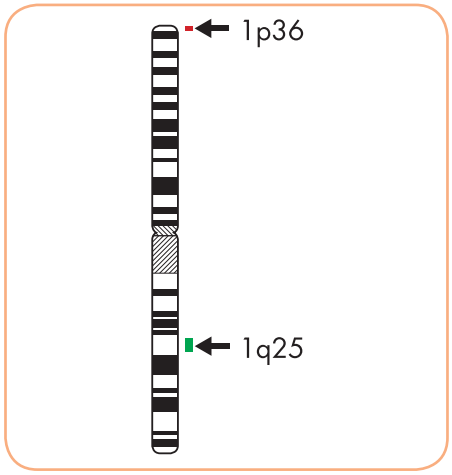
Background

The ZytoDot® 2C SPEC 1p36/1q25 Probe (PD21) is intended to be used for the qualitative detection of deletions involving the human chromosomal region 1p36.31 as well as chromosome 1q25.3 specific sequences in formalin-fixed, paraffin-embedded specimens, such as glioma, by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of glioma and therapeutic measures should not be initiated based on the test result alone.

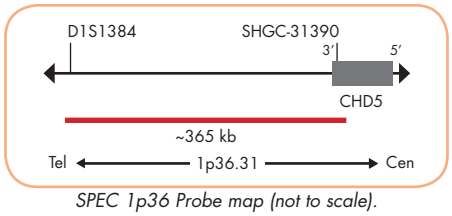
Probe Description

The ZytoDot® 2C SPEC 1p36/1q25 Probe is composed of:

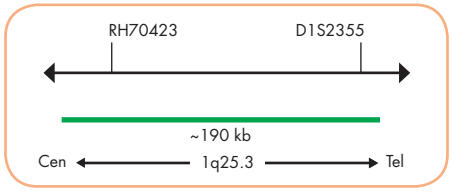
- Dinitrophenyl-labeled polynucleotides (~1.7 ng/µl), which target sequences mapping in 1p36.31** (chr1:5,808,946-6,176,336).
- Digoxigenin-labeled polynucleotides (~1.7 ng/µl), which target sequences mapping in 1q25.3** (chr1:184,562,510-184,752,938).
- Formamide based hybridization buffer



Ideogram of chromosome 1 indicating the hybridization locations.



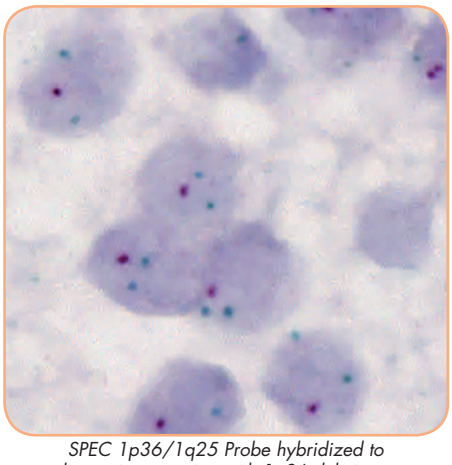
SPEC 1p36 Probe map (not to scale).



SPEC 1q25 Probe map (not to scale).

Results

In a normal interphase nucleus, using the ZytoDot® 2C SPEC 1p36/1q25 Probe in combination with ZytoDot® 2C CISH Implementation Kit, two red (1p) and two green (1q) signals are expected. In a cell with deletions affecting the 1p36 locus, one or no copy of the red signal will be observed.



SPEC 1p36/1q25 Probe hybridized to glioma tissue section with 1p36 deletion as indicated by one red signal in each nucleus.

Image kindly provided by Prof. W. Müller, University Leipzig, Germany.

Prod. No.	Product	Label	Tests* (Volume)
C-3036-100	ZytoDot 2C SPEC 1p36/1q25 Probe CE IVD	DNP/DIG	10 (100 µl)
C-3036-400	ZytoDot 2C SPEC 1p36/1q25 Probe CE IVD	DNP/DIG	40 (400 µl)
Related Products			
C-3044-10	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 20x Wash Buffer TBS, 50 ml; Anti-DIG/DNP-Mix, 1 ml; HRP/AP-Polymer-Mix,1 ml; AP-Red Solution A, 0.1 ml; AP-Red Solution B, 4 ml; HRP-Green Solution A, 0.2 ml; HRP-Green Solution B, 4 ml; Nuclear Blue Solution, 4 ml; Mounting Solution (alcoholic), 1 ml		10
C-3044-40	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 20x Wash Buffer TBS, 2x 50 ml; Anti-DIG/DNP-Mix, 4 ml; HRP/AP-Polymer-Mix, 4 ml; AP-Red Solution A, 0.4 ml; AP-Red Solution B, 15 ml; HRP-Green Solution A, 0.8 ml; HRP-Green Solution B, 15 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml		40

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoDot® 2C SPEC 19q13/19p13 Probe

CE IVD

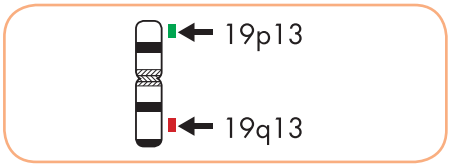
Background

The ZytoDot® 2C SPEC 19q13/19p13 Probe (PD22) is intended to be used for the qualitative detection of deletions involving the human chromosomal region 19q13.32-q13.33 as well as chromosome 19p13.3 specific sequences in formalin-fixed, paraffin-embedded specimens, such as glioma, by chromogenic *in situ* hybridization (CISH). The probes are intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The product is intended to be used as an aid to the differential diagnosis of glioma and therapeutic measures should not be initiated based on the test result alone.

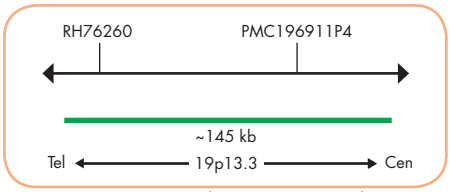
Probe Description

The ZytoDot® 2C SPEC 19q13/19p13 Probe is composed of:

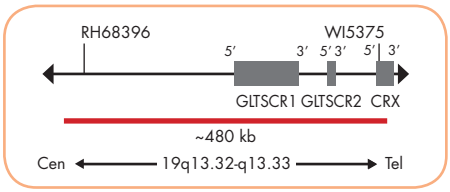
- Dinitrophenyl-labeled polynucleotides (~0.8 ng/µl), which target sequences mapping in 19q13.32-q13.33** (chr19:47,857,776-48,339,398).
- Digoxigenin-labeled polynucleotides (~0.8 ng/µl), which target sequences mapping in 19p13.3** (chr19:815,938-962,244).
- Formamide based hybridization buffer



Ideogram of chromosome 19 indicating the hybridization locations.



SPEC 19p13 Probe map (not to scale).



SPEC 19q13 Probe map (not to scale).

Results

Using the ZytoDot® 2C SPEC 19q13/19p13 Probe in combination with the ZytoDot® 2C CISH Implementation Kit, two red (19q) and two green (19p) signals are expected in a normal interphase nucleus. In a cell with deletions affecting the 19q13 locus, one or no copy of the red signal will be observed.

SPEC 19q13/19p13 Dual Color Probe hybridized to glioma tissue section with 19q13 deletion as indicated by one red signal in each nucleus.

Image kindly provided by Prof. W. Müller, University Leipzig, Germany.

Prod. No.	Product	Label	Tests* (Volume)
C-3037-100	ZytoDot 2C SPEC 19q13/19p13 Probe CE IVD	DNP/DIG	10 (100 µl)
C-3037-400	ZytoDot 2C SPEC 19q13/19p13 Probe CE IVD	DNP/DIG	40 (400 µl)
Related Products			
C-3044-10	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 20x Wash Buffer TBS, 50 ml; Anti-DIG/DNP-Mix, 1 ml; HRP/AP-Polymer-Mix,1 ml; AP-Red Solution A, 0.1 ml; AP-Red Solution B, 4 ml; HRP-Green Solution A, 0.2 ml; HRP-Green Solution B, 4 ml; Nuclear Blue Solution, 4 ml; Mounting Solution (alcoholic), 1 ml		10
C-3044-40	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 20x Wash Buffer TBS, 2x 50 ml; Anti-DIG/DNP-Mix, 4 ml; HRP/AP-Polymer-Mix, 4 ml; AP-Red Solution A, 0.4 ml; AP-Red Solution B, 15 ml; HRP-Green Solution A, 0.8 ml; HRP-Green Solution B, 15 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml		40

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoDot® 2C SPEC NTRK1 Break Apart Probe

CE IVD

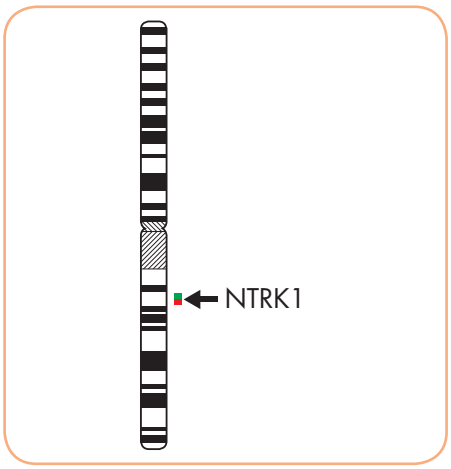
Background

The ZytoDot® 2C SPEC NTRK1 Break Apart Probe (PD57) is intended to be used for the qualitative detection of translocations involving the human NTRK1 gene at 1q23.1 in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

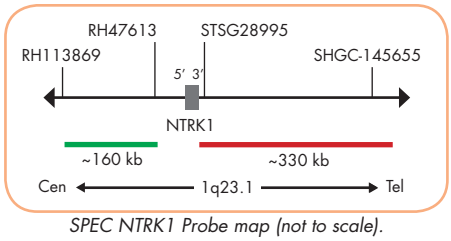
Probe Description

The ZytoDot® 2C SPEC NTRK1 Break Apart Probe is composed of:

- Digoxigenin-labeled polynucleotides (~0.50 ng/µl), which target sequences mapping in 1q23.1** (chr1:156,621,188-156,781,745) proximal to the NTRK1 breakpoint region.
- Dinitrophenyl-labeled polynucleotides (~0.75 ng/µl), which target sequences mapping in 1q23.1** (chr1:156,854,527-157,186,293) distal to the NTRK1 breakpoint region.
- Formamide based hybridization buffer



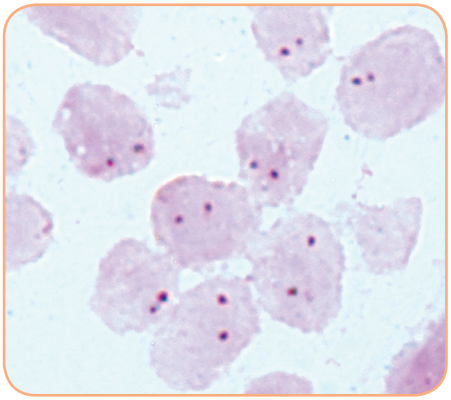
Ideogram of chromosome 1 indicating the hybridization locations.



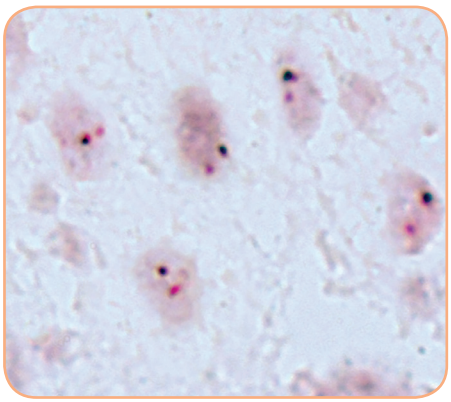
SPEC NTRK1 Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 1q23.1 band, using the ZytoDot® 2C CISH Implementation Kit, two red/green fusion signals are expected representing two normal (non-rearranged) 1q23.1 loci. A signal pattern consisting of one red/green fusion signal, one red signal, and a separate green signal indicates one normal 1q23.1 locus and one 1q23.1 locus affected by a translocation. Isolated red signals are the result of deletions proximal to the NTRK1 breakpoint region or are due to unbalanced translocations affecting this chromosomal region.



SPEC NTRK1 Break Apart Probe hybridized to normal interphase cells as indicated by two red/green fusion signals per nucleus.



Example of an aberrant signal pattern: Spindle cell sarcoma tissue section with rearrangement of the NTRK1 gene as indicated by isolated red signals.

Prod. No.	Product	Label	Tests* (Volume)
C-3078-100	ZytoDot 2C SPEC NTRK1 Break Apart Probe CE IVD	DIG/DNP	10 (100 µl)
Related Products			
C-3044-10	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 20x Wash Buffer TBS, 50 ml; Anti-DIG/DNP-Mix, 1 ml; HRP/AP-Polymer-Mix,1 ml; AP-Red Solution A, 0.2 ml; AP-Red Solution B, 4 ml; HRP-Green Solution A, 0.2 ml; HRP-Green Solution B, 4 ml; Nuclear Blue Solution, 4 ml; Mounting Solution (alcoholic), 1 ml		10

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoDot ® SPEC MYCN Probe

CE
IVD

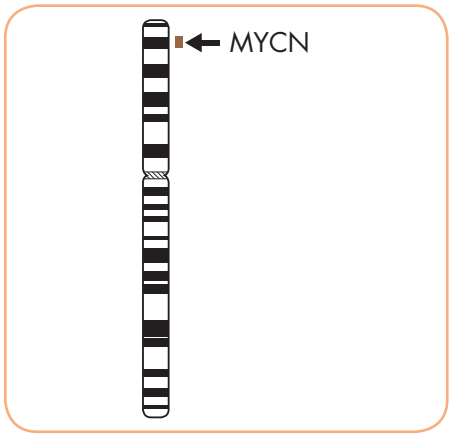
Background

The ZytoDot ® SPEC MYCN Probe (PD17) is intended to be used for the qualitative detection of amplifications involving the human MYCN gene in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot ® CISH Implementation Kit (Prod. No. C-3018-40).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

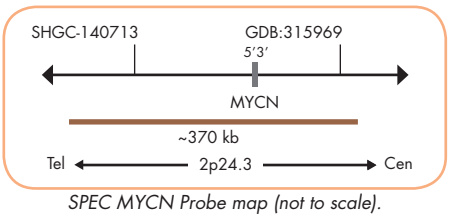
Probe Description

The ZytoDot ® SPEC MYCN Probe is composed of:

- Digoxigenin-labeled polynucleotides (~1.8 ng/µl), which target sequences mapping in 2p24.3** (chr2:15,846,046-16,213,717) harboring the MYCN gene region.
- Formamide based hybridization buffer



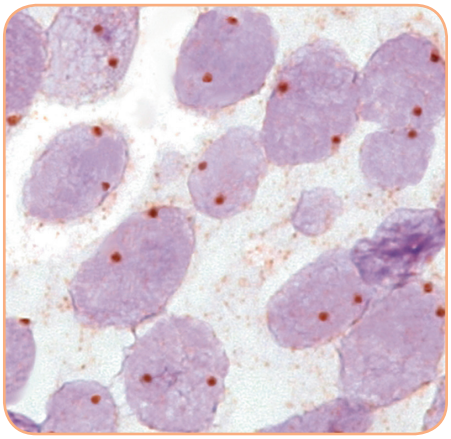
Ideogram of chromosome 2 indicating the hybridization locations.



SPEC MYCN Probe map (not to scale).

Results

In normal cells, two distinct dot-shaped signals per nucleus will be observed. Nuclei with amplification of the MYCN gene locus or aneuploidy of chromosome 2 will show multiple dots or large signal clusters.



Normal nuclei each with two MYCN signals.

Prod. No.	Product	Label	Tests* (Volume)
C-3029-400	ZytoDot SPEC MYCN Probe CE IVD	DIG	40 (400 µl)
Related Products			
C-3018-40	ZytoDot CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; PBS/Tween, good for 2000 ml; Blocking Solution, 4 ml; Mouse-anti-DIG, 4 ml; Anti-Mouse-HRP-Polymer, 4 ml; DAB Solution A, 0.3 ml; DAB Solution B, 10 ml; Mayer's Hematoxylin Solution, 20 ml; Mounting Solution (alcoholic), 4 ml		40

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoDot ® 2C SPEC ALK Break Apart Probe

CE IVD

Background

The ZytoDot ® 2C SPEC ALK Break Apart Probe (PD35) is intended to be used for the qualitative detection of translocations involving the human ALK gene at 2p23.2 in formalin-fixed, paraffin-embedded specimens, such as non-small cell lung cancer (NSCLC), by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot ® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).

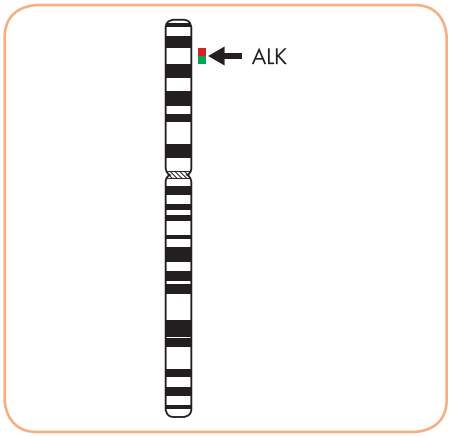
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of NSCLC and therapeutic measures should not be initiated based on the test result alone.

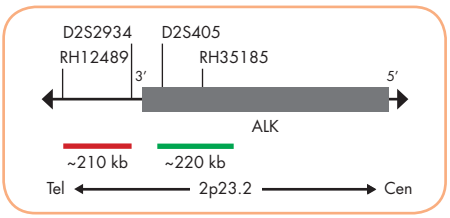
Probe Description

The ZytoDot ® 2C SPEC ALK Break Apart Probe is composed of:

- Digoxigenin-labeled polynucleotides (~0.50 ng/µl), which target sequences mapping in 2p23.2** (chr2:29,460,144-29,681,581) proximal to the ALK breakpoint region.
- Dinitrophenyl-labeled polynucleotides (~0.75 ng/µl), which target sequences mapping in 2p23.2** (chr2:29,174,204-29,383,335) distal to the ALK breakpoint region.
- Formamide based hybridization buffer



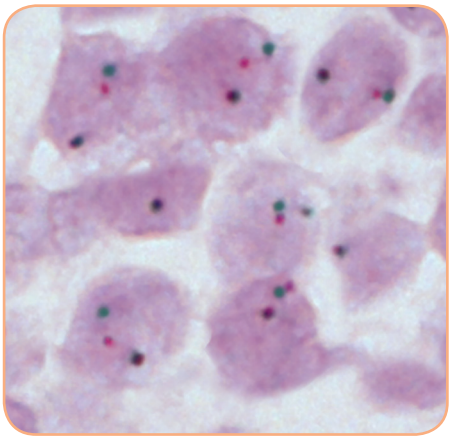
Ideogram of chromosome 2 indicating the hybridization locations.



SPEC ALK Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 2p23.2 band, using the ZytoDot ® 2C CISH Implementation Kit, two red/green fusion signals are expected representing two normal (non-rearranged) 2p23.2 loci. A signal pattern consisting of one red/green fusion signal, one red signal, and a separate green signal indicates one normal 2p23.2 locus and one 2p23.2 locus affected by a translocation or inversion. EML4-ALK inversion with deletion of 5′-ALK sequences is indicated by one or multiple isolated red signals.



Lung carcinoma tissue section with translocation affecting the 2p23.2 locus as indicated by one red/green fusion (non-rearranged) signal, one red signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
C-3055-100	ZytoDot 2C SPEC ALK Break Apart Probe CE IVD	DIG/DNP	10 (100 µl)
C-3055-400	ZytoDot 2C SPEC ALK Break Apart Probe CE IVD	DIG/DNP	40 (400 µl)
Related Products			
C-3044-10	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 20x Wash Buffer TBS, 50 ml; Anti-DIG/DNP-Mix, 1 ml; HRP/AP-Polymer-Mix,1 ml; AP-Red Solution A, 0.1 ml; AP-Red Solution B, 4 ml; HRP-Green Solution A, 0.2 ml; HRP-Green Solution B, 4 ml; Nuclear Blue Solution, 4 ml; Mounting Solution (alcoholic), 1 ml		10
C-3044-40	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 20x Wash Buffer TBS, 2x 50 ml; Anti-DIG/DNP-Mix, 4 ml; HRP/AP-Polymer-Mix, 4 ml; AP-Red Solution A, 0.4 ml; AP-Red Solution B, 15 ml; HRP-Green Solution A, 0.8 ml; HRP-Green Solution B, 15 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml		40

** Using 10 µl probe solution per test.* IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoDot ® 2C SPEC EML4 Break Apart Probe

RUO

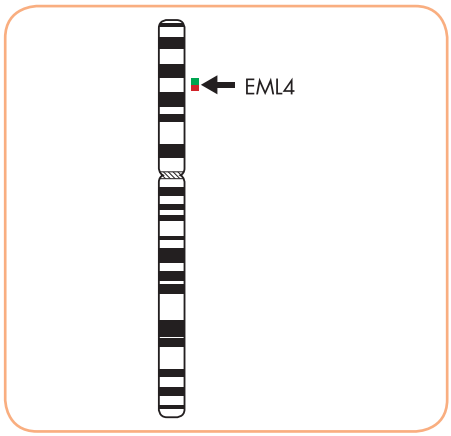
Background

The ZytoDot ® 2C SPEC EML4 Break Apart Probe (PD39) is intended to be used for the qualitative detection of translocations involving the human EML4 gene at 2p21 in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot ® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).

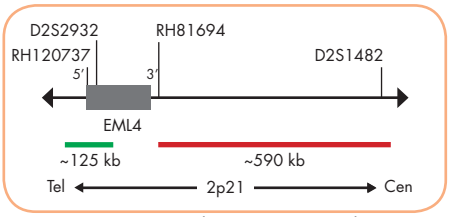
Probe Description

The ZytoDot ® 2C SPEC EML4 Break Apart Probe is composed of:

- Digoxigenin-labeled polynucleotides (~0.50 ng/µl), which target sequences mapping in 2p21** (chr2:42,342,038-42,464,761) distal to the EML4 breakpoint region.
- Dinitrophenyl-labeled polynucleotides (~0.75 ng/µl), which target sequences mapping in 2p21** (chr2:42,576,262-43,163,545) proximal to the EML4 breakpoint region.
- Formamide based hybridization buffer



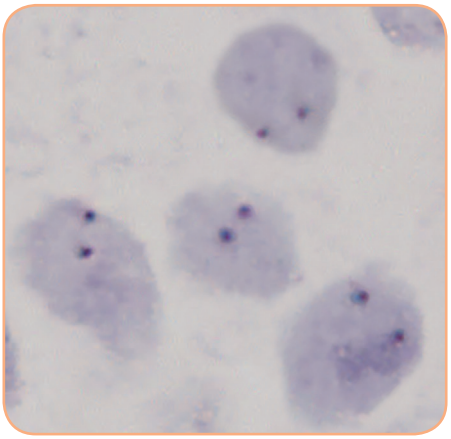
Ideogram of chromosome 2 indicating the hybridization locations.



SPEC EML4 Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 2p21 band, using the ZytoDot ® 2C CISH Implementation Kit, two red/green fusion signals are expected representing two normal (non-rearranged) 2p21 loci. A signal pattern consisting of one red/green fusion signal, one red signal, and a separate green signal indicates one normal 2p21 locus and one 2p21 locus affected by a translocation or inversion.



SPEC EML4 Break Apart Probe hybridized to normal interphase cells as indicated by two red/green fusion signals per nucleus.

Prod. No.	Product	Label	Tests* (Volume)
C-3059-400	ZytoDot 2C SPEC EML4 Break Apart Probe RUO	DIG/DNP	40 (400 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoDot® 2C SPEC BCL6 Break Apart Probe

CE IVD

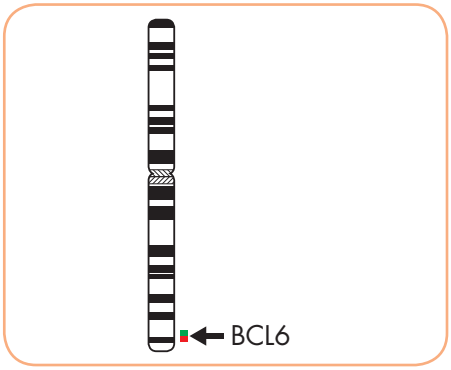
Background

The ZytoDot® 2C SPEC BCL6 Break Apart Probe (PD54) is intended to be used for the qualitative detection of translocations involving the human BCL6 gene at 3q27.3 in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

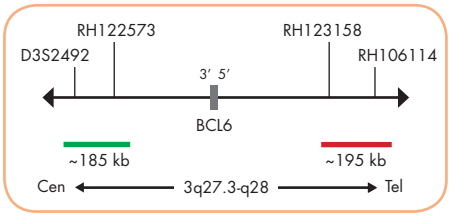
Probe Description

The ZytoDot® 2C SPEC BCL6 Break Apart Probe is composed of:

- Digoxigenin-labeled polynucleotides (~0.50 ng/µl), which target sequences mapping in 3q27.3** (chr3:187,028,236-187,403,834) proximal to the BCL6 breakpoint region.
- Dinitrophenyl-labeled polynucleotides (~0.75 ng/µl), which target sequences mapping in 3q27.3-q28** (chr3:187,744,962-188,097,195 distal to the BCL6 breakpoint region.
- Formamide based hybridization buffer



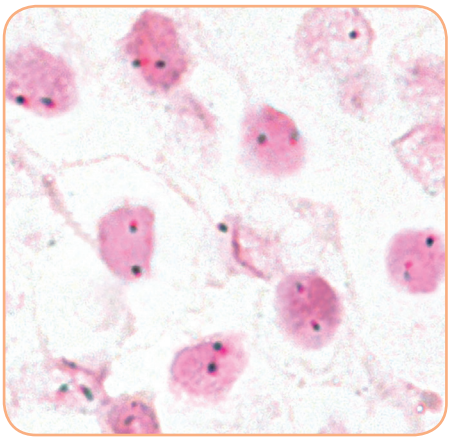
Ideogram of chromosome 3 indicating the hybridization locations.



SPEC BCL6 Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 3q27.3-q28 band, using the ZytoDot® 2C CISH Implementation Kit, two red/green fusion signals are expected representing two normal (non-rearranged) 3q27.3-q28 loci. A signal pattern consisting of one red/green fusion signal, one red signal, and a separate green signal indicates one normal 3q27.3-q28 locus and one 3q27.3-q28 locus affected by a translocation.



SPEC BCL6 Break Apart Probe hybridized to normal interphase cells as indicated by two red/green fusion signals per nucleus.

Prod. No.	Product	Label	Tests* (Volume)
C-3074-100	ZytoDot 2C SPEC BCL6 Break Apart Probe CE IVD	DIG/DNP	10 (100 µl)
Related Products			
C-3044-10	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 20x Wash Buffer TBS, 50 ml; Anti-DIG/DNP-Mix, 1 ml; HRP/AP-Polymer-Mix,1 ml; AP-Red Solution A, 0.1 ml; AP-Red Solution B, 4 ml; HRP-Green Solution A, 0.2 ml; HRP-Green Solution B, 4 ml; Nuclear Blue Solution, 4 ml; Mounting Solution (alcoholic), 1 ml		10

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoDot® 2C SPEC ROS1 Break Apart Probe

CE IVD

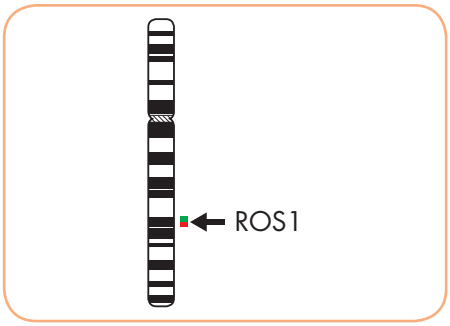
Background

The ZytoDot® 2C SPEC ROS1 Break Apart Probe PD43) is intended to be used for the qualitative detection of translocations involving the human ROS1 gene at 6q22.1 in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

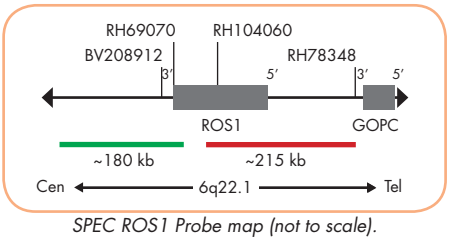
Probe Description

The ZytoDot® 2C SPEC ROS1 Break Apart Probe is composed of:

- Digoxigenin-labeled polynucleotides (~0.50 ng/µl), which target sequences mapping in 6q22.1** (chr6:117,448,964-117,627,255) proximal to the ROS1 breakpoint region.
- Dinitrophenyl-labeled polynucleotides (~0.75 ng/µl), which target sequences mapping in 6q22.1** (chr6:117,659,135-117,871,701) distal to the ROS1 breakpoint region.
- Formamide based hybridization buffer



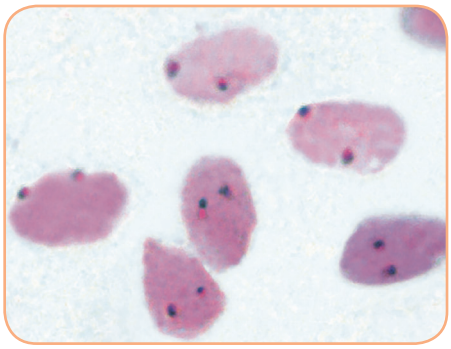
Ideogram of chromosome 6 indicating the hybridization locations.



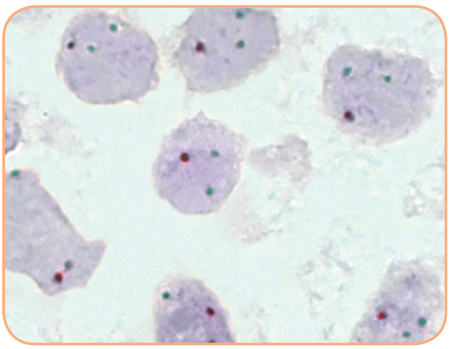
SPEC ROS1 Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking an aberration involving the 6q22.1 band, using the ZytoDot® 2C CISH Implementation Kit, two red/green fusion signals are expected representing two normal (non-rearranged) 6q22.1 loci. A signal pattern consisting of one red/green fusion signal, one red signal, and a separate green signal indicates one normal 6q22.1 locus and one 6q22.1 locus affected by a translocation.
Isolated green signals are the result of deletions distal to the ROS1 breakpoint region or are due to unbalanced translocations affecting this chromosomal region.



SPEC ROS1 Break Apart Probe hybridized to normal interphase cells as indicated by two red/green fusion signals per nucleus.



Example of an aberrant signal pattern: Lung cancer tissue section with rearrangement of the ROS1 gene as indicated by isolated green signals.

Prod. No.	Product	Label	Tests* (Volume)
C-3063-100	ZytoDot 2C SPEC ROS1 Break Apart Probe CE IVD	DIG/DNP	40 (400 µl)
C-3063-400	ZytoDot 2C SPEC ROS1 Break Apart Probe CE IVD	DIG/DNP	40 (400 µl)
Related Products			
C-3044-10	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 20x Wash Buffer TBS, 50 ml; Anti-DIG/DNP-Mix, 1 ml; HRP/AP-Polymer-Mix,1 ml; AP-Red Solution A, 0.1 ml; AP-Red Solution B, 4 ml; HRP-Green Solution A, 0.2 ml; HRP-Green Solution B, 4 ml; Nuclear Blue Solution, 4 ml; Mounting Solution (alcoholic), 1 ml		10
C-3044-40	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 20x Wash Buffer TBS, 2x 50 ml; Anti-DIG/DNP-Mix, 4 ml; HRP/AP-Polymer-Mix, 4 ml; AP-Red Solution A, 0.4 ml; AP-Red Solution B, 15 ml; HRP-Green Solution A, 0.8 ml; HRP-Green Solution B, 15 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml		40

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoDot ® SPEC EGFR Probe

RUO

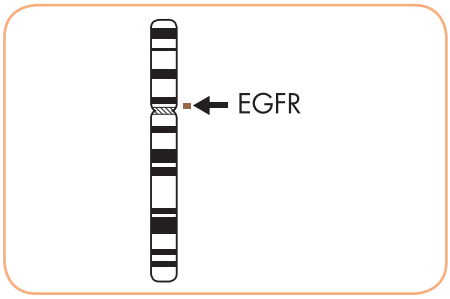
Background

The ZytoDot ® SPEC EGFR Probe (PD4) is intended to be used for the qualitative detection of human EGFR gene amplifications in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot ® CISH Implementation Kit (Prod. No. C-3018-40).

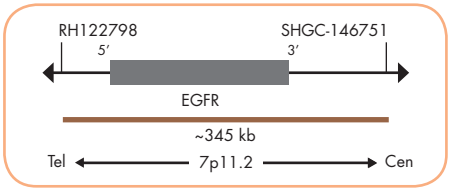
Probe Description

The ZytoDot ® SPEC EGFR Probe is composed of:

- Digoxigenin-labeled polynucleotides (~1.8 ng/µl), which target sequences mapping in 7p11.2** (chr7:55,034,991-55,380,617) harboring the EGFR gene region.
- Formamide based hybridization buffer



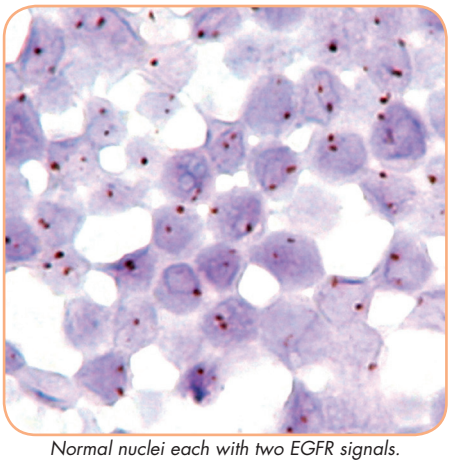
Ideogram of chromosome 7 indicating the hybridization locations.



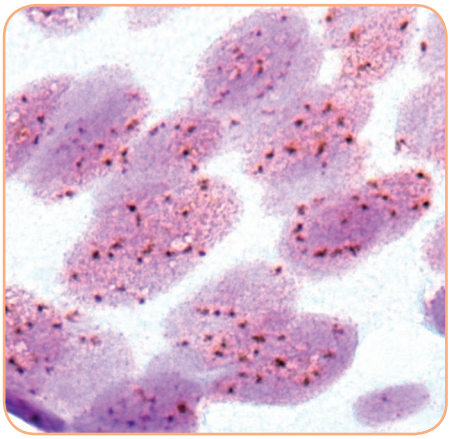
SPEC EGFR Probe map (not to scale).

Results

In normal cells, two distinct dot-shaped signals per nucleus will be observed. Nuclei with amplification of the EGFR gene locus or aneuploidy of chromosome 7 will show multiple dots or large signal clusters.



Normal nuclei each with two EGFR signals.



Example of an aberrant signal pattern: Cancer cells with multiple EGFR signals in sputum sample from a NSCLC patient.

Prod. No.	Product	Label	Tests* (Volume)
C-3007-400	ZytoDot SPEC EGFR Probe RUO	DIG	40 (400 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoDot ® 2C SPEC EGFR/CEN 7 Probe

CE IVD

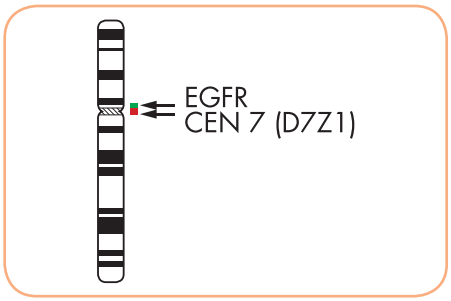
Background

The ZytoDot ® 2C SPEC EGFR/CEN 7 Probe (PD18) is intended to be used for the qualitative detection of amplifications involving the human EGFR gene as well as the detection of chromosome 7 alpha satellites in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot ® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

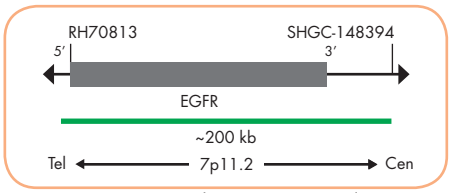
Probe Description

The ZytoDot ® 2C SPEC EGFR/CEN 7 Probe is composed of:

- Digoxigenin-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 7p11.2** (chr7:55,082,262-55,278,647) harboring the EGFR gene region.
- Dinitrophenyl-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 7p11.1-q11.1 specific for the alpha satellite centromeric region D7Z1 of chromosome 7.
- Formamide based hybridization buffer



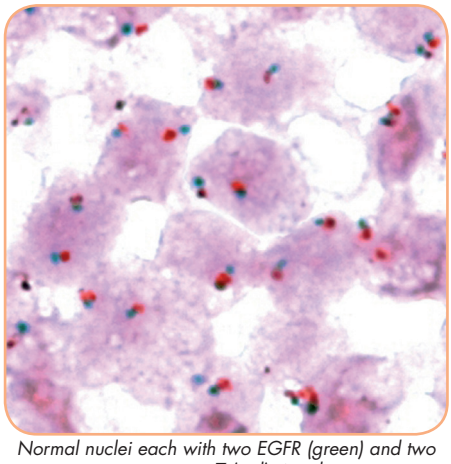
Ideogram of chromosome 7 indicating the hybridization locations.



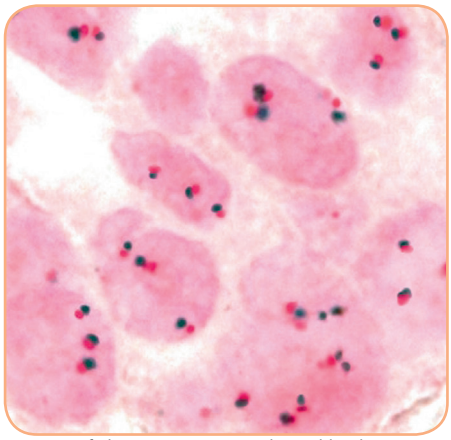
SPEC EGFR Probe map (not to scale).

Results

In a normal interphase nucleus, using the ZytoDot ® 2C CISH Implementation Kit two green and two red signals are expected. In a cell with amplification of the EGFR gene locus, multiple copies of the green signal or green signal clusters will be observed.



Normal nuclei each with two EGFR (green) and two centromere 7 (red) signals.



Trisomy of chromosome 7 as indicated by three EGFR (green) and three CEN 7 (red) signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
C-3033-100	ZytoDot 2C SPEC EGFR/CEN 7 Probe CE IVD	DIG/DNP	10 (100 µl)
C-3033-400	ZytoDot 2C SPEC EGFR/CEN 7 Probe CE IVD	DIG/DNP	40 (400 µl)
Related Products			
C-3044-10	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 20x Wash Buffer TBS, 50 ml; Anti-DIG/DNP-Mix, 1 ml; HRP/AP-Polymer-Mix,1 ml; AP-Red Solution A, 0.1 ml; AP-Red Solution B, 4 ml; HRP-Green Solution A, 0.2 ml; HRP-Green Solution B, 4 ml; Nuclear Blue Solution, 4 ml; Mounting Solution (alcoholic), 1 ml		10
C-3044-40	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 20x Wash Buffer TBS, 2x 50 ml; Anti-DIG/DNP-Mix, 4 ml; HRP/AP-Polymer-Mix, 4 ml; AP-Red Solution A, 0.4 ml; AP-Red Solution B, 15 ml; HRP-Green Solution A, 0.8 ml; HRP-Green Solution B, 15 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml		40

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoDot ® 2C SPEC MET/CEN 7 Probe

CE IVD

Background

The ZytoDot ® 2C SPEC MET/CEN 7 Probe (PD37) is intended to be used for the qualitative detection of amplifications involving the human MET gene as well as the detection of chromosome 7 alpha satellites in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot ® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).

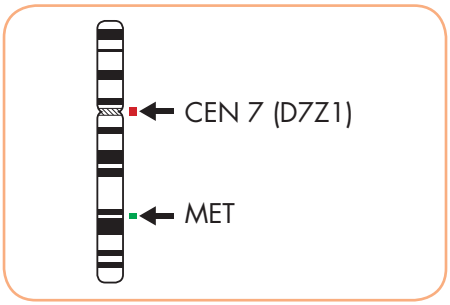
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

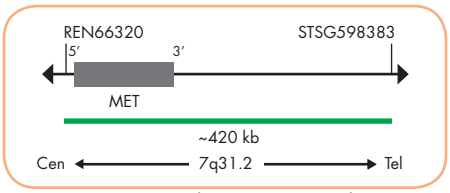
Probe Description

The ZytoDot ® 2C SPEC MET/CEN 7 Probe is composed of:

- Digoxigenin-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 7q31.2** (chr7:116,298,989-116,718,699) harboring the MET gene region.
- Dinitrophenyl-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 7p11.1-q11.1 specific for the alpha satellite centromeric region D7Z1 of chromosome 7.
- Formamide based hybridization buffer



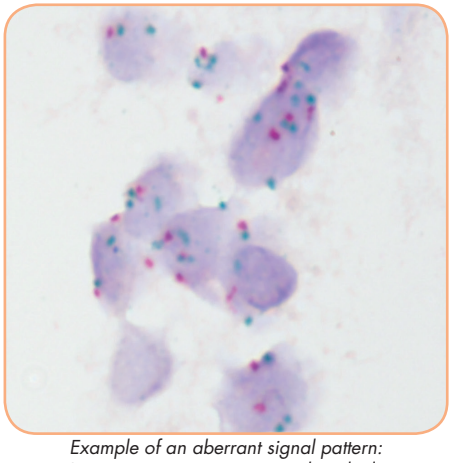
Ideogram of chromosome 7 indicating the hybridization locations.



SPEC MET Probe map (not to scale).

Results

In a normal interphase nucleus, using the ZytoDot ® 2C CISH Implementation Kit two red (CEN 7) and two green (MET) signals are expected. In a cell with amplification of the MET gene locus, multiple copies of the green signal or green signal clusters will be observed.



Example of an aberrant signal pattern: Lung cancer tissue section with multiple copies of chromosome 7 (red) and extra MET signals (green) in the nuclei.

Prod. No.	Product	Label	Tests* (Volume)
C-3057-400	ZytoDot 2C SPEC MET/CEN 7 Probe CE IVD	DIG/DNP	40 (400 µl)
Related Products			
C-3044-40	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 20x Wash Buffer TBS, 2x 50 ml; Anti-DIG/DNP-Mix, 4 ml; HRP/AP-Polymer-Mix, 4 ml; AP-Red Solution A, 0.4 ml; AP-Red Solution B, 15 ml; HRP-Green Solution A, 0.8 ml; HRP-Green Solution B, 15 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml		40

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoDot® 2C SPEC FGFR1/CEN 8 Probe

RUO

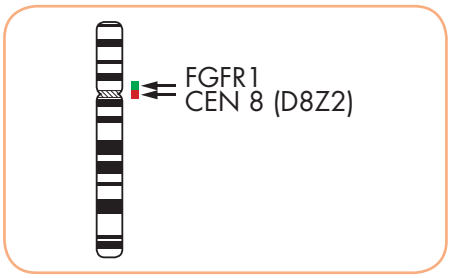
Background

The ZytoDot® 2C SPEC FGFR1/CEN 8 Probe (PD30) is intended to be used for the qualitative detection of human FGFR1 gene amplifications as well as the detection of chromosome 8 alpha satellites in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).

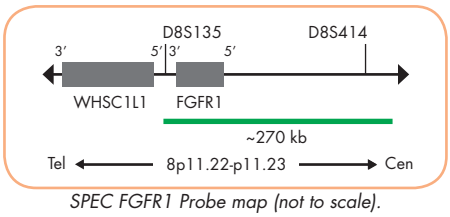
Probe Description

The ZytoDot® 2C SPEC FGFR1/CEN 8 Probe is composed of:

- Digoxigenin-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 8p11.22-p11.23** (chr8:38,255,843-38,527,745) harboring the FGFR1 gene region.
- Dinitrophenyl-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 8p11.1-q11.1 specific for the alpha satellite centromeric region D8Z2 of chromosome 8
- Formamide based hybridization buffer



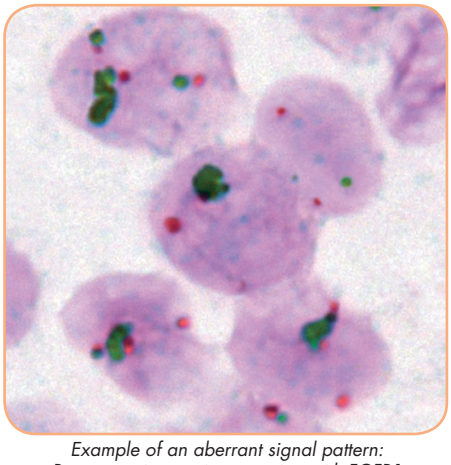
Ideogram of chromosome 8 indicating the hybridization locations.



SPEC FGFR1 Probe map (not to scale).

Results

In a normal interphase nucleus, using the ZytoDot® 2C CISH Implementation Kit two green (FGFR1) and two red (CEN 8) signals are expected. In a cell with an amplification of the FGFR1 gene locus, multiple copies of the green signal or green signal clusters will be observed.



Example of an aberrant signal pattern: Breast carcinoma tissue section with FGFR1 amplification as indicated by large green clusters.

Prod. No.	Product	Label	Tests* (Volume)
C-3050-400	ZytoDot 2C SPEC FGFR1/CEN 8 Probe RUO	DIG/DNP	40 (400 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoDot® SPEC MYC Probe

RUO

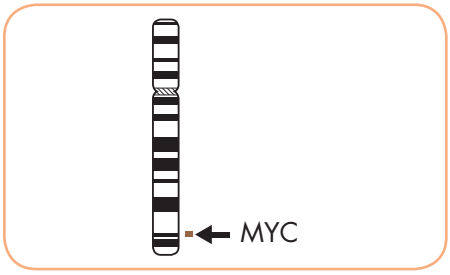
Background

The ZytoDot® SPEC MYC Probe (PD6) is intended to be used for the qualitative detection of human MYC gene amplifications in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® CISH Implementation Kit (Prod. No. C-3018-40).

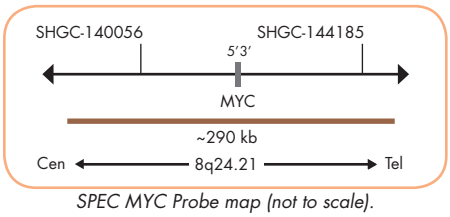
Probe Description

The ZytoDot® SPEC MYC Probe is composed of:

- Digoxigenin-labeled polynucleotides (~1.8 ng/µl), which target sequences mapping in 8q24.21** (chr8:128,596,776-128,887,929) harboring the MYC gene region.
- Formamide based hybridization buffer



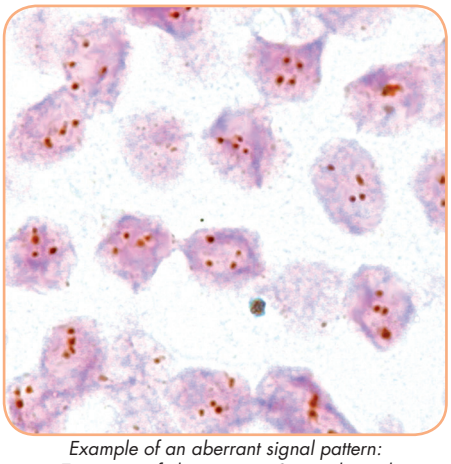
Ideogram of chromosome 8 indicating the hybridization locations.



SPEC MYC Probe map (not to scale).

Results

In normal cells, two distinct dot-shaped signals per nucleus will be observed. Nuclei with amplification of the MYC gene locus or polysomy of chromosome 8 will show multiple dots or large signal clusters.



Example of an aberrant signal pattern: Tetrasomy of chromosome 8 as indicated by four MYC signals per nucleus.

Prod. No.	Product	Label	Tests* (Volume)
C-3013-400	ZytoDot SPEC MYC Probe RUO	DIG	40 (400 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoDot® 2C SPEC MYC Break Apart Probe

CE IVD

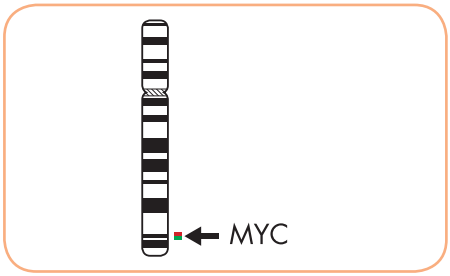
Background

The ZytoDot® 2C SPEC MYC Break Apart Probe (PD46) is intended to be used for the qualitative detection of translocations involving the human MYC gene at 8q24.21 in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

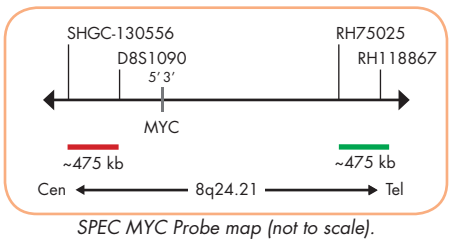
Probe Description

The ZytoDot® 2C SPEC MYC Break Apart Probe is composed of:

- Digoxigenin-labeled polynucleotides (~0.50 ng/µl), which target sequences mapping in 8q24.21** (chr8:130,373,051-130,847,951) distal to the MYC breakpoint region.
- Dinitrophenyl-labeled polynucleotides (~0.75 ng/µl), which target sequences mapping in 8q24.21** (chr8:127,888,765-128,363,281) proximal to the MYC breakpoint region.
- Formamide based hybridization buffer



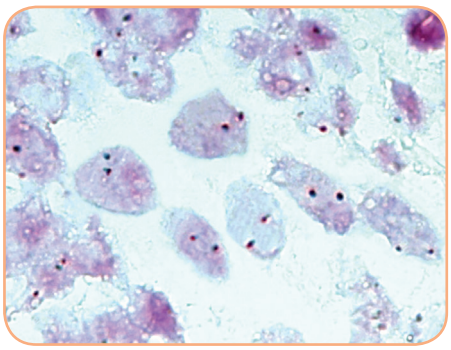
Ideogram of chromosome 8 indicating the hybridization locations.



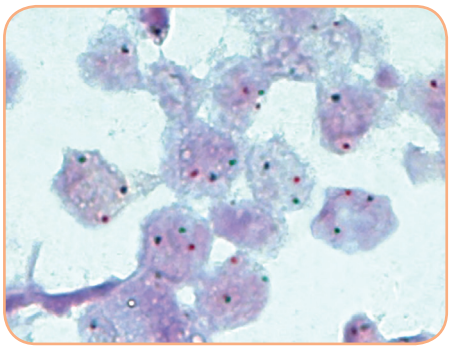
SPEC MYC Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 8q24.21 band, using the ZytoDot® 2C CISH Implementation Kit, two red/green fusion signals are expected representing two normal (non-rearranged) 8q24.21 loci. A signal pattern consisting of one red/green fusion signal, one red signal, and a separate green signal indicates one normal 8q24.21 locus and one 8q24.21 locus affected by a translocation. Alternative break points particularly observed in variant MYC translocations t(8;22) and t(2;8) might result in different signal patterns.



SPEC MYC Break Apart Probe hybridized to normal interphase cells as indicated by two red/green fusion signals per nucleus.



Example of an aberrant signal pattern: Non-Hodgkin lymphoma tissue section with translocation affecting the 8q24.21 locus as indicated by one red/green fusion (non-rearranged) signal, one red signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
C-3066-400	ZytoDot 2C SPEC MYC Break Apart Probe CE IVD	DIG/DNP	40 (400 µl)
Related Products			
C-3044-40	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 20x Wash Buffer TBS, 2x 50 ml; Anti-DIG/DNP-Mix, 4 ml; HRP/AP-Polymer-Mix, 4 ml; AP-Red Solution A, 0.4 ml; AP-Red Solution B, 15 ml; HRP-Green Solution A, 0.8 ml; HRP-Green Solution B, 15 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml		40

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoDot® 2C SPEC CDKN2A/CEN 9 Probe

CE IVD

Background

The ZytoDot® 2C SPEC CDKN2A/CEN 9 Probe is designed for the detection of CDKN2A deletions frequently observed in most tumor cell lines as well as in primary human malignancies.

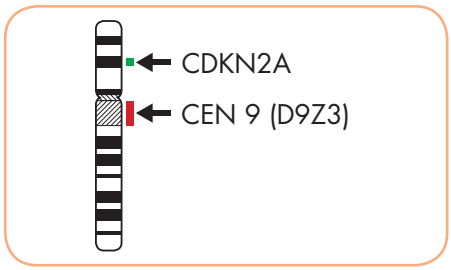
The CDKN2A gene, often referred to as p16 or INK4a/ARF, is located in the chromosomal region 9p21.3. Using alternative first exons and an alternative reading frame, the gene encodes for two distinct tumor suppressor proteins p16INK4a and p14ARF, both involved in cell cycle regulation. CDKN2A has been identified as a major susceptibility gene for melanoma. The tumor suppressor gene CDKN2A is inactivated by homozygous deletions with high frequency in a variety of human primary tumors e.g. bladder and renal cell carcinoma, prostate and ovarian adenocarcinoma, non-small cell lung cancer, sarcoma, glioma, mesothelioma, and melanoma. Furthermore, deletion of the CDKN2A gene is found in up to 80% of T-cell acute lymphoblastic leukemia cases and is associated with poor prognosis and relapse of the disease.

References
Arif Q & Husain AN (2015) Arch Pathol Lab Med 139: 978-80.
Cowan JM et al. (1988) J Natl Cancer Inst 80: 1159-64.
Holley T, et al. (2012) PLoS One 7: e50586.
Hussussian CJ, et al. (1994) Nat Genet 8: 15-21.
Kamb A, et al. (1994) Science 264: 436-40.
Nobori T, et al. (1994) Nature 368: 753-6.
Quelle DE, et al. (1995) Cell 83: 993-1000.
Rocco JW & Sidransky D (2001) Exp Cell Res 264: 42-55.
Schopmeyer K, et al. (1999) Neoplasia 1: 128-37.
Schwarz S, et al. (2008) Cytometry A 73: 305-11.
Sharpless NE (2005) Mutat Res 576: 22-38.

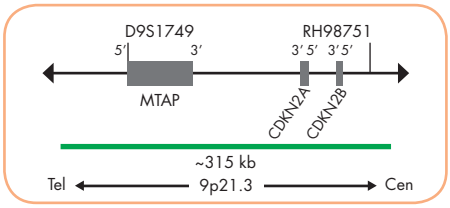
Probe Description

The ZytoDot® 2C SPEC CDKN2A/CEN 9 Probe is composed of:

- Digoxigenin-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 9p21.3** (chr9:21,742,629-22,056,853) harboring the CDKN2A gene region.
- Dinitrophenyl-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in chromosomal region 9q12 specific for the classical satellite III region D9Z3 of chromosome 9.
- Formamide based hybridization buffer



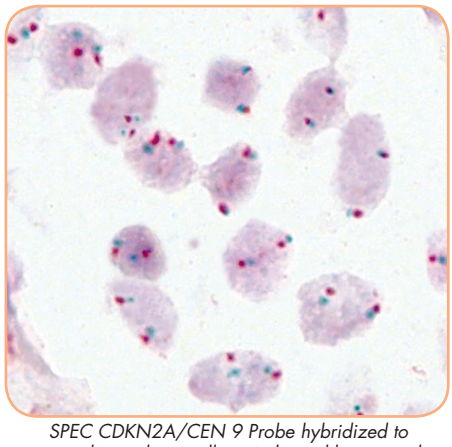
Ideogram of chromosome 9 indicating the hybridization locations.



SPEC CDKN2A Probe map (not to scale).

Results

In a normal interphase nucleus, using the ZytoDot® 2C CISH Implementation Kit two green (CDKN2A) and two red (CEN 9) signals are expected. In a cell with deletion of the CDKN2A gene locus, a reduced number of green signals will be observed. Deletions affecting only parts of the CDKN2A gene might result in a normal signal pattern with green signals of reduced size.



SPEC CDKN2A/CEN 9 Probe hybridized to normal interphase cells as indicated by two red and two green signals per nucleus.

Prod. No.	Product	Label	Tests* (Volume)
C-3067-400	ZytoDot 2C SPEC CDKN2A/CEN 9 Probe CE IVD	DIG/DNP	40 (400 µl)
Related Products			
C-3044-40	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 20x Wash Buffer TBS, 2x 50 ml; Anti-DIG/DNP-Mix, 4 ml; HRP/AP-Polymer-Mix, 4 ml; AP-Red Solution A, 0.4 ml; AP-Red Solution B, 15 ml; HRP-Green Solution A, 0.8 ml; HRP-Green Solution B, 15 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml		40

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoDot® 2C SPEC RET Break Apart Probe

CE IVD

Background

The ZytoDot® 2C SPEC RET Break Apart Probe (PD44) is intended to be used for the qualitative detection of translocations involving the human RET gene at 10q11.21 in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).

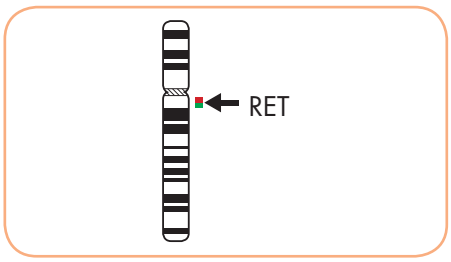
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

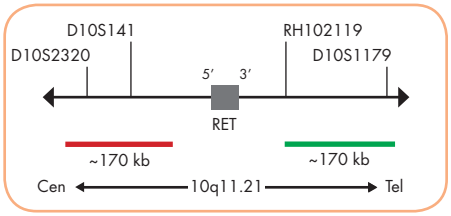
Probe Description

The ZytoDot® 2C SPEC RET Break Apart Probe is composed of:

- Digoxigenin-labeled polynucleotides (~0.50 ng/µl), which target sequences mapping in 10q11.21** (chr10:43,687,278-43,856,587) distal to the RET breakpoint region.
- Dinitrophenyl-labeled polynucleotides (~0.75 ng/µl), which target sequences mapping in 10q11.21** (chr10:43,340,888-43,510,171) proximal to the RET breakpoint region.
- Formamide based hybridization buffer



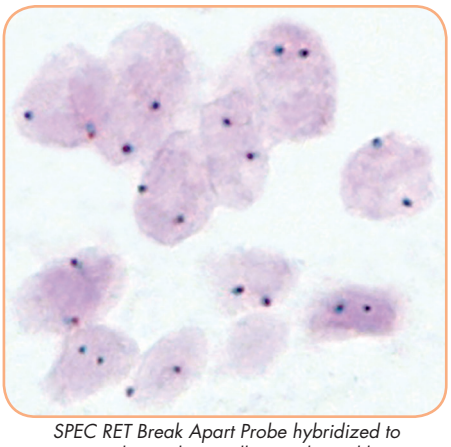
Ideogram of chromosome 10 indicating the hybridization locations.



SPEC RET Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 10q11.21 band, using the ZytoDot® 2C CISH Implementation Kit, two red/green fusion signals are expected representing two normal (non-rearranged) 10q11.21 loci. A signal pattern consisting of one red/green fusion signal, one red signal, and a separate green signal indicates one normal 10q11.21 locus and one 10q11.21 locus affected by a translocation or inversion.



SPEC RET Break Apart Probe hybridized to normal interphase cells as indicated by two red/green fusion signals per nucleus.

Prod. No.	Product	Label	Tests* (Volume)
C-3064-100	ZytoDot 2C SPEC RET Break Apart Probe CE IVD	DIG/DNP	10 (100 µl)
C-3064-400	ZytoDot 2C SPEC RET Break Apart Probe CE IVD	DIG/DNP	40 (400 µl)
Related Products			
C-3044-10	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 20x Wash Buffer TBS, 50 ml; Anti-DIG/DNP-Mix, 1 ml; HRP/AP-Polymer-Mix,1 ml; AP-Red Solution A, 0.1 ml; AP-Red Solution B, 4 ml; HRP-Green Solution A, 0.2 ml; HRP-Green Solution B, 4 ml; Nuclear Blue Solution, 4 ml; Mounting Solution (alcoholic), 1 ml		10
C-3044-40	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 20x Wash Buffer TBS, 2x 50 ml; Anti-DIG/DNP-Mix, 4 ml; HRP/AP-Polymer-Mix, 4 ml; AP-Red Solution A, 0.4 ml; AP-Red Solution B, 15 ml; HRP-Green Solution A, 0.8 ml; HRP-Green Solution B, 15 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml		40

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoDot® 2C SPEC PTEN/CEN 10 Probe

RUO

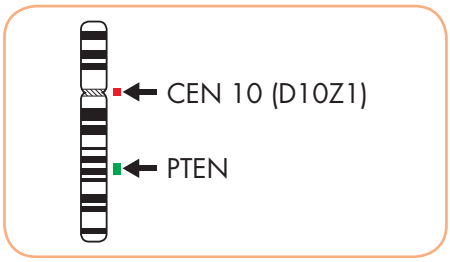
Background

The ZytoDot® 2C SPEC PTEN/CEN 10 Probe (PD33) is intended to be used for the qualitative detection of human PTEN gene deletions and the detection of chromosome 10 alpha satellites in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).

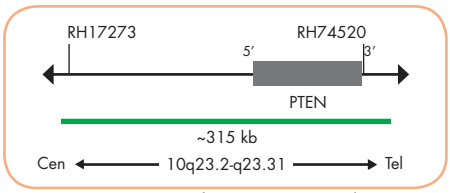
Probe Description

The ZytoDot® 2C SPEC PTEN/CEN 10 Probe is composed of:

- Digoxigenin-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 10q23.2-q23.31** (chr10:89,440,649-89,755,790) harboring the PTEN gene region.
- Dinitrophenyl-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 10p11.1-q11.1 specific for the alpha satellite centromeric region D10Z1 of chromosome 10.
- Formamide based hybridization buffer



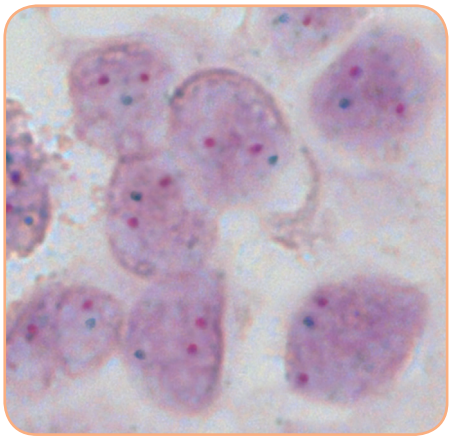
Ideogram of chromosome 10 indicating the hybridization locations.



SPEC PTEN Probe map (not to scale).

Results

In a normal interphase nucleus, using the ZytoDot® 2C CISH Implementation Kit two red (CEN 10) and two green (PTEN) signals are expected. In a cell with a deletion of the PTEN gene locus a reduced number of green signals will be observed. Deletions affecting only parts of the PTEN gene might result in normal signal pattern with green signals of reduced size.



Example of an aberrant signal pattern: Prostate cancer tissue section with deletion of the PTEN gene as indicated by one green signal.

Prod. No.	Product	Label	Tests* (Volume)
C-3053-400	ZytoDot 2C SPEC PTEN/CEN 10 Probe RUO	DIG/DNP	40 (400 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoDot® 2C SPEC FGFR2/CEN 10 Probe

CE IVD

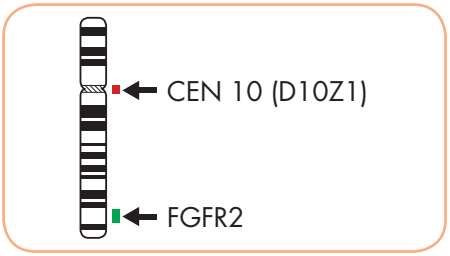
Background

The ZytoDot® 2C SPEC FGFR2/CEN 10 Probe (PD36) is intended to be used for the qualitative detection of amplifications involving the human FGFR2 gene as well as the detection of chromosome 10 alpha satellites in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

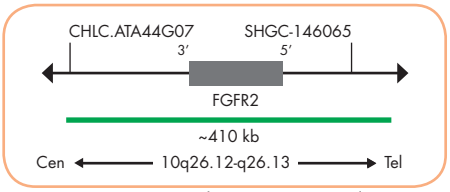
Probe Description

The ZytoDot® 2C SPEC FGFR2/CEN 10 Probe is composed of:

- Digoxigenin-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 10q26.12-10q26.13** (chr10:123,080,085-123,492,398) harboring the FGFR2 gene region.
- Dinitrophenyl-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 10p11.1-q11.1 specific for the alpha satellite centromeric region D10Z1 of chromosome chromosome 10.
- Formamide based hybridization buffer



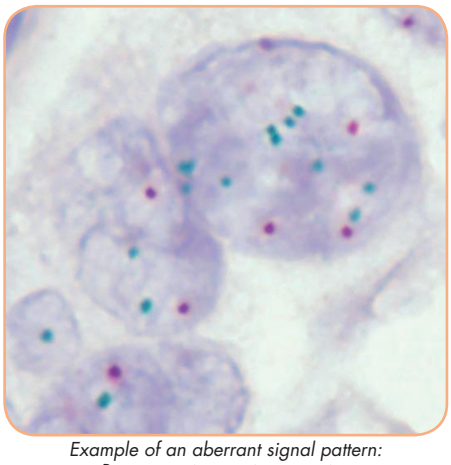
Ideogram of chromosome 10 indicating the hybridization locations.



SPEC FGFR2 Probe map (not to scale).

Results

In a normal interphase nucleus, using the ZytoDot® 2C CISH Implementation Kit two red (CEN 10) and two green (FGFR2) signals are expected. Nuclei with amplification of the FGFR2 gene locus at 10q26.12-q26.13 or polysomy of chromosome 10 will show multiple copies of the green signal or large green signal clusters.



Example of an aberrant signal pattern: Breast carcinoma tissue section with FGFR2 (green) amplification.

Prod. No.	Product	Label	Tests* (Volume)
C-3056-400	ZytoDot 2C SPEC FGFR2/CEN 10 Probe CE IVD	DIG/DNP	40 (400 µl)
Related Products			
C-3044-40	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 20x Wash Buffer TBS, 2x 50 ml; Anti-DIG/DNP-Mix, 4 ml; HRP/AP-Polymer-Mix, 4 ml; AP-Red Solution A, 0.4 ml; AP-Red Solution B, 15 ml; HRP-Green Solution A, 0.8 ml; HRP-Green Solution B, 15 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml		40

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoDot® 2C SPEC CCND1 Break Apart Probe

RUO

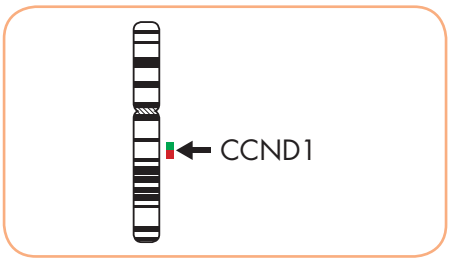
Background

The ZytoDot® 2C SPEC CCND1 Break Apart Probe (PD55) is intended to be used for the qualitative detection of translocations involving the human CCND1 gene at 11q13.3 in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).

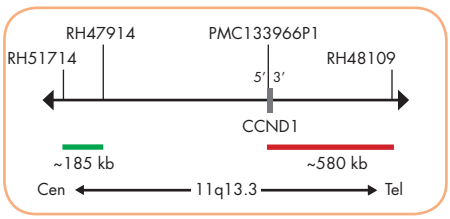
Probe Description

The ZytoDot® 2C SPEC CCND1 Break Apart Probe is composed of:

- Digoxigenin-labeled polynucleotides (~0.50 ng/µl), which target sequences mapping in 11q13.3** (chr11:68,522,105-68,705,283) proximal to the CCND1 breakpoint region.
- Dinitrophenyl-labeled polynucleotides (~0.75 ng/µl), which target sequences mapping in 11q13.3** (chr11:69,453,301-70,031,240) distal to the CCND1 breakpoint region.
- Formamide based hybridization buffer



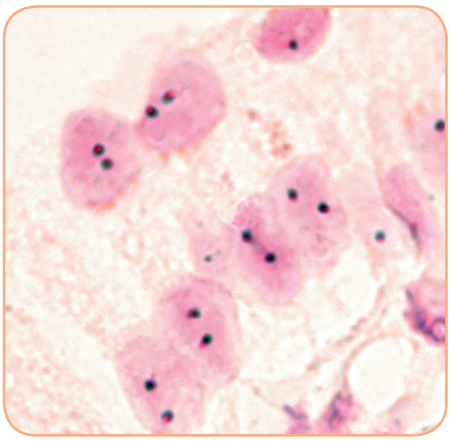
Ideogram of chromosome 11 indicating the hybridization locations.



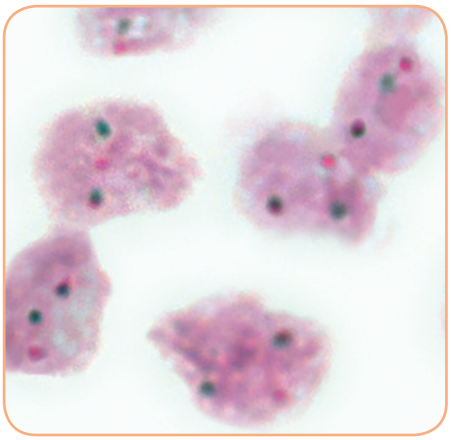
SPEC CCND1 Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 11q13.3 band, using the ZytoDot® 2C CISH Implementation Kit, two red/green fusion signals are expected representing two normal (non-rearranged) 11q13.3 loci. A signal pattern consisting of one red/green fusion signal, one red signal, and a separate green signal indicates one normal 11q13.3 locus and one 11q13.3 locus affected by a translocation.



SPEC CCND1 Break Apart Probe hybridized to normal interphase cells as indicated by two red/green fusion signals per nucleus.



Example of an aberrant signal pattern: Mantle cell lymphoma tissue section with translocation affecting the 11q13.3 locus as indicated by one non-rearranged red/green fusion signal, one red signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
C-3075-100	ZytoDot 2C SPEC CCND1 Break Apart Probe RUO	DIG/DNP	10 (100 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoDot® 2C SPEC DDIT3 Break Apart Probe

CE IVD

Background

The ZytoDot® 2C SPEC DDIT3 Break Apart Probe (PD27) is intended to be used for the qualitative detection of translocations involving the human DDIT3 gene at 12q13.3 in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).

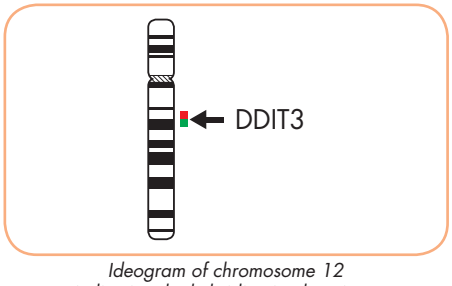
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

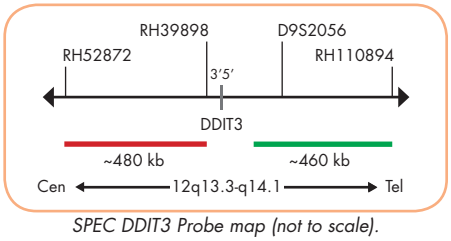
Probe Description

The ZytoDot® 2C SPEC DDIT3 Break Apart Probe is composed of:

- Digoxigenin-labeled polynucleotides (~0.50 ng/µl), which target sequences mapping in 12q13.3-q14.1** (chr12:58,024,366-58,486,511) distal to the DDIT3 breakpoint region.
- Dinitrophenyl-labeled polynucleotides (~0.75 ng/µl), which target sequences mapping in 12q13.3** (chr12:57,386,302-57,865,800) proximal to the DDIT3 breakpoint region.
- Formamide based hybridization buffer



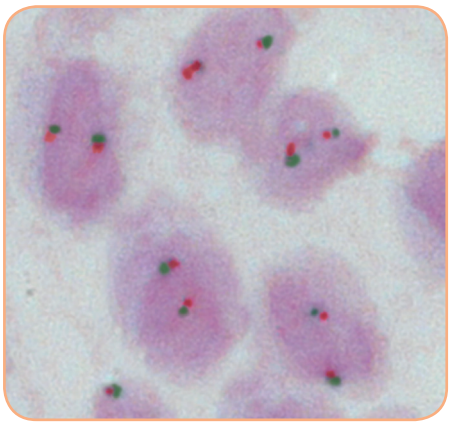
Ideogram of chromosome 12 indicating the hybridization locations.



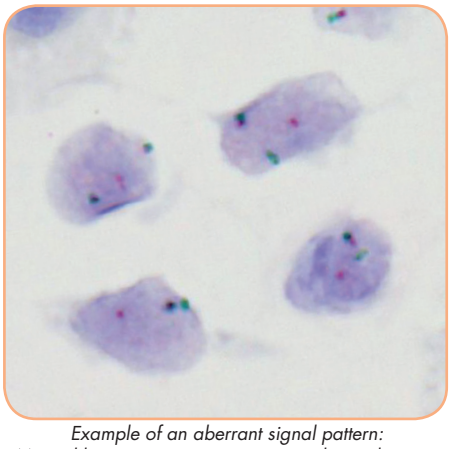
SPEC DDIT3 Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 12q13.3-q14.1 band, using the ZytoDot® 2C CISH Implementation Kit, two red/green fusion signals are expected representing two normal (non-rearranged) 12q13.3-q14.1 loci. A signal pattern consisting of one red/green fusion signal, one red signal, and a separate green signal indicates one normal 12q13.3-q14.1 locus and one 12q13.3-q14.1 locus affected by a translocation or inversion.



SPEC DDIT3 Break Apart Probe hybridized to normal interphase cells as indicated by two red/green fusion signals per nucleus.



Example of an aberrant signal pattern: Myxoid liposarcoma tissue section with translocation affecting the 12q13.3-q14.1 locus as indicated by one non-rearranged red/green fusion signal, one red signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
C-3047-100	ZytoDot 2C SPEC DDIT3 Break Apart Probe CE IVD	DIG/DNP	10 (100 µl)
Related Products			
C-3044-10	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 20x Wash Buffer TBS, 50 ml; Anti-DIG/DNP-Mix, 1 ml; HRP/AP-Polymer-Mix,1 ml; AP-Red Solution A, 0.1 ml; AP-Red Solution B, 4 ml; HRP-Green Solution A, 0.2 ml; HRP-Green Solution B, 4 ml; Nuclear Blue Solution, 4 ml; Mounting Solution (alcoholic), 1 ml		10

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoDot ® 2C SPEC CDK4/CEN 12 Probe

CE IVD

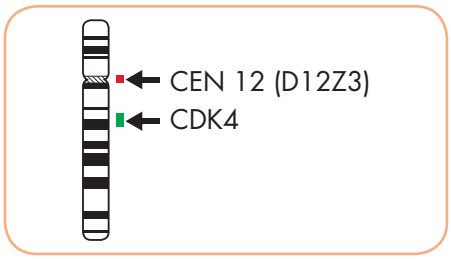
Background

The ZytoDot ® 2C SPEC CDK4/CEN 12 Probe (PD42) is intended to be used for the qualitative detection of amplifications involving the human CDK4 gene as well as the detection of chromosome 12 alpha satellites in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot ® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

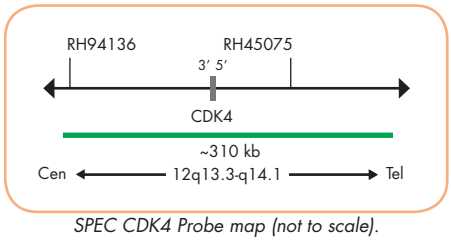
Probe Description

The ZytoDot ® 2C SPEC CDK4/CEN 12 Probe is composed of:

- Digoxigenin-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 12q13.3-q14.1** (chr12:58,004,553-58,313,271) harboring the CDK4 gene region.
- Dinitrophenyl-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 12p11.1-q11 specific for the alpha satellite centromeric region D12Z3 of chromosome 12.
- Formamide based hybridization buffer



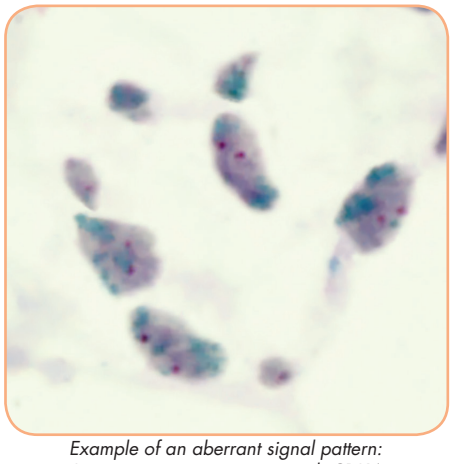
Ideogram of chromosome 12 indicating the hybridization locations.



SPEC CDK4 Probe map (not to scale).

Results

In a normal interphase nucleus, using the ZytoDot ® 2C CISH Implementation Kit, two green (CDK4) and two red (CEN 12) signals are expected. In a cell with amplification of the CDK4 gene locus or polysomy of chromosome 12, multiple copies of the green signal or green signal clusters will be observed.



Example of an aberrant signal pattern: Liposarcoma tissue section with CDK4 amplification as indicated by large green clusters.

Prod. No.	Product	Label	Tests* (Volume)
C-3062-400	ZytoDot 2C SPEC CDK4/CEN 12 Probe CE IVD	DIG/DNP	40 (400 µl)
Related Products			
C-3044-40	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 20x Wash Buffer TBS, 2x 50 ml; Anti-DIG/DNP-Mix, 4 ml; HRP/AP-Polymer-Mix, 4 ml; AP-Red Solution A, 0.4 ml; AP-Red Solution B, 15 ml; HRP-Green Solution A, 0.8 ml; HRP-Green Solution B, 15 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml		40

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoDot ® SPEC MDM2 Probe

CE
IVD

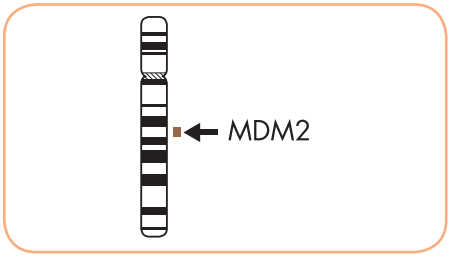
Background

The ZytoDot ® SPEC MDM2 Probe (PD9) is intended to be used for the qualitative detection of amplifications involving the human MDM2 gene in formalin-fixed, paraffin-embedded specimens, such as atypical lipomatous tumor/well-differentiated liposarcoma (ALT/WDLPS) and dedifferentiated liposarcoma (DDLPS), by chromogenic *in situ* hybridization (CISH).
The probe is intended to be used in combination with the ZytoDot ® CISH Implementation Kit (Prod. No. C-3018-40).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of ALT/WDLPS and DDLPS and therapeutic measures should not be initiated based on the test result alone.

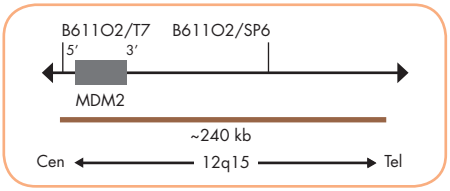
Probe Description

The ZytoDot ® SPEC MDM2 Probe is composed of:

- Digoxigenin-labeled polynucleotides (~1.8 ng/µl), which target sequences mapping in 12q15** (chr12:69,190,708-69,430,185) harboring the MDM2 gene region.
- Formamide based hybridization buffer



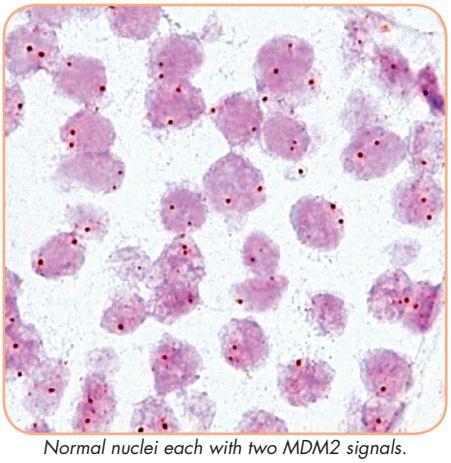
Ideogram of chromosome 12 indicating the hybridization locations.



SPEC MDM2 Probe map (not to scale).

Results

In normal cells, two distinct dot-shaped signals per nucleus will be observed. Nuclei with amplification of the MDM2 gene locus or polysomy of chromosome 12 will show multiple dots or large signal clusters.



Normal nuclei each with two MDM2 signals.

Prod. No.	Product	Label	Tests* (Volume)
C-3012-400	ZytoDot SPEC MDM2 Probe CE IVD	DIG	40 (400 µl)
Related Products			
C-3018-40	ZytoDot CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; PBS/Tween, good for 2000 ml; Blocking Solution, 4 ml; Mouse-anti-DIG, 4 ml; Anti-Mouse-HRP-Polymer, 4 ml; DAB Solution A, 0.3 ml; DAB Solution B, 10 ml; Mayer's Hematoxylin Solution, 20 ml; Mounting Solution (alcoholic), 4 ml		40

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoDot® 2C SPEC MDM2/CEN 12 Probe

CE IVD

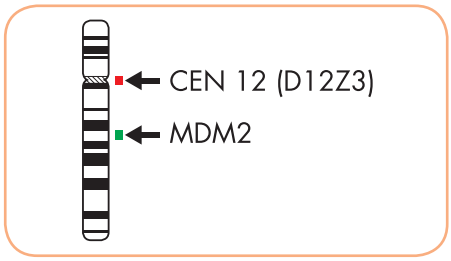
Background

The ZytoDot® 2C SPEC MDM2/CEN 12 Probe (PD29) is intended to be used for the qualitative detection of amplifications involving the human MDM2 gene as well as the detection of chromosome 12 alpha satellites in formalin-fixed, paraffin-embedded specimens, such as atypical lipomatous tumor/well-differentiated liposarcoma (ALT/WDLPS) and dedifferentiated liposarcoma (DDLPS), by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of ALT/WDLPS and DDLPS and therapeutic measures should not be initiated based on the test result alone.

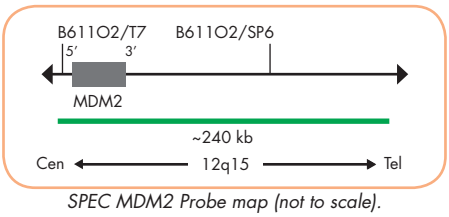
Probe Description

The ZytoDot® 2C SPEC MDM2/CEN 12 Probe is composed of:

- Digoxigenin-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 12q15** (chr12:69,190,708-69,430,185) harboring the MDM2 gene region.
- Dinitrophenyl-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 12p11.1-q11 specific for the alpha satellite centromeric region D12Z3 of chromosome 12.
- Formamide based hybridization buffer



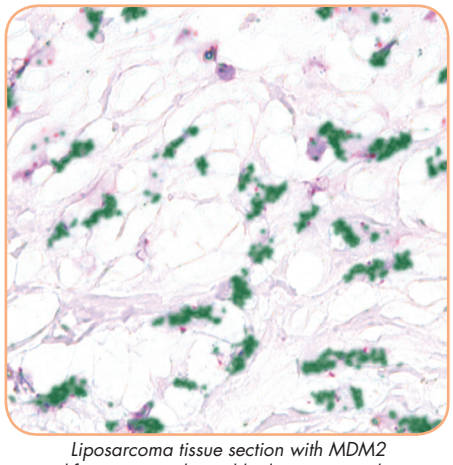
Ideogram of chromosome 12 indicating the hybridization locations.



SPEC MDM2 Probe map (not to scale).

Results

In a normal interphase nucleus,using the ZytoDot® 2C CISH Implementation Kit two red and two green signals are expected. In a cell with amplification of the MDM2 gene locus, multiple copies of the green signal or green signal clusters will be observed.



Liposarcoma tissue section with MDM2 amplification as indicated by large green clusters.

Prod. No.	Product	Label	Tests* (Volume)
C-3049-100	ZytoDot 2C SPEC MDM2/CEN 12 Probe CE IVD	DIG/DNP	10 (100 µl)
C-3049-400	ZytoDot 2C SPEC MDM2/CEN 12 Probe CE IVD	DIG/DNP	40 (400 µl)
Related Products			
C-3044-10	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 20x Wash Buffer TBS, 50 ml; Anti-DIG/DNP-Mix, 1 ml; HRP/AP-Polymer-Mix,1 ml; AP-Red Solution A, 0.1 ml; AP-Red Solution B, 4 ml; HRP-Green Solution A, 0.2 ml; HRP-Green Solution B, 4 ml; Nuclear Blue Solution, 4 ml; Mounting Solution (alcoholic), 1 ml		10
C-3044-40	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 20x Wash Buffer TBS, 2x 50 ml; Anti-DIG/DNP-Mix, 4 ml; HRP/AP-Polymer-Mix, 4 ml; AP-Red Solution A, 0.4 ml; AP-Red Solution B, 15 ml; HRP-Green Solution A, 0.8 ml; HRP-Green Solution B, 15 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml		40

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoDot® 2C SPEC FOXO1 Break Apart Probe

RUO

Background

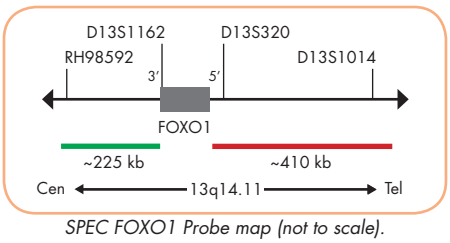
The ZytoDot® 2C SPEC FOXO1 Break Apart Probe (PD45) is intended to be used for the qualitative detection of translocations involving the human FOXO1 gene at 13q14.11 in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).

Probe Description

The ZytoDot® 2C SPEC FOXO1 Break Apart Probe is composed of:

- Digoxigenin-labeled polynucleotides (~0.50 ng/µl), which target sequences mapping in 13q14.11** (chr13:40,908,021-41,132,595) proximal to the FOXO1 breakpoint region.
- Dinitrophenyl-labeled polynucleotides (~0.75 ng/µl), which target sequences mapping in 13q14.11** (chr13:41,246,897-41,654,419) distal to the FOXO1 breakpoint region.
- Formamide based hybridization buffer

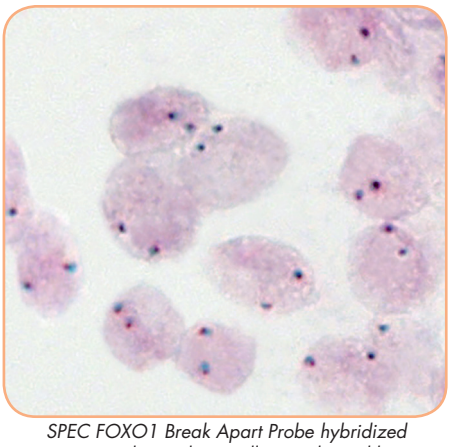
Ideogram of chromosome 13 indicating the hybridization locations.



SPEC FOXO1 Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 13q14.11 band, using the ZytoDot® 2C CISH Implementation Kit, two red/green fusion signals are expected representing two normal (non-rearranged) 13q14.11 loci. A signal pattern consisting of one red/green fusion signal, one red signal, and a separate green signal indicates one normal 13q14.11 locus and one 13q14.11 locus affected by a translocation.



SPEC FOXO1 Break Apart Probe hybridized to normal interphase cells as indicated by two red/green fusion signals per nucleus.

Prod. No.	Product	Label	Tests* (Volume)
C-3065-100	ZytoDot 2C SPEC FOXO1 Break Apart Probe RUO	DIG/DNP	10 (100 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoDot® 2C SPEC IGH Break Apart Probe

CE IVD

Background

The ZytoDot® 2C SPEC IGH Break Apart Probe (PD51) is intended to be used for the qualitative detection of translocations involving the human IGH locus at 14q32.33 in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).

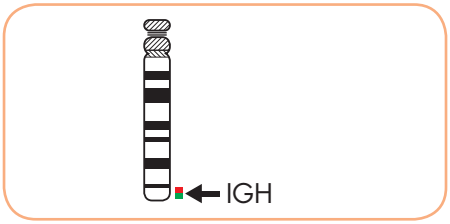
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

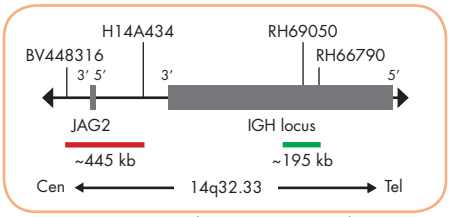
Probe Description

The ZytoDot® 2C SPEC IGH Break Apart Probe is composed of:

- Digoxigenin-labeled polynucleotides (~0.50 ng/µl), which target sequences mapping in 14q32.33** (chr14:106,690,778-106,883,535) distal to the IGH breakpoint region.
- Dinitrophenyl-labeled polynucleotides (~0.75 ng/µl), which target sequences mapping in 14q32.33** (chr14:105,462,169-105,909,611) proximal to the IGH breakpoint region.
- Formamide based hybridization buffer



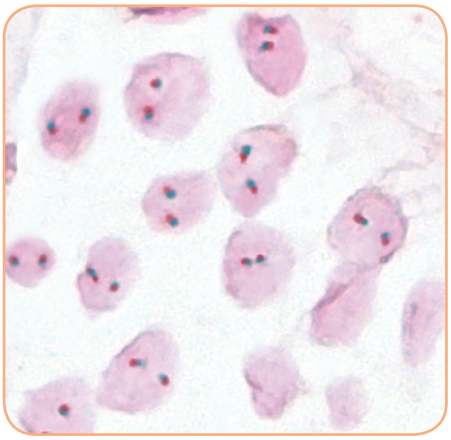
Ideogram of chromosome 14 indicating the hybridization locations.



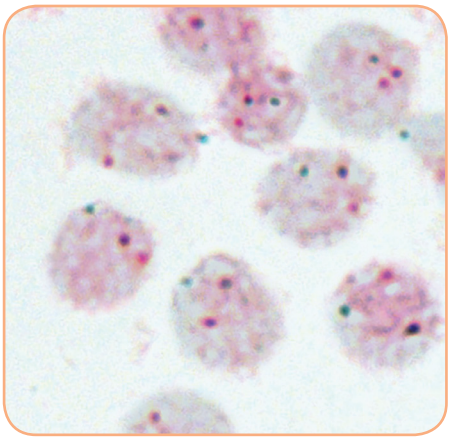
SPEC IGH Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 14q32.33 band, using the ZytoDot® 2C CISH Implementation Kit, two red/green fusion signals are expected representing two normal (non-rearranged) 14q32.33 loci. A signal pattern consisting of one red/green fusion signal, one red signal, and a separate green signal indicates one normal 14q32.33 locus and one 14q32.33 locus affected by a translocation.



SPEC IGH Break Apart Probe hybridized to normal interphase cells as indicated by two red/green fusion signals per nucleus.



Example of an aberrant signal pattern: Burkitt lymphoma tissue section with translocation affecting the 14q32.33 locus as indicated by one red/green fusion (non-rearranged) signal, one red signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
C-3071-100	ZytoDot 2C SPEC IGH Break Apart Probe CE IVD	DIG/DNP	10 (100 µl)
Related Products			
C-3044-10	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 20x Wash Buffer TBS, 50 ml; Anti-DIG/DNP-Mix, 1 ml; HRP/AP-Polymer-Mix,1 ml; AP-Red Solution A, 0.1 ml; AP-Red Solution B, 4 ml; HRP-Green Solution A, 0.2 ml; HRP-Green Solution B, 4 ml; Nuclear Blue Solution, 4 ml; Mounting Solution (alcoholic), 1 ml		10

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoDot® 2C SPEC NTRK3 Break Apart Probe

CE IVD

Background

The ZytoDot® 2C SPEC NTRK3 Break Apart Probe is designed to detect translocations involving the chromosomal region 15q25.3 harboring the NTRK3 (neurotrophic receptor tyrosine kinase 3, a.k.a. TRKC) gene.

NTRK3 is a receptor tyrosine kinase (TK) for neurotrophin 3 (NT3) and plays a key role in central and peripheral nervous system development as well as in cell survival. Translocations affecting the NTRK3 gene have been reported in several cancer types, including glioblastomas, Philadelphia chromosome-like acute lymphoblastic leukemia, congenital fibrosarcomas, cellular mesoblastic nephromas, acute myeloid leukemia, radiation-associated thyroid cancer, secretory breast carcinoma, and mammary analog secretory carcinoma of the salivary gland.

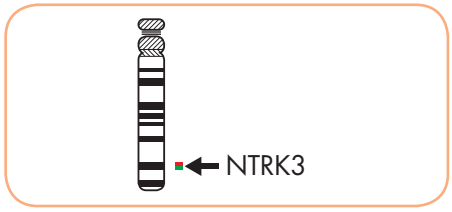
The most frequent rearrangement involving the NTRK3 gene is the t(12;15)(p13.2;q25) which results in a fusion between the 5' part of the ETV6 gene and the 3' part of the NTRK3 gene. This fusion gene encodes a hybrid protein comprising the TK domain of NTRK3 and the dimerization domain of ETV6, which leads to a ligand-independent TK activity.

The treatment of patients with NTRK1, 2, or 3 fusion-positive cancers with an NTRK inhibitor, such as the FDA-approved drugs larotrectinib or entrectinib, is associated with high response rates, regardless of NTRK gene, fusion partner, and tumor type. Hence, detection of NTRK3 translocations by CISH may be of diagnostic and therapeutic relevance.

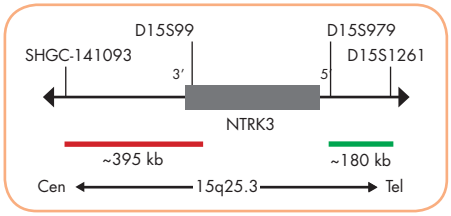
Probe Description

The ZytoDot® 2C SPEC NTRK3 Break Apart Probe is composed of:

- Digoxigenin-labeled polynucleotides (~0.50 ng/µl), which target sequences mapping in 15q25.3** (chr15:88,825,346-89,007,107) distal to the NTRK3 breakpoint region.
- Dinitrophenyl-labeled polynucleotides (~0.75 ng/µl), which target sequences mapping in 15q25.3** (chr15:88,077,591-88,471,002) proximal to the NTRK3 breakpoint region.
- Formamide based hybridization buffer



Ideogram of chromosome 15 indicating the hybridization locations.

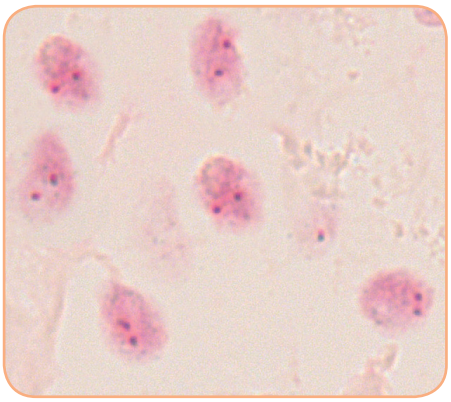


SPEC NTRK3 Probe map (not to scale).

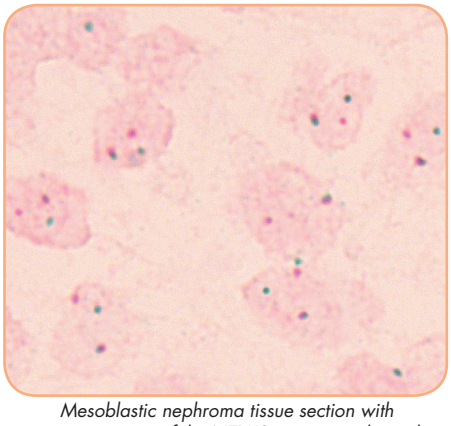
References
Amatu A, et al. (2016) ESMO Open 1: e000023.
Arce C, et al. (2005) World J Surg Oncol 3: 35.
Knezevich SR, et al. (1998) Nat Genet 18: 184-7.
Leeman-Neill RJ, et al. (2014) Cancer 120: 799-807.
Nagasubramanian R, et al. (2016) Pediatr Blood Cancer 63: 1468-70.
Raez LE & Rolfo C (2016) Lung Cancer Manag 5: 1-4.
Roberts KG, et al. (2014) N Engl J Med 371: 1005-15.
Skálová A, et al. (2010) Am J Surg Pathol 34: 599-608.
Tognon C, et al. (2002) Cancer Cell 2: 367-76.
Wang L, et al. (2017) J Mol Diagn 19: 387-96.
Wu G, et al. (2014) Nat Genet 46: 444-50.

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 15q25.3 band, using the ZytoDot® 2C CISH Implementation Kit, two red/green fusion signals are expected representing two normal (non-rearranged) 15q25.3 loci. A signal pattern consisting of one red/green fusion signal, one red signal, and a separate green signal indicates one normal 15q25.3 locus and one 15q25.3 locus affected by a translocation. Isolated red signals are the result of deletions distal to the NTRK3 breakpoint region or are due to unbalanced translocations affecting this chromosomal region.



SPEC NTRK3 Break Apart Probe hybridized to normal interphase cells as indicated by two red/green fusion signals per nucleus.



Mesoblastic nephroma tissue section with rearrangement of the NTRK3 gene as indicated by one red/green fusion (non-rearranged) signal, one red signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
C-3079-100	ZytoDot 2C SPEC NTRK3 Break Apart Probe CE IVD	DIG/DNP	10 (100 µl)
Related Products			
C-3044-10	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 20x Wash Buffer TBS, 50 ml; Anti-DIG/DNP-Mix, 1 ml; HRP/AP-Polymer-Mix,1 ml; AP-Red Solution A, 0.2 ml; AP-Red Solution B, 4 ml; HRP-Green Solution A, 0.2 ml; HRP-Green Solution B, 4 ml; Nuclear Blue Solution, 4 ml; Mounting Solution (alcoholic), 1 ml		10

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoDot® 2C SPEC FUS Break Apart Probe

RUO

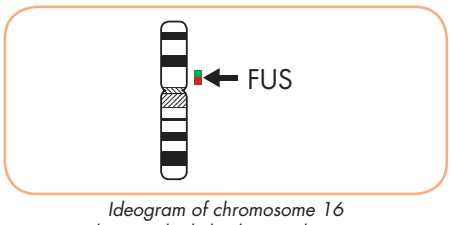
Background

The ZytoDot® 2C SPEC FUS Break Apart Probe (PD34) is intended to be used for the qualitative detection of translocations involving the human FUS gene at 16p11.2 in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).

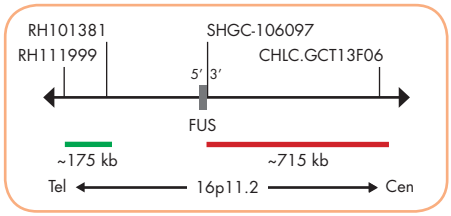
Probe Description

The ZytoDot® 2C SPEC FUS Break Apart Probe is composed of:

- Digoxigenin-labeled polynucleotides (~0.50 ng/µl), which target sequences mapping in 16p11.2** (chr16:30,663,949-30,840,569) distal to the FUS breakpoint region.
- Dinitrophenyl-labeled polynucleotides (~0.75 ng/µl), which target sequences mapping in 16p11.2** (chr16:31,213,259-31,927,155) proximal to the FUS breakpoint region.
- Formamide based hybridization buffer



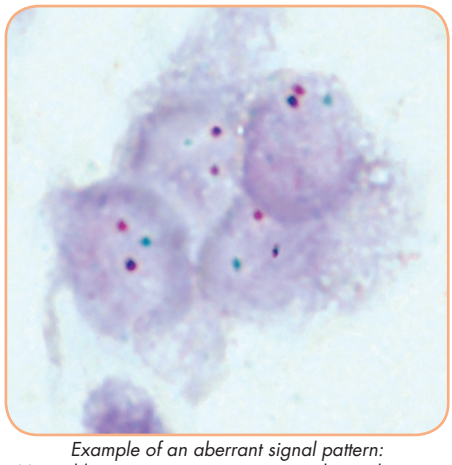
Ideogram of chromosome 16 indicating the hybridization locations.



SPEC FUS Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 16p11.2 band, using the ZytoDot® 2C CISH Implementation Kit two red/green fusion signals are expected representing two normal (non-rearranged) 16p11.2 loci. A signal pattern consisting of one red/green fusion signal, one red signal, and a separate green signal indicates one normal 16p11.2 locus and one 16p11.2 locus affected by a 16p11.2 translocation.



Example of an aberrant signal pattern: Myxoid liposarcoma tissue section with translocation affecting the 16p11.2 locus as indicated by one non-rearranged red/green fusion signal, one red signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
C-3054-100	ZytoDot 2C SPEC FUS Break Apart Probe RUO	DIG/DNP	10 (100 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoDot® 2C SPEC USP6 Break Apart Probe

CE IVD

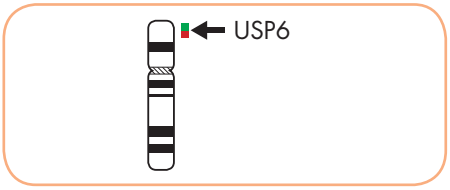
Background

The ZytoDot® 2C SPEC USP6 Break Apart Probe (PD56) is intended to be used for the qualitative detection of translocations involving the human USP6 gene at 17p13.2 in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

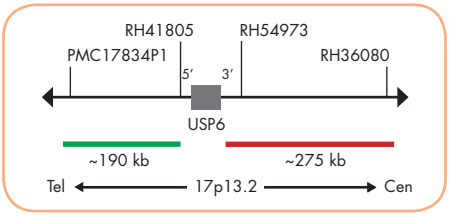
Probe Description

The ZytoDot® 2C SPEC USP6 Break Apart Probe is composed of:

- Digoxigenin-labeled polynucleotides (~0.50 ng/µl), which target sequences mapping in 17p13.2** (chr17:4,825,753-5,017,582) distal to the USP6 breakpoint region.
- Dinitrophenyl-labeled polynucleotides (~0.75 ng/µl), which target sequences mapping in 17p13.2** (chr17:5,087,046-5,361,104) proximal to the USP6 breakpoint region.
- Formamide based hybridization buffer



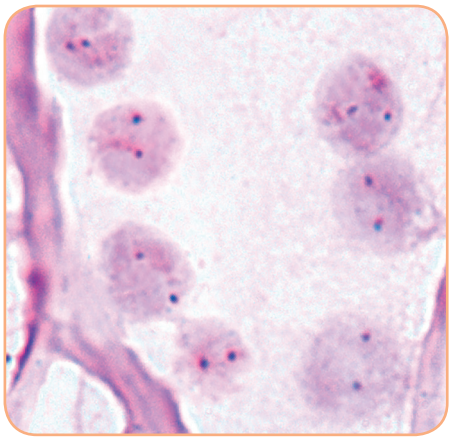
Ideogram of chromosome 17 indicating the hybridization locations.



SPEC USP6 Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 17p13.2 band, using the ZytoDot® 2C CISH Implementation Kit, two red/green fusion signals are expected representing two normal (non-rearranged) 17p13.2 loci. A signal pattern consisting of one red/green fusion signal, one red signal, and a separate green signal indicates one normal 17p13.2 locus and one 17p13.2 locus affected by a translocation.



SPEC USP6 Break Apart Probe hybridized to normal interphase cells as indicated by two red/green fusion signals per nucleus.

Prod. No.	Product	Label	Tests* (Volume)
C-3077-100	ZytoDot 2C SPEC USP6 Break Apart Probe CE IVD	DIG/DNP	10 (100 µl)
Related Products			
C-3044-10	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 20x Wash Buffer TBS, 50 ml; Anti-DIG/DNP-Mix, 1 ml; HRP/AP-Polymer-Mix,1 ml; AP-Red Solution A, 0.1 ml; AP-Red Solution B, 4 ml; HRP-Green Solution A, 0.2 ml; HRP-Green Solution B, 4 ml; Nuclear Blue Solution, 4 ml; Mounting Solution (alcoholic), 1 ml		10

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoDot ® SPEC ERBB2 Probe

CE
IVD

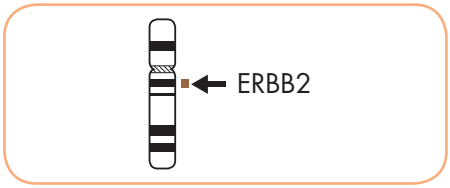
Background

The ZytoDot ® SPEC ERBB2 Probe (PD1) is intended to be used for the qualitative detection of amplifications involving the human ERBB2 gene in formalin-fixed, paraffin-embedded specimens, such as breast cancer, by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot ® CISH Implementation Kit (Prod. No. C-3018-40).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of breast cancer and therapeutic measures should not be initiated based on the test result alone.

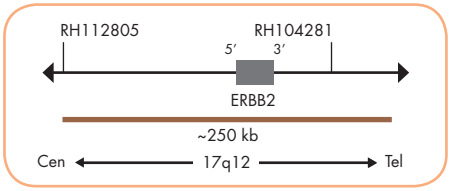
Probe Description

The ZytoDot ® SPEC ERBB2 Probe is composed of:

- Digoxigenin-labeled polynucleotides (~1.8 ng/µl), which target sequences mapping in 17q12** (chr17:37,725,661-37,973,541) harboring the ERBB2 gene region.
- Formamide based hybridization buffer



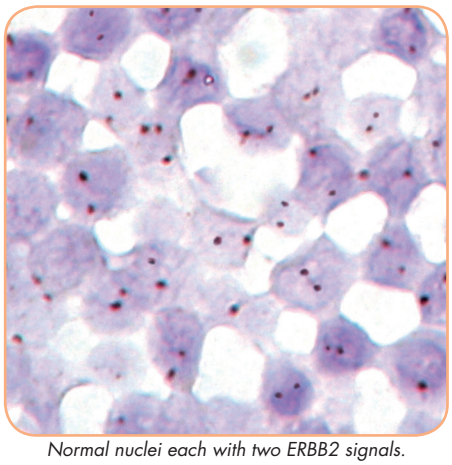
Ideogram of chromosome 17 indicating the hybridization locations.



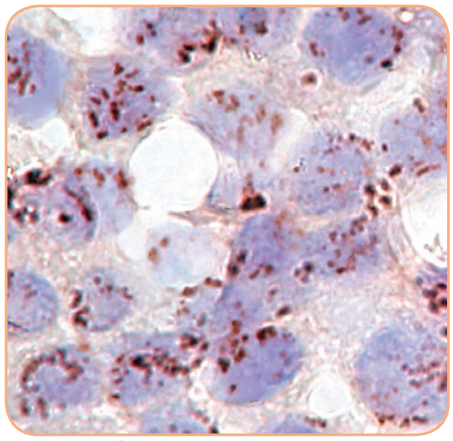
SPEC ERBB2 Probe map (not to scale).

Results

In normal cells, two distinct dot-shaped signals per nucleus will be observed. Nuclei with amplification of the ERBB2 gene locus or polysomy of chromosome 17 will show multiple dots or large signal clusters.



Normal nuclei each with two ERBB2 signals.



Breast cancer tissue section with ERBB2 amplification.

Prod. No.	Product	Label	Tests* (Volume)
C-3001-400	ZytoDot SPEC ERBB2 Probe CE IVD	DIG	40 (400 µl)
C-3003-40	ZytoDot SPEC ERBB2 Probe Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; Probe, 0.4 ml; Wash Buffer SSC, 560 ml; PBS/Tween, good for 2000 ml; Blocking Solution, 4 ml; Mouse-anti-DIG, 4 ml; Anti-Mouse-HRP-Polymer, 4 ml; DAB Solution A, 0.3 ml; DAB Solution B, 10 ml; Mayer's Hematoxylin Solution, 20 ml; Mounting Solution (alcoholic), 4 ml	DIG	40

** Using 10 µl probe solution per test.* IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoDot® 2C SPEC ERBB2/CEN 17 Probe

CE IVD

Background

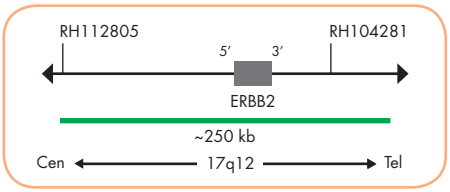
The ZytoDot® 2C SPEC ERBB2/CEN 17 Probe (PD12) is intended to be used for the qualitative detection of amplifications involving the human ERBB2 gene as well as the detection of chromosome 17 alpha satellites in formalin-fixed, paraffin-embedded specimens, such as breast cancer, by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of breast cancer and therapeutic measures should not be initiated based on the test result alone.

Probe Description

The ZytoDot® 2C SPEC ERBB2/CEN 17 Probe is composed of:

- Digoxigenin-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 17q12** (chr17:37,725,661-37,973,541) harboring the ERBB2 gene region.
- Dinitrophenyl-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 17p11.1-q11.1 specific for the alpha satellite centromeric region D17Z1 of chromosome 17.
- Formamide based hybridization buffer

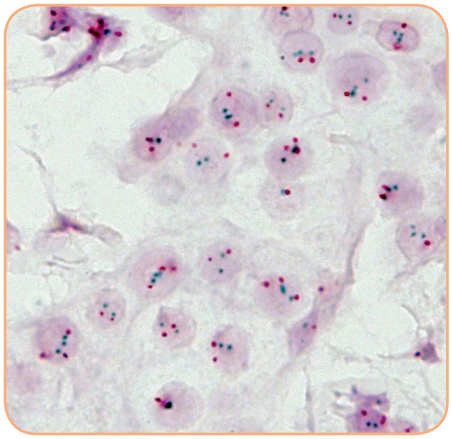
Ideogram of chromosome 17 indicating the hybridization locations.



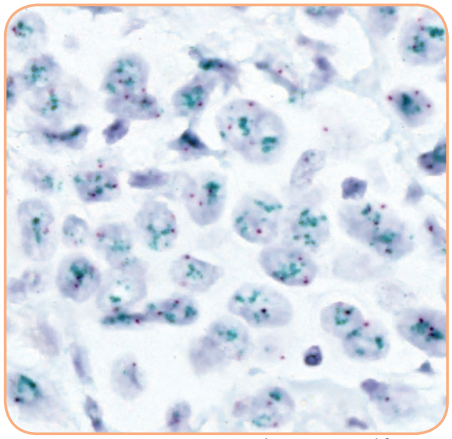
SPEC ERBB2 Probe map (not to scale).

Results

Using the ZytoDot® 2C SPEC ERBB2/CEN 17 Probe Kit, two green (ERBB2) and two red (CEN 17) signals are expected in a normal interphase nucleus. In a cell with amplification of the ERBB2 gene locus, multiple copies of the green signal or green signal clusters will be observed.



SPEC ERBB2/CEN 17 Probe hybridized to normal interphase cells as indicated by two red and two green signals per nucleus.



Breast cancer tissue section with ERBB2 amplification as indicated by multiple green signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
C-3032-100	ZytoDot 2C SPEC ERBB2/CEN 17 Probe CE IVD	DIG/DNP	10 (100 µl)
C-3032-400	ZytoDot 2C SPEC ERBB2/CEN 17 Probe CE IVD	DIG/DNP	40 (400 µl)
C-3022-10	ZytoDot 2C SPEC ERBB2/CEN 17 Probe Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 150 ml; Pepsin Solution, 1 ml; Probe, 0.1 ml; Wash Buffer SSC, 210 ml; 20x Wash Buffer TBS, 50 ml; Anti-DIG/DNP-Mix, 1 ml; HRP/AP-Polymer-Mix,1 ml; AP-Red Solution A, 0.1 ml; AP-Red Solution B, 4 ml; HRP-Green Solution A, 0.2 ml; HRP-Green Solution B, 4 ml; Nuclear Blue Solution, 4 ml; Mounting Solution (alcoholic), 1 ml	DIG/DNP	10
C-3022-40	ZytoDot 2C SPEC ERBB2/CEN 17 Probe Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; Probe, 0.4 ml; Wash Buffer SSC, 560 ml; 20x Wash Buffer TBS, 2x 50 ml; Anti-DIG/DNP-Mix, 4 ml; HRP/AP-Polymer-Mix, 4 ml; AP-Red Solution A, 0.4 ml; AP-Red Solution B, 15 ml; HRP-Green Solution A, 0.8 ml; HRP-Green Solution B, 15 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml	DIG/DNP	40

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoDot ® 2C SPEC ERBB2/D17S122 Probe

RUO

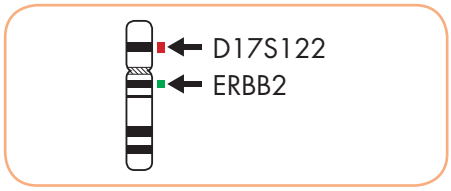
Background

The ZytoDot ® 2C SPEC ERBB2/D17S122 Probe (PD48) is intended to be used for the qualitative detection of human ERBB2 gene amplifications as well as the detection of the D17S122 locus in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot ® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).

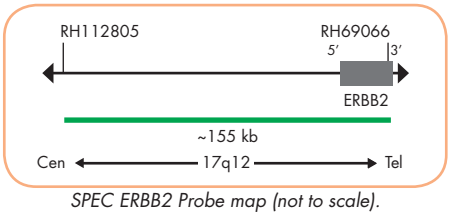
Probe Description

The ZytoDot ® 2C SPEC ERBB2/D17S122 Probe is composed of:

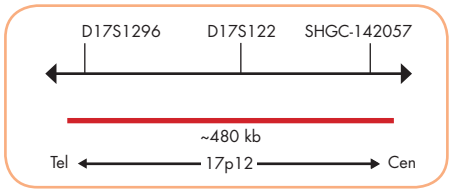
- Digoxigenin-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 17q12** (chr17:37,725,661-37,882,844) harboring the ERBB2 gene region.
- Dinitrophenyl-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 17p12** (chr17:14,954,785-15,434,017) harboring the D17S122 locus.
- Formamide based hybridization buffer



Ideogram of chromosome 17 indicating the hybridization locations.



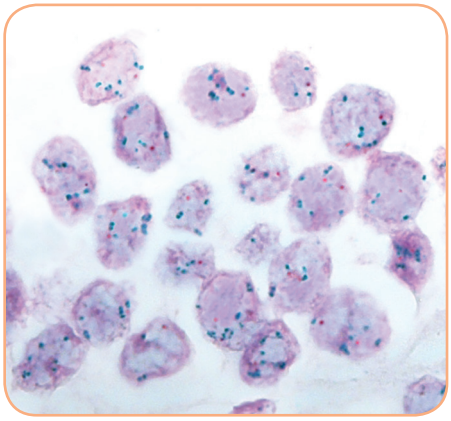
SPEC ERBB2 Probe map (not to scale).



SPEC D17S122 Probe map (not to scale).

Results

In a normal interphase nucleus, using the ZytoDot ® 2C CISH Implementation Kit, two green (ERBB2) and two red (D17S122) signals are expected. In a cell with amplification of the ERBB2 gene locus or polysomy of chromosome 17, multiple copies of the green signal or green signal clusters will be observed.



Example of an aberrant signal pattern: Breast cancer tissue section with amplification of the ERBB2 gene as indicated by multiple green signals in relation to red (D17S122) signals in each nucleus.

Prod. No.	Product	Label	Tests* (Volume)
C-3068-100	ZytoDot 2C SPEC ERBB2/D17S122 Probe RUO	DIG/DNP	10 (100 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoDot® 2C SPEC TOP2A/CEN 17 Probe

RUO

Background

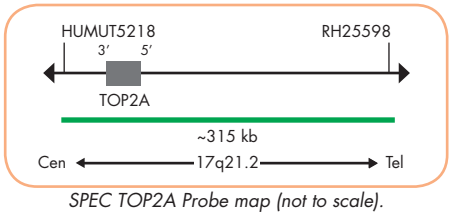
The ZytoDot® 2C SPEC TOP2A/CEN 17 Probe (PD23) is intended to be used for the qualitative detection of human TOP2A gene amplifications and the detection of chromosome 17 alpha satellites in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).

Probe Description

The ZytoDot® 2C SPEC TOP2A/CEN 17 Probe is composed of:

- Digoxigenin-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 17q21.2** (chr17:38,501,231-38,818,030) harboring the TOP2A gene region.
- Dinitrophenyl-labeled polynucleotides (~1.1 ng/µl), which target sequences mapping in 17p11.1-q11.1 specific for the alpha satellite centromeric region D17Z1 of chromosome 17.
- Formamide based hybridization buffer

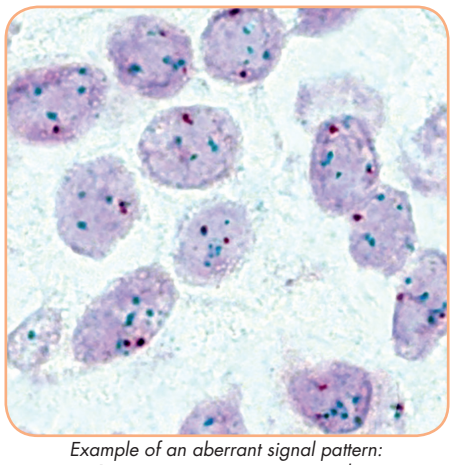
Ideogram of chromosome 17 indicating the hybridization locations.



SPEC TOP2A Probe map (not to scale).

Results

In a normal interphase nucleus, using the ZytoDot® 2C CISH Implementation Kit two green and two red signals are expected. In a cell with amplification of the TOP2A gene locus, multiple copies of the green signal or green signal clusters will be observed.



Example of an aberrant signal pattern: Breast cancer tissue section with TOP2A amplification as indicated by multiple green signals per nucleus.

Prod. No.	Product	Label	Tests* (Volume)
C-3040-400	ZytoDot 2C SPEC TOP2A/CEN 17 Probe RUO	DIG/DNP	40 (400 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoDot® 2C SPEC SS18 Break Apart Probe

CE IVD

Background

The ZytoDot® 2C SPEC SS18 Break Apart Probe (PD26) is intended to be used for the qualitative detection of translocations involving the human SS18 gene at 18q11.2 in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).

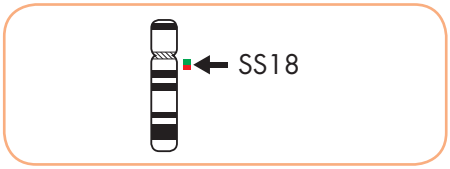
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

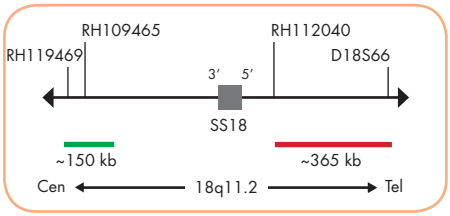
Probe Description

The ZytoDot® 2C SPEC SS18 Break Apart Probe is composed of:

- Digoxigenin-labeled polynucleotides (~0.50 ng/µl), which target sequences mapping in 18q11.2** (chr18:23,109,942-23,262,464) proximal to the SS18 breakpoint region.
- Dinitrophenyl-labeled polynucleotides (~0.75 ng/µl), which target sequences mapping in 18q11.2** (chr18:23,772,255-24,137,169) distal to the SS18 breakpoint region.
- Formamide based hybridization buffer



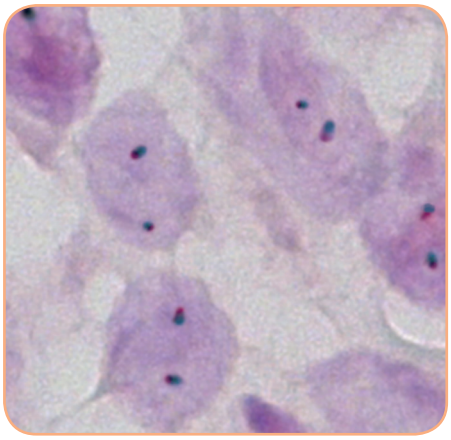
Ideogram of chromosome 18 indicating the hybridization locations.



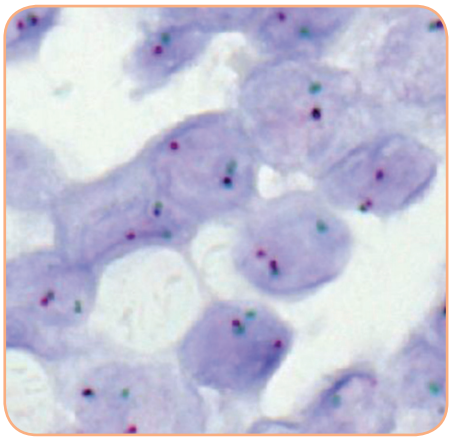
SPEC SS18 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 18q11.2 band, using the ZytoDot® 2C CISH Implementation Kit two red/green fusion signals are expected representing two normal (non-rearranged) 18q11.2 loci. A signal pattern consisting of one red/green fusion signal, one red signal, and a separate green signal indicates one normal 18q11.2 locus and one 18q11.2 locus affected by an 18q11.2 translocation.



SPEC SS18 Break Apart Probe hybridized to normal interphase cells as indicated by two red/green fusion signals per nucleus.



Example of an aberrant signal pattern: Synovial sarcoma tissue section with translocation affecting the 18q11.2 locus as indicated by one non-rearranged red/green fusion signal, one red signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
C-3046-100	ZytoDot 2C SPEC SS18 Break Apart Probe CE IVD	DIG/DNP	10 (100 µl)
Related Products			
C-3044-10	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 20x Wash Buffer TBS, 50 ml; Anti-DIG/DNP-Mix, 1 ml; HRP/AP-Polymer-Mix,1 ml; AP-Red Solution A, 0.1 ml; AP-Red Solution B, 4 ml; HRP-Green Solution A, 0.2 ml; HRP-Green Solution B, 4 ml; Nuclear Blue Solution, 4 ml; Mounting Solution (alcoholic), 1 ml		10

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

***According to Human Genome Assembly GRCh37/hg19*

ZytoDot® 2C SPEC BCL2 Break Apart Probe

CE IVD

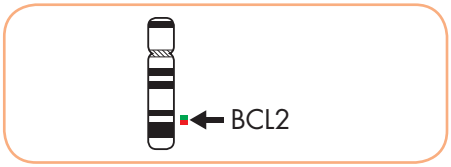
Background

The ZytoDot® 2C SPEC BCL2 Break Apart Probe (PD53) is intended to be used for the qualitative detection of translocations involving the human BCL2 gene at 18q21.33 in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

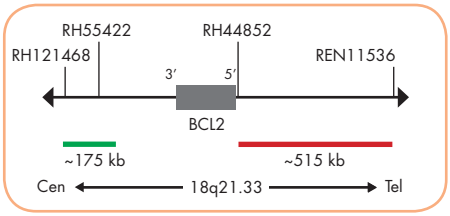
Probe Description

The ZytoDot® 2C SPEC BCL2 Break Apart Probe is composed of:

- Digoxigenin-labeled polynucleotides (~0.50 ng/µl), which target sequences mapping in 18q21.33** (chr18:60,415,418-60,589,273) proximal to the BCL2 breakpoint region.
- Dinitrophenyl-labeled polynucleotides (~0.75 ng/µl), which target sequences mapping in 18q21.33** (chr18:60,994,528-61,507,691) distal to the BCL2 breakpoint region.
- Formamide based hybridization buffer



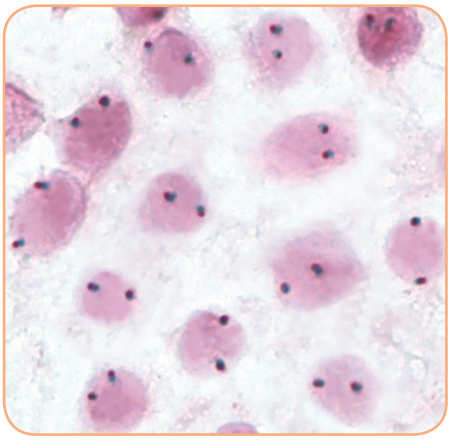
Ideogram of chromosome 18 indicating the hybridization locations.



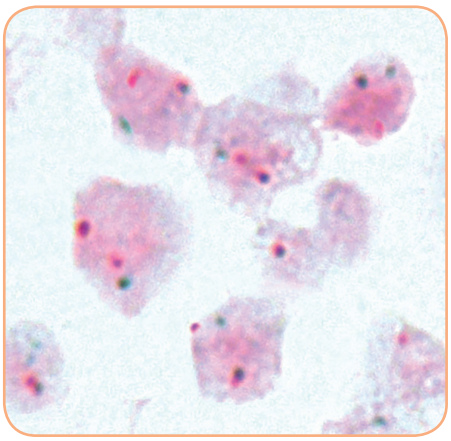
SPEC BCL2 Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 18q21.33 band, using the ZytoDot® 2C CISH Implementation Kit, two red/green fusion signals are expected representing two normal (non-rearranged) 18q21.33 loci. A signal pattern consisting of one red/green fusion signal, one red signal, and a separate green signal indicates one normal 18q21.33 locus and one 18q21.33 locus affected by a translocation.



SPEC BCL2 Break Apart Probe hybridized to normal interphase cells as indicated by two red/green fusion signals per nucleus.



Example of an aberrant signal pattern: Lymphoma tissue section with translocation affecting the 18q21.33 locus as indicated by one red/green fusion (non-rearranged) signal, one red signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
C-3073-100	ZytoDot 2C SPEC BCL2 Break Apart Probe CE IVD	DIG/DNP	10 (100 µl)
Related Products			
C-3044-10	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 20x Wash Buffer TBS, 50 ml; Anti-DIG/DNP-Mix, 1 ml; HRP/AP-Polymer-Mix,1 ml; AP-Red Solution A, 0.1 ml; AP-Red Solution B, 4 ml; HRP-Green Solution A, 0.2 ml; HRP-Green Solution B, 4 ml; Nuclear Blue Solution, 4 ml; Mounting Solution (alcoholic), 1 ml		10

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoDot® 2C SPEC MALT1 Break Apart Probe

RUO

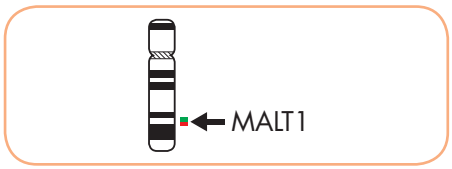
Background

The ZytoDot® 2C SPEC MALT1 Break Apart Probe (PD52) is intended to be used for the qualitative detection of translocations involving the human MALT1 gene at 18q21.32 in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).

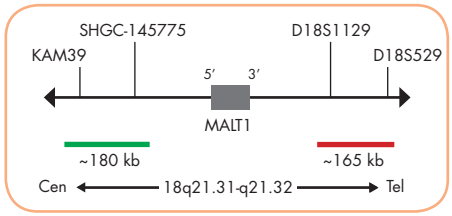
Probe Description

The ZytoDot® 2C SPEC MALT1 Break Apart Probe is composed of:

- Digoxigenin-labeled polynucleotides (~0.50 ng/µl), which target sequences mapping in 18q21.31-q21.32** (chr18:56,021,766-56,202,885) proximal to the MALT1 breakpoint region.
- Dinitrophenyl-labeled polynucleotides (~0.75 ng/µl), which target sequences mapping in 18q21.32** (chr18:56,557,814-56,724,408) distal to the MALT1 breakpoint region
- Formamide based hybridization buffer



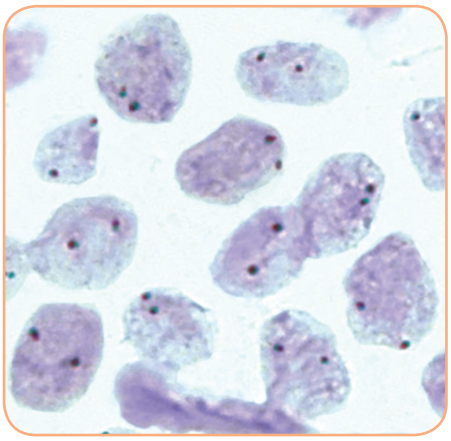
Ideogram of chromosome 18 indicating the hybridization locations.



SPEC MALT1 Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking a translocation involving the 18q21.31-q21.32 band, using the ZytoDot® 2C CISH Implementation Kit, two red/green fusion signals are expected representing two normal (non-rearranged) 18q21.31-q21.32 loci. A signal pattern consisting of one red/green fusion signal, one red signal, and a separate green signal indicates one normal 18q21.31-q21.32 locus and one 18q21.31-q21.32 locus affected by a translocation.



SPEC MALT1 Break Apart Probe hybridized to normal interphase cells as indicated by two red/green fusion signals per nucleus.

Prod. No.	Product	Label	Tests* (Volume)
C-3072-100	ZytoDot 2C SPEC MALT1 Break Apart Probe RUO	DIG/DNP	10 (100 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoDot® 2C SPEC ERG Break Apart Probe

RUO

Background

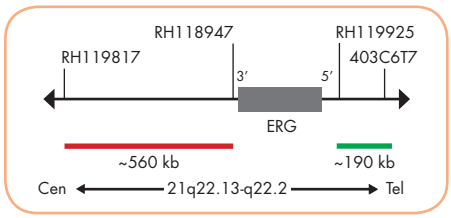
The ZytoDot® 2C SPEC ERG Break Apart Probe (PD38) is intended to be used for the qualitative detection of translocations involving the human ERG gene at 21q22.2 in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).

Probe Description

The ZytoDot® 2C SPEC ERG Break Apart Probe is composed of:

- Digoxigenin-labeled polynucleotides (~0.50 ng/µl), which target sequences mapping in 21q22.2** (chr21:40,078,039-40,269,979) distal to the ERG breakpoint region.
- Dinitrophenyl-labeled polynucleotides (~0.75 ng/µl), which target sequences mapping in 21q22.13- 21q22.2** (chr21:39,171,790-39,733,849) proximal to the ERG breakpoint region.
- Formamide based hybridization buffer

Ideogram of chromosome 21 indicating the hybridization locations.



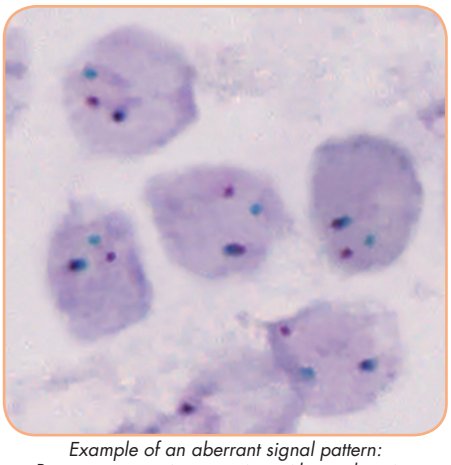
SPEC ERG Probe map (not to scale).

Results

In an interphase nucleus of a normal cell lacking an aberration involving the 21q22.13-q22.2 band, using the ZytoDot® 2C CISH Implementation Kit, two red/green fusion signals are expected representing the two normal (non-rearranged) 21q22.13-q22.2 loci.

A 21q22.13-q22.2 locus affected by a 21q22.2 deletion resulting in the TMPRSS2-ERG fusion is indicated by the loss of one green signal.

A signal pattern consisting of one red/green fusion signal, a separate green, and a separate red signal indicates an ERG translocation without involvement of TMPRSS2 (e.g. SLC45A3-ERG).



Example of an aberrant signal pattern: Prostate cancer tissue section with translocation affecting the 21q22.13-q22.2 locus as indicated by one non-rearranged red/green fusion signal, one red signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
C-3058-400	ZytoDot 2C SPEC ERG Break Apart Probe RUO	DIG/DNP	40 (400 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoDot® 2C SPEC EWSR1 Break Apart Probe

CE IVD

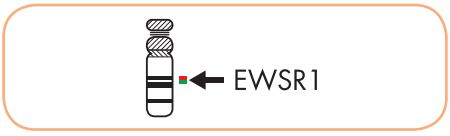
Background

The ZytoDot® 2C SPEC EWSR1 Break Apart Probe (PD24) is intended to be used for the qualitative detection of translocations involving the human EWSR1 gene at 22q12.2 in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot® 2C CISH Implementation Kit (Prod. No. C-3044-10/-40).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

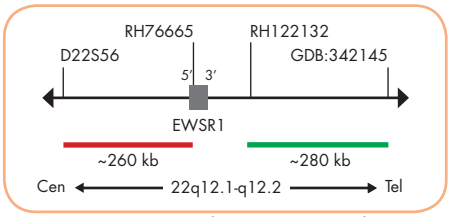
Probe Description

The ZytoDot® 2C SPEC EWSR1 Break Apart Probe is composed of:

- Digoxigenin-labeled polynucleotides (~0.50 ng/µl), which target sequences mapping in 22q12.2** (chr22:29,779,841-30,057,928) distal to the EWSR1 breakpoint region.
- Dinitrophenyl-labeled polynucleotides (~0.75 ng/µl), which target sequences mapping in 22q12.1-22q12.2** (chr22:29,413,831-29,673,440) proximal to the EWSR1 breakpoint region.
- Formamide based hybridization buffer



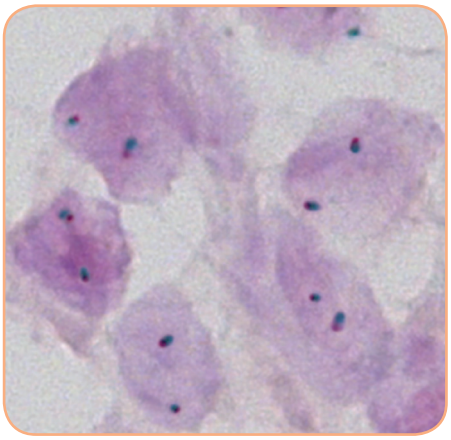
Ideogram of chromosome 22 indicating the hybridization locations.



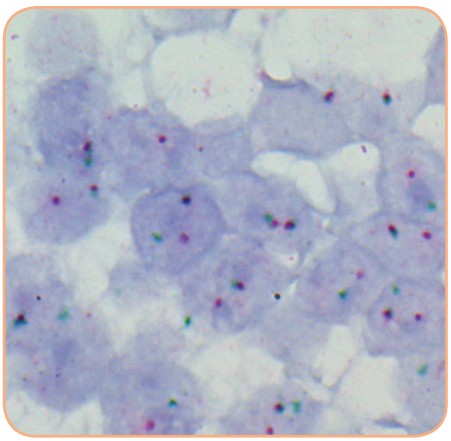
SPEC EWSR1 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 22q12.1-q12.2 band, using the ZytoDot® 2C CISH Implementation Kit two red/green fusion signals are expected representing two normal (non-rearranged) 22q12.1-q12.2 loci. A signal pattern consisting of one red/green fusion signal, one red signal, and a separate green signal indicates one normal 22q12.1-q12.2 locus and one 22q12.1-q12.2 locus affected by a 22q12.1-q12.2 translocation.



SPEC EWSR1 Break Apart Probe hybridized to normal interphase cells as indicated by two red/green fusion signals per nucleus.



Example of an aberrant signal pattern: Ewing sarcoma tissue section with translocation affecting the 22q12.1-q12.2 locus as indicated by one non-rearranged red/green fusion signal, one red signal, and one separate green signal.

Prod. No.	Product	Label	Tests* (Volume)
C-3043-100	ZytoDot 2C SPEC EWSR1 Break Apart Probe CE IVD	DIG/DNP	10 (100 µl)
Related Products			
C-3044-10	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 20x Wash Buffer TBS, 50 ml; Anti-DIG/DNP-Mix, 1 ml; HRP/AP-Polymer-Mix,1 ml; AP-Red Solution A, 0.1 ml; AP-Red Solution B, 4 ml; HRP-Green Solution A, 0.2 ml; HRP-Green Solution B, 4 ml; Nuclear Blue Solution, 4 ml; Mounting Solution (alcoholic), 1 ml		10

** Using 10 µl probe solution per test.* IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
***According to Human Genome Assembly GRCh37/hg19*

ZytoDot® Probes for Chromosome Enumeration

RUO

Background

The ZytoDot® Chromosome Enumeration Probes are designed for identification and enumeration of human chromosomes in interphase cells and as an adjunct to standard karyotyping in metaphases. These probes will produce sharp, bright signals specific for each individual chromosome.

CEN Probe Description

For most chromosomes, direct labeled ZytoDot® CEN™ Probes hybridizing to highly repetitive human satellite DNA sequences mainly located at the centromeric regions of chromosomes are applicable.

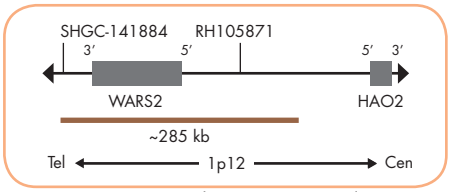
SPEC Probe Description

As several chromosomes share the same repetitive sequences resulting in cross-hybridization signals, they cannot be differentiated by centromere specific probes. Instead these chromosomes can be identified by direct labeled ZytoDot® SPEC™ Probes hybridizing in close proximity to the respective satellite DNA sequences or to other chromosome specific loci.

ZytoDot® SPEC Probe Maps

The ZytoDot® SPEC 1p12 Probe is composed of:

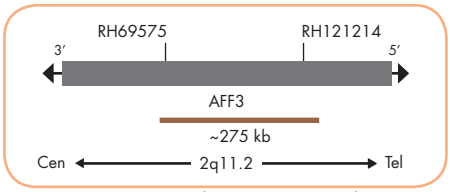
- Digoxigenin-labeled polynucleotides (~1.8 ng/µl), which target sequences mapping in 1p12** (chr1:119,537,082-119,664,354 [...] 119,712,804-119,823,167).
- Formamide based hybridization buffer



SPEC 1p12 Probe map (not to scale).

The ZytoDot® SPEC 2q11 Probe is composed of:

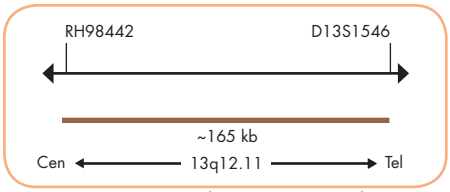
- Digoxigenin-labeled polynucleotides (~1.8 ng/µl), which target sequences mapping in 2q11.2** (chr2:100,346,637-100,621,745).
- Formamide based hybridization buffer



SPEC 2q11 Probe map (not to scale).

The ZytoDot® SPEC 13q12 Probe is composed of:

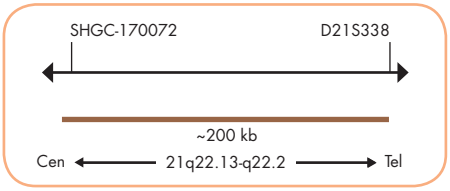
- Digoxigenin-labeled polynucleotides (~1.8 ng/µl), which target sequences mapping in 13q12.11** (chr13:20,609,044-20,776,358).
- Formamide based hybridization buffer



SPEC 13q12 Probe map (not to scale).

The ZytoDot® SPEC 21q22 Probe is composed of:

- Digoxigenin-labeled polynucleotides (~1.8 ng/µl), which target sequences mapping in 21q22.13-q22.2** (chr21:39,583,050-39,784,793).
- Formamide based hybridization buffer



SPEC 21q22 Probe map (not to scale).

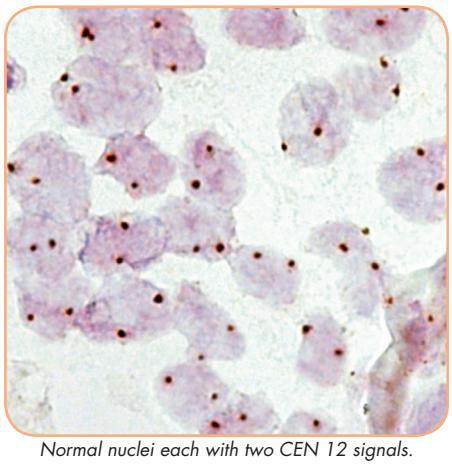
Results

In a normal interphase nucleus, two signals are expected using Chromosome Enumeration Probes specific for autosomes. Using chromosome Y specific probes will result in normal male cells in one signal and in normal female cells in no signal. Using chromosome X specific probes will result in normal male cells in one signal and in normal female cells in two signals per nucleus. Other signal patterns indicate numerical aberrations of the respective chromosome.

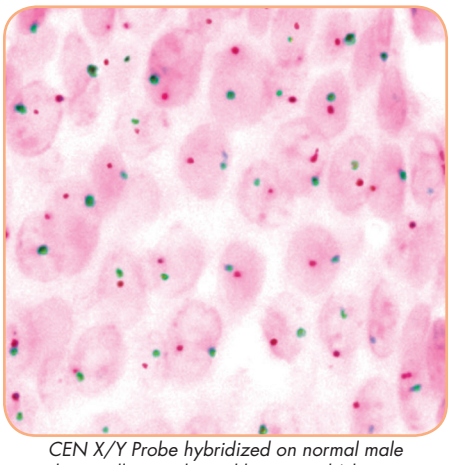
***According to Human Genome Assembly GRCh37/hg19*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

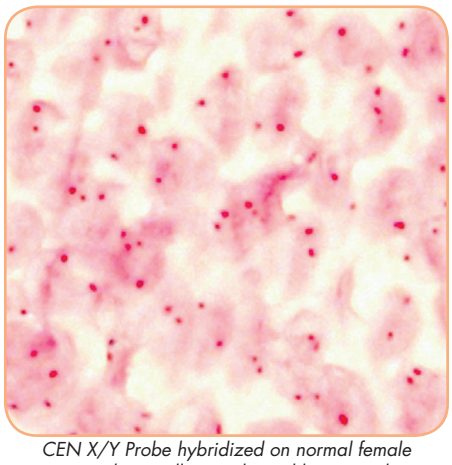
RUO



Normal nuclei each with two CEN 12 signals.



CEN X/Y Probe hybridized on normal male interphase cells as indicated by one red (chromosome X) and one green (chromosome Y) signal per nucleus.



CEN X/Y Probe hybridized on normal female interphase cells as indicated by two red (chromosome X) signals per nucleus.

Prod. No.	Product	Alpha/Class. Sat.	Chr. Band	Label	Tests* (Volume)
C-3035-400	ZytoDot SPEC 1p12 Probe RUO	-	1p12	DIG	40 (400 µl)
C-3051-400	ZytoDot SPEC 2q11 Probe RUO	-	2q11.2	DIG	40 (400 µl)
C-3045-400	ZytoDot CEN 3 Probe RUO	D3Z1	3p11.1-q11.1	DIG	40 (400 µl)
C-3002-400	ZytoDot CEN 6 Probe RUO	D6Z1	6p11.1-q11	DIG	40 (400 µl)
C-3008-400	ZytoDot CEN 7 Probe RUO	D7Z1	7p11.1-q11.1	DIG	40 (400 µl)
C-3016-400	ZytoDot CEN 8 Probe RUO	D8Z2	8p11.1-q11.1	DIG	40 (400 µl)
C-3014-400	ZytoDot CEN 12 Probe RUO	D12Z3	12p11.1-q11	DIG	40 (400 µl)
C-3052-400	ZytoDot SPEC 13q12 Probe RUO	-	13q12.11	DIG	40 (400 µl)
C-3006-400	ZytoDot CEN 17 Probe RUO	D17Z1	17p11.1-q11.1	DIG	40 (400 µl)
C-3026-400	ZytoDot SPEC 21q22 Probe RUO	-	21q22.13-q22.2	DIG	40 (400 µl)
C-3025-400	ZytoDot CEN X Probe RUO	DXZ1	Xp11.1-q11.1	DIG	40 (400 µl)
C-3020-400	ZytoDot CEN Yq12 Probe RUO	III DYZ1	Yq12	DIG	40 (400 µl)
C-3048-400	ZytoDot 2C CEN X/Y Probe RUO	DXZ1/DYZ3	Xp11.1-q11.1/Yp11.1-q11.1	DNP/DIG	40 (400 µl)

** Using 10 µl probe solution per test. **According to Human Genome Assembly GRCh37/hg19*
RUO *For Research Use Only. Not for use in diagnostic procedures.*

Accessories

ZytoDot ® Kits

For the detection of Digoxigenin-labeled ZytoDot ® Probes

Prod. No.	Product	Tests
C-3018-40	ZytoDot CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; PBS/Tween, good for 2000 ml; Blocking Solution, 4 ml; Mouse-anti-DIG, 4 ml; Anti-Mouse-HRP-Polymer, 4 ml; DAB Solution A, 0.3 ml; DAB Solution B, 10 ml; Mayer's Hematoxylin Solution, 20 ml; Mounting Solution (alcoholic), 4 ml	40

ZytoDot ® 2C Kits

For the detection of Digoxigenin/Dinitrophenyl-labeled ZytoDot ® 2C Probes

Prod. No.	Product	Tests
C-3044-10	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 20x Wash Buffer TBS, 50 ml; Anti-DIG/DNP-Mix, 1 ml; HRP/AP-Polymer-Mix, 1 ml; AP-Red Solution A, 0.2 ml; AP-Red Solution B, 4 ml; HRP-Green Solution A, 0.2 ml; HRP-Green Solution B, 4 ml; Nuclear Blue Solution, 4 ml; Mounting Solution (alcoholic), 1 ml	10
C-3044-40	ZytoDot 2C CISH Implementation Kit CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 ml; 20x Wash Buffer TBS, 2x 50 ml; Anti-DIG/DNP-Mix, 4 ml; HRP/AP-Polymer-Mix, 4 ml; AP-Red Solution A, 0.5 ml; AP-Red Solution B, 15 ml; HRP-Green Solution A, 0.8 ml; HRP-Green Solution B, 15 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml	40

ZytoDot ® Pretreatment Reagents

Prod. No.	Product
ES-0001-4	Pepsin Solution, 4 ml CE IVD
ES-0001-50	Pepsin Solution, 50 ml CE IVD
ES-0001-1000	Pepsin Solution, 1000 ml CE IVD
PT-0002-500	Heat Pretreatment Solution EDTA, 500 ml CE IVD

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

Accessories

ZytoDot® Wash Buffers & Ancillary Reagents

Prod. No.	Product
AB-0001-4	Mouse-anti-DIG, 4 ml CE IVD
AB-0002-4	Anti-Mouse-HRP-Polymer, 4 ml CE IVD
AB-0013-4	HRP/AP-Polymer-Mix, 4 ml CE IVD
AB-0014-4	Anti-DIG/DNP-Mix, 4 ml CE IVD
BS-0001-4	Blocking Solution, 4 ml CE IVD
C-3015-100	DAB Solution Set CE IVD Incl. DAB Solution A, 0.3 ml; DAB Solution B, 10 ml; good for 10 ml DAB Solution
C-3038-100	ZytoDot AP-Red Solution Set CE IVD Incl. AP-Red Solution A, 0.5 ml; AP-Red Solution B, 15 ml; good for 15 ml AP-Red Solution
C-3039-100	ZytoDot HRP-Green Solution Set CE IVD Incl. HRP-Green Solution A, 0.8 ml; HRP-Green Solution B, 15 ml; good for 15 ml HRP-Green Solution
CS-0001-20	Mayer's Hematoxylin Solution, 20 ml CE IVD
CS-0002-20	Nuclear Blue Solution, 20 ml CE IVD
MT-0004-4	Mounting Solution (alcoholic), 4 ml CE IVD
WB-0001-560	Wash Buffer SSC, 560 ml CE IVD
WB-0004-1000	PBS/Tween, good for 1000 ml CE IVD
WB-0005-50	20x Wash Buffer TBS, 50 ml CE IVD

Accessories for Research Use Only

ZytoDot® Ancillary Reagents

Prod. No.	Product
E-4007-2	ERBB2 Control Slide Set, 2 pcs. RUO

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

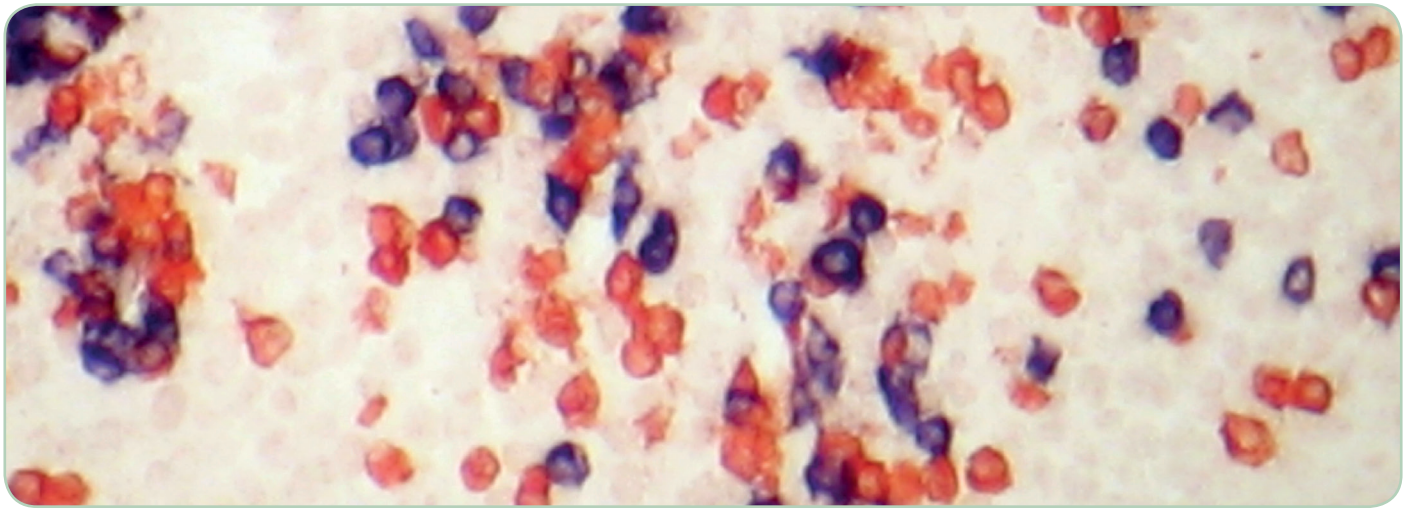
RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoFast® Products for CISH analysis

ZytoFast® PLUS Products for CISH analysis

263

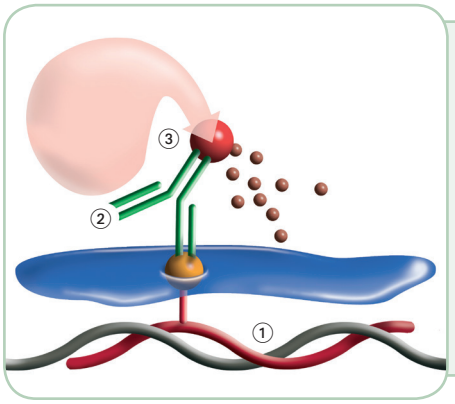
Achieving Chromogenic *in situ* Hybridization Results in just 4 Hours!



Introduction
The Zyto*Fast* ® products are designed for outstandingly fast detection and determination of lymphocyte clonality by detecting IGK and IGL light chain RNA by Chromogenic *in situ* Hybridization (CISH) in formalin-fixed, paraffin-embedded (FFPE) specimens..

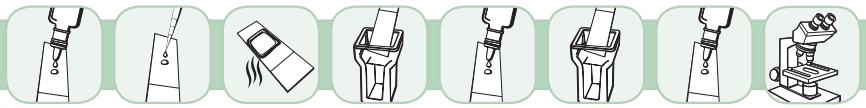
Zyto*Fast* ®: Outstandingly fast CISH
Optimized protocols and faster tissue penetration due to short oligonucleotide probes of the Zyto*Fast* ® system, make the Zyto*Fast* ® CISH procedure outstandingly fast.
Results can be achieved within just 5 hours, hands-on time is about 3 hours!

Advantages of CISH
- Simultaneous observation of tissue morphology and CISH signals
- No risk of false positives due to mis-priming or contamination as with PCR
- Easy method comparable to IHC
- No costly equipment needed
- Ability to test archival specimens

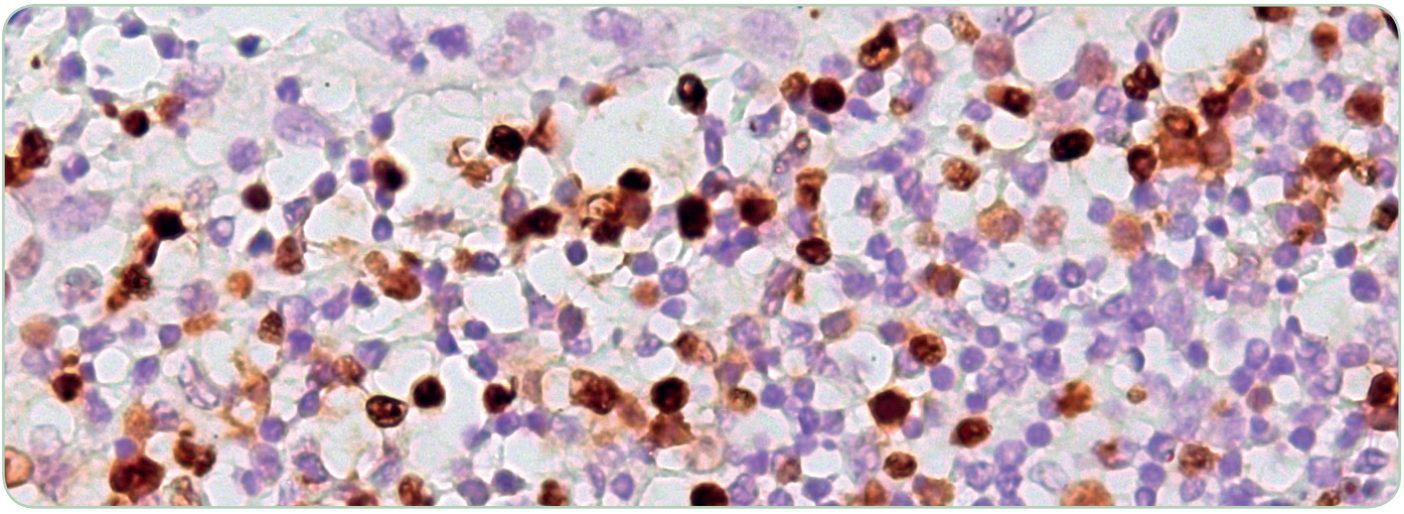


The Zyto*Fast* ® system uses oligonucleotide probes tagged with Biotin and Digoxigenin ① which are detected using HRP-conjugated antibodies and AP-conjugated streptavidin targeting the tags ②. The enzymatic reaction of chromogenic substrates ③, e.g. BCIP/NBT and AEC, leads to the formation of strong color precipitates that can be visualized by light microscopy.

Protocol Overview



ZytoFast® PLUS for Increased Sensitivity!



Introduction

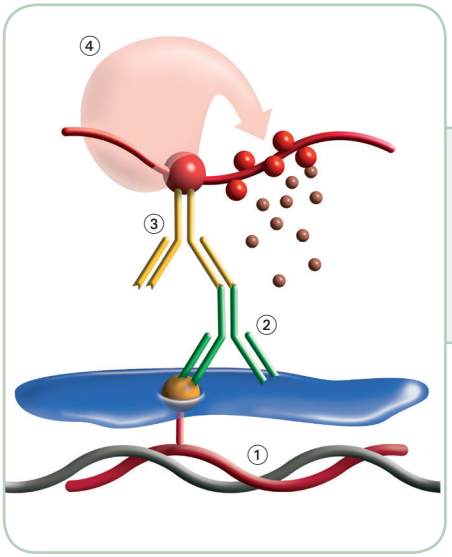
The ZytoFast® PLUS products are designed for outstandingly fast detection and discrimination of human pathogen viruses, e.g. HPV and EBV and the determination of lymphocyte clonality by detecting IGK and IGL light chain RNA by Chromogenic *in situ* Hybridization (CISH) in formalin-fixed, paraffin-embedded (FFPE) specimens. The signal intensity of ZytoFast® probes is increased even more when using the ZytoFast® PLUS Implementation Kits.

ZytoFast® PLUS – Outstandingly fast and sensitive CISH

Depending on the time required for dewaxing and pretreatment of tissue sections, ZytoFast® PLUS protocols can be performed within approx. 4 hours! Thus, due to optimized protocols, the ZytoFast® PLUS method takes only slightly more time compared to ZytoFast® protocols while being much more sensitive!

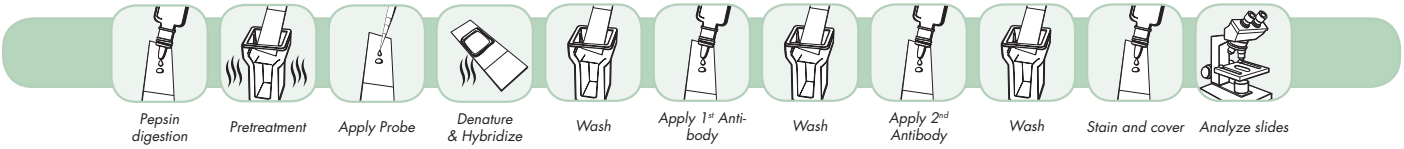
ZytoFast® PLUS – Flexibility that meets your needs

Several ZytoFast® PLUS CISH Implementation Kits using different enzyme/substrate combinations can be combined with any separately available Digoxigenin-labeled ZytoFast® probe to meet your preferences concerning the detection chemistry and counterstaining. Each ZytoFast® PLUS CISH Implementation Kit includes a detailed protocol and all necessary reagents for versatile use in DNA as well as RNA *in situ* hybridizations.



The ZytoFast® PLUS system uses Digoxigenin-labeled probes ① which are detected using primary antibodies ②. These antibodies are detected by polymerized enzyme-conjugated secondary antibodies ③. The enzymatic reaction of chromogenic substrates ④, e.g. DAB, leads to the formation of strong color precipitates that can be visualized by light microscopy.

Protocol Overview



Virus Index

Virus Index	Product Name	Label	Product No.	Quantity	Page
HPV	ZytoFast HPV type 6/11 Probe CE IVD	DIG	T-1055-400	400 µl	269
	ZytoFast HPV type 16/18 Probe CE IVD	DIG	T-1056-400	400 µl	269
	ZytoFast HPV type 31/33 Probe CE IVD	DIG	T-1057-400	400 µl	269
	ZytoFast HPV High-Risk (HR) Types Probe CE IVD (specific for HPV type 16/18/31/33/35/39/45/51/52/56/58/59/66/68/82)	DIG	T-1140-400	400 µl	268
	ZytoFast HPV Screening Probe CE IVD (specific for HPV type 6/11/16/18/31/33/35/39/45/51/52/56/58/59/66/68/82)	DIG	T-1144-400	400 µl	270
EBV	ZytoFast EBV Probe CE IVD	DIG	T-1114-400	400 µl	271
CMV	ZytoFast CMV Probe RUO	DIG	T-1113-400	400 µl	272

mRNA Index

mRNA Index	Product Name	Label	Product No.	Quantity	Page
Ig-kappa	ZytoFast human Ig-kappa Probe CE IVD	DIG	T-1115-400	400 µl	273 f.
	ZytoFast human Ig-kappa/Ig-lambda Probe CE IVD	DIG/Biotin	T-1017-400	400 µl	273 f.
	ZytoFast human Ig-kappa/Ig-lambda CISH Kit CE IVD	DIG/Biotin	T-1005-40	40 tests	273 f.
	ZytoFast human Ig-kappa/Ig-lambda Permanent CISH Kit CE IVD	DIG/Biotin	T-1105-40	40 tests	273 f.
Ig-lambda	ZytoFast human Ig-lambda Probe CE IVD	DIG	T-1116-400	400 µl	273 f.
	ZytoFast human Ig-kappa/Ig-lambda Probe CE IVD	DIG/Biotin	T-1017-400	400 µl	273 f.
	ZytoFast human Ig-kappa/Ig-lambda CISH Kit CE IVD	DIG/Biotin	T-1005-40	40 tests	273 f.
	ZytoFast human Ig-kappa/Ig-lambda Permanent CISH Kit CE IVD	DIG/Biotin	T-1105-40	40 tests	273 f.

IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.

RUO For Research Use Only. Not for use in diagnostic procedures.

Indication Index

Indication	Product Name	Label	Product No.	Quantity	Page
Solid Tumors Specific Probes					
Cervical Cancer					
Cervical Carcinoma	ZytoFast HPV High-Risk (HR) Types Probe CE IVD	DIG	T-1140-400	400 µl	268
Head and Neck Cancer					
Oropharyngeal Squamous Cell Cancer (OSCC)	ZytoFast HPV High-Risk (HR) Types Probe CE IVD	DIG	T-1140-400	400 µl	268
Hematology Specific Probes					
Lymphoma					
Diffuse Large B-Cell Lymphoma (DLBCL)	ZytoFast EBV Probe CE IVD	DIG	T-1114-400	400 µl	271
Hodgkin Lymphoma	ZytoFast EBV Probe CE IVD	DIG	T-1114-400	400 µl	271
Multiple Myeloma	ZytoFast human Ig-kappa Probe CE IVD	DIG	T-1115-400	400 µl	273 f.
	ZytoFast human Ig-lambda Probe CE IVD	DIG	T-1116-400	400 µl	273 f.
	ZytoFast human Ig-kappa/Ig-lambda Probe CE IVD	DIG/Biotin	T-1017-400	400 µl	273 f.
	ZytoFast human Ig-kappa/Ig-lambda CISH Kit CE IVD	DIG/Biotin	T-1005-40	40 tests	273 f.
	ZytoFast human Ig-kappa/Ig-lambda Permanent CISH Kit CE IVD	DIG/Biotin	T-1105-40	40 tests	273 f.

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

ZytoFast® HPV High-Risk (HR) Types Probe

CE IVD

Background

The ZytoFast® HPV High-Risk (HR) Types Probe (PF46) is intended to be used for the qualitative detection of human papillomavirus (HPV) type 16/18/31/33/35/39/45/51/52/56/58/59/66/68/82 DNA in formalin-fixed, paraffin-embedded specimens, such as cervical carcinoma and oropharyngeal squamous cell cancer (OSCC), by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoFast® PLUS CISH Implementation Kit HRP-DAB (Prod. No. T-1063-40).

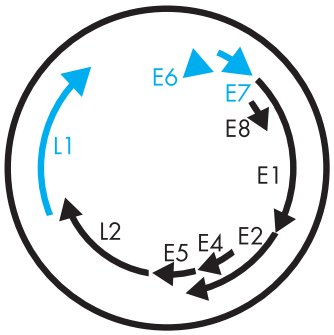
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.

The probe is intended to be used as an aid to the differential diagnosis of cervical carcinoma and OSCC and therapeutic measures should not be initiated based on the test result alone.

Probe Description

ZytoFast® HPV High-Risk (HR) Probe (PF46) is composed of:

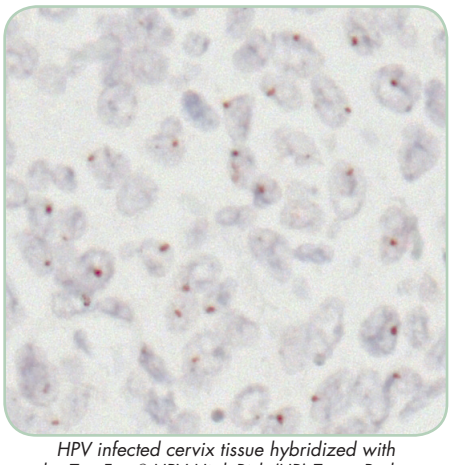
- Digoxigenin-labeled oligonucleotides (~ 2.2 ng/µl) specific for HPV type 16/18/31/33/35/39/45/51/52/56/58/59/66/68/82, which target DNA sequences encoding for HPV 16/18/31/33/ 35/39/45/51/52/56/58/59/66/68/82 proteins E6, E7, and/or L1.
- The probe also targets the respective RNA sequences of E6, E7, and/or L1 proteins, which are expressed during some stages of infection.
- Formamide based hybridization buffer



Schematic representation of the HPV genome with E and L open reading frames. Genomic regions targeted by ZytoFast® HPV specific oligonucleotides are indicated in blue.

Results

A positive reactivity for HPV DNA in epithelial cells is indicated by a distinctly stained nucleus. Due to the detection of HPV DNA as well as E6, E7, and/or L1 RNAs, depending on the infection stage, cytoplasmic staining might be observed additionally. Colored precipitates, which can be clearly distinguished from the background, will be dark brown when using DAB as substrate for the detection.



HPV infected cervix tissue hybridized with the ZytoFast® HPV High-Risk (HR) Types Probe, detected with the ZytoFast® PLUS CISH Implementation Kit HRP-DAB.

Prod. No.	Product	Label	Tests* (Volume)
T-1140-400	ZytoFast HPV High-Risk (HR) Types Probe (specific for HPV type 16/18/31/33/35/39/45/51/52/56/58/59/66/68/82) CE IVD	DIG	40 (400 µl)
Related Products			
T-1063-40	ZytoFast PLUS CISH Implementation Kit HRP-DAB CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 4x 50 ml; Mouse-anti-DIG, 4 ml; Anti-Mouse-HRP-Polymer, 4 ml; DAB Solution A, 0.3 ml; DAB Solution B, 10 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml		40

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

ZytoFast® HPV-CISH System

CE IVD

Background

The ZytoFast® HPV type 6/11 Probe (PF25) is intended to be used for the qualitative detection of human papillomavirus (HPV) type 6/11 DNA in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH).

The ZytoFast® HPV type 16/18 Probe (PF26) is intended to be used for the qualitative detection of human papillomavirus (HPV) type 16/18 DNA in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH).

The ZytoFast® HPV type 31/33 Probe (PF27) is intended to be used for the qualitative detection of human papillomavirus (HPV) type 31/33 DNA in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH).

The probes are intended to be used in combination with the ZytoFast® PLUS CISH Implementation Kit HRP-DAB (Prod. No. T-1063-40).

The products are intended for professional use only. All tests using these products should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel. The probes are intended to be used as an aid to the differential diagnosis of various cancers and therapeutic measures should not be initiated based on the test result alone.

Probe Description

ZytoFast® HPV type 6/11 Probe is composed of:

- Digoxigenin-labeled oligonucleotides (~ 0.6 ng/µl) specific for HPV type 6/11, which target DNA sequences encoding for HPV 6/11 proteins E6, E7, and/or L1.
- The probe also targets the respective RNA sequences of E6, E7, and/or L1 proteins, which are expressed during some stages of infection.
- Formamide based hybridization buffer

The ZytoFast® HPV type 16/18 Probe is composed of:

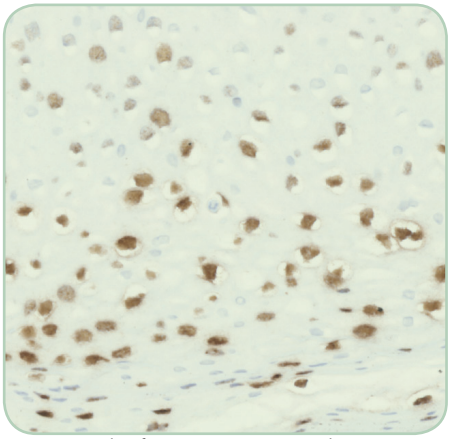
- Digoxigenin-labeled oligonucleotides (~ 0.6 ng/µl) specific for HPV type 16/18, which target DNA sequences encoding for the HPV 16/18 proteins E6, E7, and/or L1.
- The probe also targets the respective RNA sequences of E6, E7, and/or L1 proteins, which are expressed during some stages of infection.
- Formamide based hybridization buffer

The ZytoFast® HPV type 31/33 Probe is composed of:

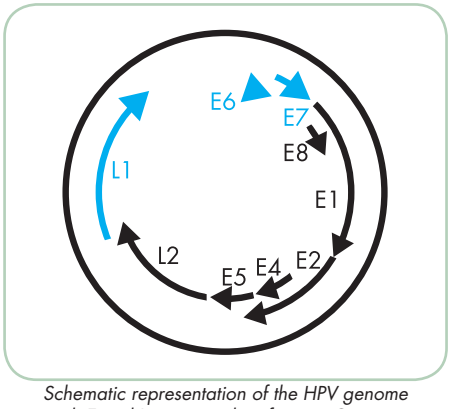
- Digoxigenin-labeled oligonucleotides (~ 0.6 ng/µl) specific for HPV type 31/33, which target DNA sequences encoding for HPV 31/33 proteins E6, E7, and/or L1.
- The probe also targets the respective RNA sequences of E6, E7, and/or L1 proteins, which are expressed during some stages of infection.
- Formamide based hybridization buffer

Results

A positive reactivity for HPV DNA in epithelial cells is indicated by a distinctly stained nucleus. Due to the detection of HPV DNA as well as E6, E7, and/or L1 RNAs, depending on the infection stage, cytoplasmic staining might be observed additionally. Colored precipitates, which can be clearly distinguished from the background, will be dark brown when using DAB as substrate for the detection.



Example of an HPV positive signal pattern: HPV infected cervix tissue hybridized with the ZytoFast® HPV type 6/11 Probe, detected with the ZytoFast® PLUS CISH Implementation Kit HRP-DAB.



Schematic representation of the HPV genome with E and L open reading frames. Genomic regions targeted by ZytoFast® HPV specific oligonucleotides are indicated in blue.

Prod. No.	Product	Label	Tests* (Volume)
T-1055-400	ZytoFast HPV type 6/11 Probe CE IVD	DIG	40 (400 µl)
T-1056-400	ZytoFast HPV type 16/18 Probe CE IVD	DIG	40 (400 µl)
T-1057-400	ZytoFast HPV type 31/33 Probe CE IVD	DIG	40 (400 µl)
Related Products			
T-1063-40	ZytoFast PLUS CISH Implementation Kit HRP-DAB CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 4x 50 ml; Mouse-anti-DIG, 4 ml; Anti-Mouse-HRP-Polymer, 4 ml; DAB Solution A, 0.3 ml; DAB Solution B, 10 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml		40

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

ZytoFast® HPV Screening Probe

CE IVD

Background

The ZytoFast® HPV Screening Probe is designed for the detection and discrimination of human papillomavirus (HPV) DNA in paraffin-embedded tissue sections or cell samples.

At least 50 percent of sexually active men and women acquire some form of genital HPV infection at some point in their lives. Most of the approx. 30 identified genital HPV types, predominantly types 6 and 11, are called "low-risk" types, and may cause mild Pap test abnormalities or genital warts. Until now, approximately 10–15 HPV types are associated with lesions that can progress to cancer. Among those are the HPV types 16/18/31/33/35/39/45/51/52/56/58/59/66/68/82.

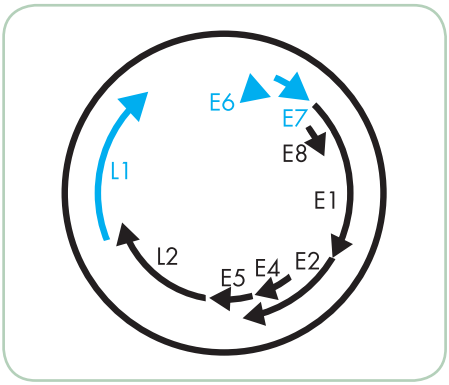
These cancer-associated HPV types are designated as high-risk HPV (hr-HPV) types. The infection with the HPV hr-types can lead to development of cancer of the cervix, vulva, vagina, anus, or penis. The majority of malignant cervical carcinomas (approx. 70%) occur as a result of infections with HPV types 16 or 18.

References
Cothran MM & White JP (2002) Health Care Women Int 23: 306-19.
Cubie HA & Norval M (1988) J Virol Methods 20: 239-49.
Faulkner-Jones BE, et al. (1993) J Virol Methods 41: 277-96.
Francis IM, et al. (2013) Sultan Qaboos Univ Med J 13: 527-33.
Grundmeier N, et al. (2011) Dermatology 223: 293-300.
Kaspersen MD, et al. (2011) PLoS One 6: e18095.
Mirasoli M, et al. (2009) Anal Bioanal Chem 394: 981-7.
Montag M, et al. (2011) Arch Gynecol Obstet 284: 999-1005.
Poljak M & Kocjan BJ (2010) Expert Rev Anti Infect Ther 8: 1139-62.
Reinholz M, et al. (2013) Arch Dermatol Res 305: 723-32.
Walboomers JMM, et al. (1999) J Pathol 189: 12-9.

Probe Description

ZytoFast® HPV Screening Probe is composed of:

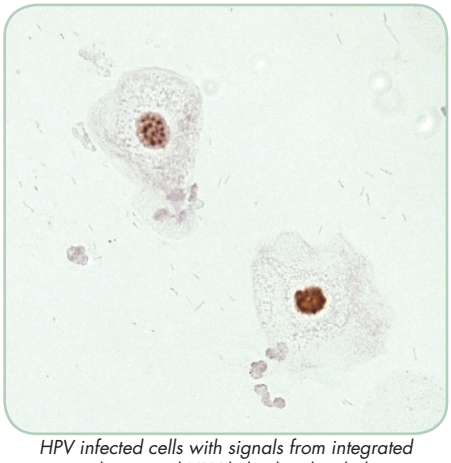
- Digoxigenin-labeled oligonucleotides (~ 2.6 ng/µl) specific for HPV type 6/11/16/18/31/33/35/39/45/51/52/56/58/59/66/68/82, which target DNA sequences encoding for HPV 6/11/16/18/31/33/35/39/45/51/52/56/58/59/66/68/82 proteins E6, E7, and/or L1.
- The probe also targets the respective RNA sequences of E6, E7, and/or L1 proteins, which are expressed during some stages of infection.
- Formamide based hybridization buffer



Schematic representation of the HPV genome with E and L open reading frames. Genomic regions targeted by ZytoFast® HPV specific oligonucleotides are indicated in blue.

Results

A positive reactivity for HPV DNA in epithelial cells is indicated by a distinctly stained nucleus. Due to the detection of HPV DNA as well as E6, E7, and/or L1 RNAs, depending on the infection stage, cytoplasmic staining might be observed additionally. Depending on the detection chemistry that is used, colored precipitates, which can be clearly distinguished from the background, will be dark brown when using DAB as substrate for the detection.



HPV infected cells with signals from integrated and episomal HPV hybridized with the ZytoFast® HPV Screening Probe, detected with the ZytoFast® PLUS CISH Implementation Kit HRP-DAB.

Prod. No.	Product	Label	Tests* (Volume)
T-1144-400	ZytoFast HPV Screening Probe (specific for HPV type 6/11/16/18/31/33/35/39/45/51/52/56/58/59/66/68/82) CE IVD	DIG	40 (400 µl)
Related Products			
T-1063-40	ZytoFast PLUS CISH Implementation Kit HRP-DAB CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 4x 50 ml; Mouse-anti-DIG, 4 ml; Anti-Mouse-HRP-Polymer, 4 ml; DAB Solution A, 0.3 ml; DAB Solution B, 10 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml		40

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

ZytoFast® EBV Probe

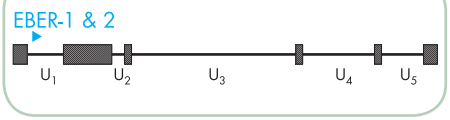
CE IVD

Background

The ZytoFast® EBV Probe (PF29) is intended to be used for the qualitative detection of human Epstein-Barr virus (EBV) EBER RNA in formalin-fixed, paraffin-embedded specimens, such as diffuse large B-cell lymphomas (DLBCL) or Hodgkin lymphomas, by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoFast® PLUS CISH Implementation Kit HRP-DAB (Prod. No. T-1063-40).
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The probe is intended to be used as an aid to the differential diagnosis of DLBCL or Hodgkin lymphomas and therapeutic action should not be initiated on the basis of the test result alone.

Probe Description

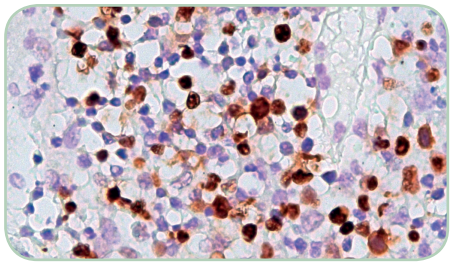
The ZytoFast® EBV is composed of:
· Digoxigenin-labeled oligonucleotides (~ 0.2 ng/µl), which target mRNA sequences encoding EBER-1 and EBER-2 regions.



Schematic representation of the EBV genome with the EBER-1 and EBER-2 encoding region indicated in blue. U1-U5 indicate unique nucleotide sequences, hatched boxes represent terminal and internal repeats.

Results

A positive reactivity for Epstein-Barr-virus (EBV) EBER RNA in the target cells is indicated by a distinctly stained nucleus. Colored precipitates, which can be clearly distinguished from the background, will be dark brown when using DAB for detection.



EBV infected tonsil tissue hybridized with ZytoFast® EBV Probe, detected with ZytoFast® PLUS CISH Implementation Kit HRP-DAB.

Prod. No.	Product	Label	Tests* (Volume)
T-1114-400	ZytoFast EBV Probe CE IVD	DIG	40 (400 µl)
Related Products			
T-1063-40	ZytoFast PLUS CISH Implementation Kit HRP-DAB CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 4x 50 ml; Mouse-anti-DIG, 4 ml; Anti-Mouse-HRP-Polymer, 4 ml; DAB Solution A, 0.3 ml; DAB Solution B, 10 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml		40

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

ZytoFast® CMV Probe

RUO

Background

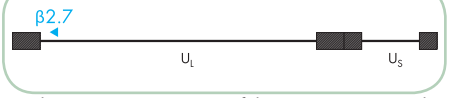
The ZytoFast® CMV Probe (PF28) is intended to be used for the qualitative detection of human cytomegalovirus (CMV (a.k.a. human herpesvirus-5, HHV-5)) DNA in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH).

The ZytoFast® CMV Probe is intended to be used in combination with one of the ZytoFast® PLUS CISH Implementation Kits, either the ZytoFast® PLUS CISH Implementation Kit AP-NBT/BCIP (Prod. No. T-1061-40), the ZytoFast® PLUS CISH Implementation Kit HRP-DAB (Prod. No. T-1063-40), or the ZytoFast® PLUS CISH Implementation Kit AP-Permanent Red (Prod. No. T-1151-40).

Probe Description

The ZytoFast® CMV Probe is composed of:

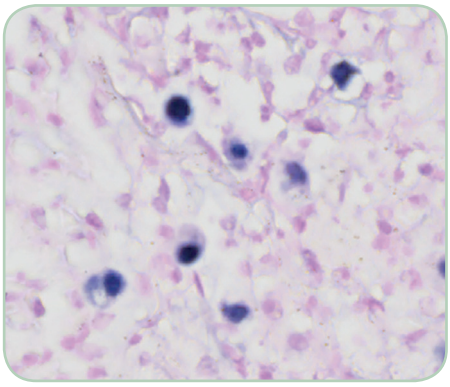
- Digoxigenin-labeled oligonucleotides (~ 0.2 ng/µl), which target DNA sequences encoding the β2.7 gene, the most abundantly transcripted early CMV gene.
- Formamide based hybridization buffer.



Schematic representation of the CMV genome with the β2.7 encoding region indicated in blue. UL and US indicate unique nucleotide sequences, hatched boxes represent terminal and internal repeats.

Results

Due to the detection of CMV DNA as well as of the abundantly transcribed β2.7 RNA, a positive reactivity for cytomegalovirus (CMV) in the target cells is indicated by a cytoplasmic and/or nuclear staining pattern. Depending on the detection chemistry that is used, colored precipitates, which can be clearly distinguished from the background, will be dark violet-blue when using NBT/BCIP as substrate, or strong red when using Permanent Red.



CISH analysis of paraffin-embedded adrenal gland tissue using the ZytoFast® CMV Probe, detected with ZytoFast® PLUS CISH Implementation Kit AP-NBT/BCIP.

Prod. No.	Product	Label	Tests* (Volume)
T-1113-400	ZytoFast CMV Probe RUO	DIG	40 (400 µl)
Related Products			
T-1061-40	ZytoFast PLUS CISH Implementation Kit AP-NBT/BCIP RUO Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 4x 50 ml; Rabbit-anti-DIG, 4 ml; Anti-Rabbit-AP-Polymer, 4 ml; NBT/BCIP Solution, 4ml; Nuclear Red Solution, 20 ml; Mounting Solution (alcoholic), 4 ml		40
T-1151-40	ZytoFast PLUS CISH Implementation Kit AP-Permanent Red RUO Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 4x50 ml; Rabbit-anti-DIG, 4 ml; Anti-Rabbit-AP-Polymer, 4 ml; Permanent Red Solution A, 0.25 ml; Permanent Red Solution B, 15 ml; Mayer's Hematoxylin Solution, 20 ml; Mounting Solution (alcoholic), 4 ml		40

** Using 10 µl probe solution per test.*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

ZytoFast® Ig-kappa/Ig-lambda-CISH System

CE IVD

Background

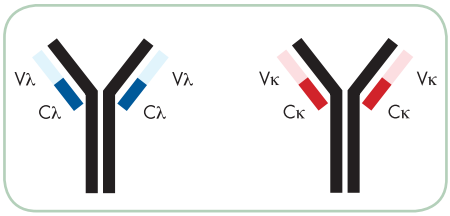
The ZytoFast® Ig-kappa/Ig-lambda-CISH System is intended to be used for the qualitative detection of human Ig-kappa (k) and Ig-lambda (l) light chain mRNA in formalin-fixed, paraffin-embedded specimens, such as multiple myeloma, by chromogenic *in situ* hybridization (CISH). The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The product is intended to be used as an aid to the differential diagnosis of multiple myeloma and therapeutic measures should not be initiated based on the test result alone.

Probe Description

The ZytoFast® human Ig-kappa Probe (PF30) is composed of:
- Digoxigenin-labeled oligonucleotides (~ 0.2 ng/µl), which target mRNA sequences encoding Ig-kappa light chain constant regions.

The ZytoFast® human Ig-lambda Probe (PF31) is composed of:
- Digoxigenin-labeled oligonucleotides (~ 0.2 ng/µl), which target mRNA sequences encoding Ig-lambda light chain constant regions.

The ZytoFast® human Ig-kappa/Ig-lambda Probe (PF22) is composed of:
- Digoxigenin-labeled oligonucleotides (~ 1 ng/µl), which target mRNA sequences encoding Ig-kappa light chain constant regions.
- Biotin-labeled oligonucleotides (~ 1 ng/µl), which target mRNA sequences encoding Ig-lambda light chain constant regions.



Basic immunoglobulin structure indicating the heavy chains (black), λ (blue) and κ (red) lights chains. The light chain constant regions (C) whose encoding mRNA sequences are targeted by ZytoFast® Ig-lambda and Ig-kappa probes are indicated in dark blue and red respectively, the variable regions (V) in light blue and red.

Results

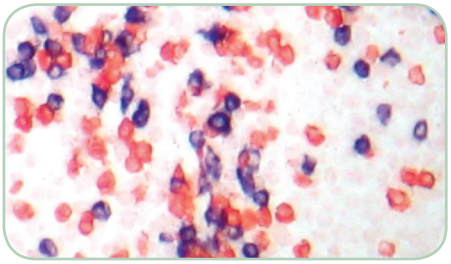
A positive reactivity in the target cells is indicated by cytoplasmic staining. Depending on the detection chemistry that is used, colored precipitates, which can be clearly distinguished from the background, will be dark violet-blue when using NBT/BCIP as substrate, strong red when using AEC, dark brown when using DAB, green when using HRP-Green, or strong red when using Permanent Red.

Using the ZytoFast® human Ig-kappa Probe, B-cells expressing antibodies with κ light chains will result in cytoplasmic staining whereas IGL expressing B-cells are not stained.

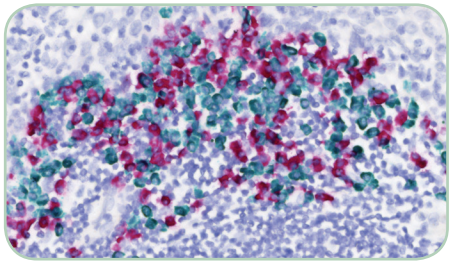
Using the ZytoFast® human Ig-lambda Probe, B-cells expressing antibodies with λ light chains will result in cytoplasmic staining whereas IGK expressing B-cells are not stained.

Using the ZytoFast® human Ig-kappa/Ig-lambda CISH Kit, B-cells expressing antibodies with κ light chains will result in a red cytoplasmic staining and simultaneously IGL expressing B-cells will result in a dark violet-blue cytoplasmic staining.

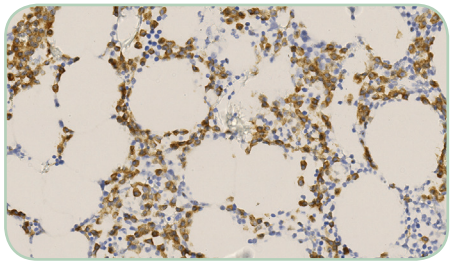
Using the ZytoFast® human Ig-kappa/Ig-lambda Permanent CISH Kit, B-cells expressing antibodies with κ light chains will result in a green cytoplasmic staining and simultaneously IGL expressing B-cells will result in permanent red cytoplasmic staining.



CISH analysis of a paraffin-embedded bone marrow biopsy specimen using the ZytoFast® human Ig-kappa/Ig-lambda CISH Kit.



CISH analysis of a paraffin-embedded tonsil tissue using the ZytoFast® human Ig-kappa/Ig-lambda Permanent CISH Kit.



Multiple myeloma tissue with B-cells expressing Ig-kappa hybridized with ZytoFast® human Ig-kappa Probe, detected with ZytoFast® PLUS CISH Implementation Kit HRP-DAB.

CE IVD

ZytoFast® Ig-kappa/Ig-lambda Probes

Digoxigenin-labeled

Prod. No.	Product	Tests* (Volume)
T-1115-400	ZytoFast human Ig-kappa Probe CE IVD	40 (400 µl)
T-1116-400	ZytoFast human Ig-lambda Probe CE IVD	40 (400 µl)
Related Products		
T-1063-40	ZytoFast PLUS CISH Implementation Kit HRP-DAB CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 4x 50 ml; Mouse-anti-DIG, 4 ml; Anti-Mouse-HRP-Polymer, 4 ml; DAB Solution A, 0.3 ml; DAB Solution B, 10 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml	40

ZytoFast® Ig-kappa/Ig-lambda Probe

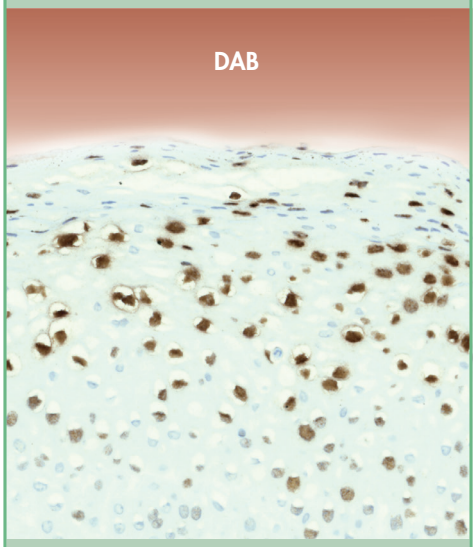
Biotin/Digoxigenin-labeled

Prod. No.	Product	Tests* (Volume)
T-1017-400	ZytoFast human Ig-kappa/Ig-lambda Probe CE IVD	40 (400 µl)
Related Products		
T-1005-40	ZytoFast human Ig-kappa/Ig-lambda CISH Kit CE IVD Incl. Ig-kappa/Ig-lambda Probe (DIG/Biotin-labeled), 0.4 ml; Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 2x 50 ml; Anti-Biotin/DIG-Mix, 4 ml; AEC Solution, 4 ml; NBT/BCIP Solution, 4 ml; Nuclear Green Solution, 20 ml; Mounting Solution (aqueous), 4 ml	40
T-1105-40	ZytoFast human Ig-kappa/Ig-lambda Permanent CISH Kit CE IVD Incl. Ig-kappa/Ig-lambda Probe (DIG/Biotin-labeled), 0.4 ml; Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 2x 50 ml; Anti-Biotin/DIG-Mix, 4 ml; HRP-Green-Solution A, 0.8 ml; HRP-Green-Solution B, 15 ml; Permanent Red Solution A, 0.25 ml; Permanent Red Solution B, 15 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml	40

** Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

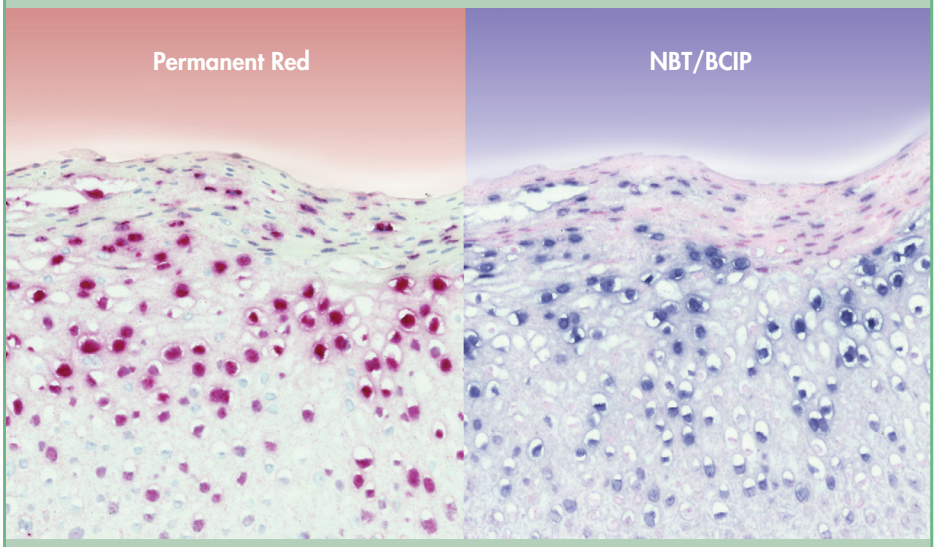
Accessories

Peroxidase (HRP)



T-1063
CE IVD

Alkaline Phosphatase (AP)



T-1151
RUO

T-1061
RUO

ZytoFast® PLUS Implementation Kits for Use in Diagnostic Procedures

For the detection of Digoxigenin-labeled ZytoFast® Probes

Prod. No.	Product	Tests
T-1063-40	ZytoFast PLUS CISH Implementation Kit HRP-DAB CE IVD Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 4x 50 ml; Mouse-anti-DIG, 4 ml; Anti-Mouse-HRP-Polymer, 4 ml; DAB Solution A, 0.3 ml; DAB Solution B, 10 ml; Nuclear Blue Solution, 20 ml; Mounting Solution (alcoholic), 4 ml	40

ZytoFast® PLUS Implementation Kits for Research Use Only

For the detection of Digoxigenin-labeled ZytoFast® Probes

Prod. No.	Product	Tests
T-1061-40	ZytoFast PLUS CISH Implementation Kit AP-NBT/BCIP RUO Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 4x 50 ml; Rabbit-anti-DIG, 4 ml; Anti-Rabbit-AP-Polymer, 4 ml; NBT/BCIP Solution, 4ml; Nuclear Red Solution, 20 ml; Mounting Solution (alcoholic), 4 ml	40
T-1151-40	ZytoFast PLUS CISH Implementation Kit AP-Permanent Red RUO Incl. Heat Pretreatment Solution EDTA, 500 ml; Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 4x50 ml; Rabbit-anti-DIG, 4 ml; Anti-Rabbit-AP-Polymer, 4 ml; Permanent Red Solution A, 0.25 ml; Permanent Red Solution B, 15 ml; Mayer's Hematoxylin Solution, 20 ml; Mounting Solution (alcoholic), 4 ml	40

CE IVD only available in certain countries. All other countries research use only! Please contact your local dealer for more information.
RUO For Research Use Only. Not for use in diagnostic procedures.

Accessories

ZytoFast® Pretreatment Reagents

Prod. No.	Product
ES-0001-4	Pepsin Solution, 4 ml CE IVD
ES-0001-50	Pepsin Solution, 50 ml CE IVD
ES-0001-1000	Pepsin Solution, 1000 ml CE IVD
PT-0002-500	Heat Pretreatment Solution EDTA, 500 ml CE IVD

ZytoFast® Wash Buffers & Ancillary Reagents

Prod. No.	Product
AB-0001-4	Mouse-anti-DIG, 4 ml CE IVD
AB-0002-4	Anti-Mouse-HRP-Polymer, 4 ml CE IVD
AB-0015-4	Anti-Biotin/DIG-Mix, 4 ml CE IVD
C-3015-100	DAB Solution Set CE IVD Incl. DAB Solution A, 0.3 ml; DAB Solution B, 10 ml; good for 10 ml DAB Solution
C-3039-100	ZytoDot HRP-Green Solution Set CE IVD Incl. HRP-Green Solution A, 0.8 ml; HRP-Green Solution B, 15 ml; good for 15 ml HRP-Green Solution
CS-0001-20	Mayer's Hematoxylin Solution, 20 ml CE IVD
CS-0002-20	Nuclear Blue Solution, 20 ml CE IVD
CS-0004-20	Nuclear Green Solution, 20 ml CE IVD
MT-0004-4	Mounting Solution (alcoholic), 4 ml CE IVD
SB-0004-4	NBT/BCIP Solution, 4 ml CE IVD
SB-0005-4	AEC Solution, 4 ml CE IVD
WB-0005-50	20x Wash Buffer TBS, 50 ml CE IVD

Accessories for Research Use Only

ZytoFast® Wash Buffers & Ancillary Reagents

Prod. No.	Product
AB-0011-4	Rabbit-anti-DIG, 4 ml RUO
AB-0012-4	Anti-Rabbit-AP-Polymer, 4 ml RUO
CS-0003-20	Nuclear Red Solution, 20 ml RUO

ZytoFast® Control Probes

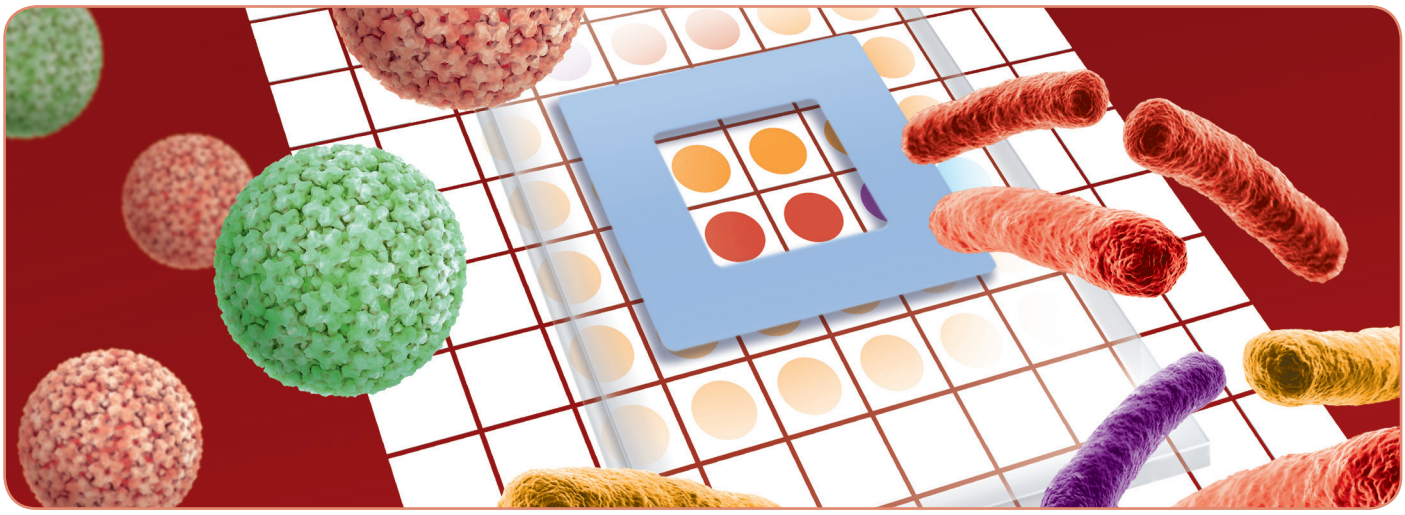
Prod. No.	Product	Label	Tests* (Volume)
T-1053-100	ZytoFast DNA (+) Control Probe RUO	DIG	40 (400 µl)
T-1054-100	ZytoFast DNA (–) Control Probe RUO	DIG	40 (400 µl)
T-1120-100	ZytoFast 28S rRNA (+) Control Probe RUO	DIG	40 (400 µl)
T-1119-100	ZytoFast RNA (–) Control Probe RUO	DIG	40 (400 µl)

** Using 10 µl probe solution per test.* IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*
RUO *For Research Use Only. Not for use in diagnostic procedures.*

VisionArray® *Arrays for DNA analysis*

277

VisionArray® Chip - Fast and Reliable Detection of DNA Sequences!



Introduction

The VisionArray® products are designed for the qualitative detection of specific DNA sequences by DNA/DNA hybridization on immobilized catcher molecules which are arranged on a glass chip. All capture sequences and positive controls are set up on the VisionArray® Chips as duplicates.

Advantages of VisionArray®

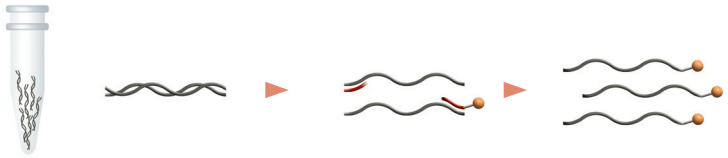
- Quick & easy 1 hour protocol
- Automated evaluation using a VisionArray® Analyzer Software – simple visualization & quick analysis in just a few minutes

Sample Collection

For the detection of DNA sequences with the VisionArray® system, the following raw material can be used for DNA extraction; depending on the VisionArray® Chip used:

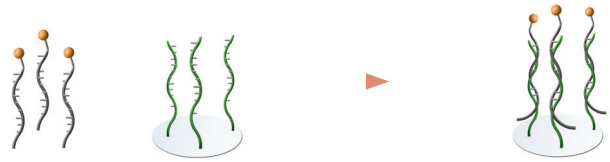
- Formalin-fixed, paraffin-embedded (FFPE) tissue or cell samples

Step 1: Amplification and Labeling in a PCR



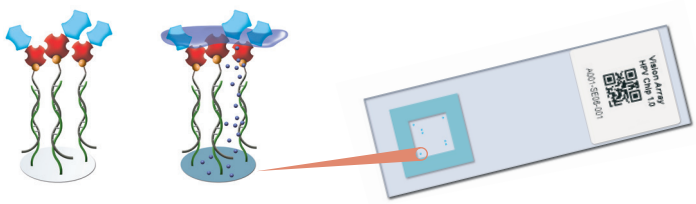
The DNA is extracted from, e.g., FFPE samples and is used as a template for PCR. Biotinylated primers are used to amplify and label different sections of the target sequences. The human HLA-DQA1 gene is also amplified and serves as a PCR positive control and as a genomic control.

Step 2: Hybridization on the Glass Chip



After amplification, the biotinylated sequences hybridize to complementary DNA capture sequences on the glass chip.

Step 3: Detection and Visualization



Specifically bound and biotinylated sequences are visualized by secondary marking with a streptavidin-peroxidase conjugate and a staining with tetramethylbenzidine. After color development, evaluation is performed using a VisionArray® Analyzer Software.

VisionArray® HPV Chip 1.0

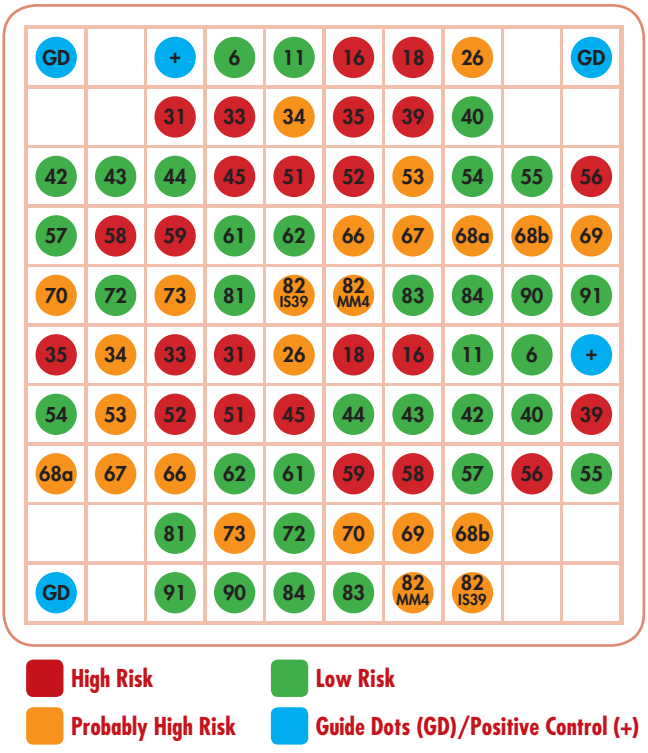
CE IVD

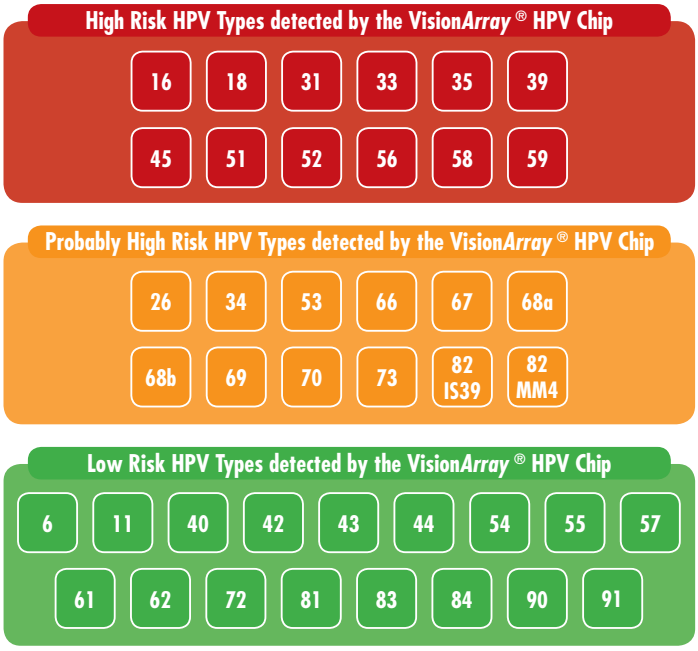
Introduction

The VisionArray® HPV Chip 1.0 is intended to be used for the qualitative detection and genotyping of PCR-amplificates of 41 clinically relevant human papilloma virus (HPV) genotypes that have been produced with the help of the VisionArray® HPV PreCise Master Mix (Prod. No. ES-0007-50) from formalin-fixed, paraffin-embedded specimens, such as cervical carcinoma or head and neck squamous cell carcinoma. The chip is intended to be used in combination with a VisionArray® Software.
The product is intended for professional use only. All tests using the product should be performed in a certified, licensed anatomic pathology laboratory under the supervision of a pathologist/human geneticist by qualified personnel.
The product is intended to be used as an aid to the differential diagnosis of cervical carcinoma or head and neck squamous cell carcinoma and therapeutic measures should not be initiated based on the test result alone.

Chip Description

The components of the product are the chip as well as the VisionArray® HPV Chip File 1.0. Positioning of the capture sequences on the chip:





HPV 55 is classified by now as subtype of HPV 44, but is still labeled HPV 55 for consistency reasons.

Prod. No.	Product	Tests
VA-0001-10	VisionArray HPV Chip 1.0 Incl. 10 pieces CE 0124 IVD	10

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

VisionArray® MYCO Chip 2.0

CE IVD

Introduction

The VisionArray® MYCO Chip 2.0 is intended to be used with a VisionArray® Analysis Package for the qualitative detection and identification of PCR amplificates of the genera *Mycobacterium, Mycobacteroides, Mycolicibacillus, Mycolicibacter,* and *Mycolicibacterium* as well as several clinically relevant mycobacterial species that have been produced with the help of the VisionArray® MYCO PreCise Master Mix 2.0.

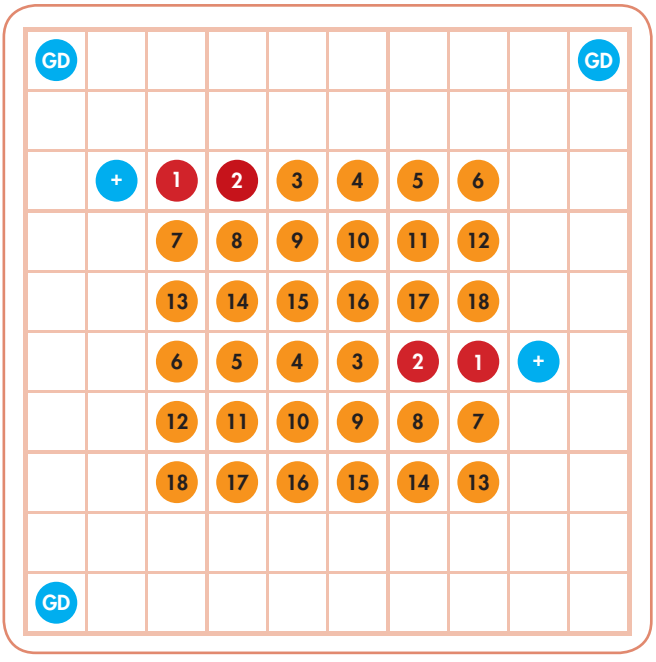
The mycobacterial genera comprise more than 140 species, which, for the purpose of diagnosis and treatment, have been grouped into three categories: *M. tuberculosis complex* (MTC), *M. leprae*, and non-tuberculous mycobacteria (NTM).

The majority of the *Mycobacterium* species belongs to the NTM group and can be found in different environments. Many of these bacteria cause life-threatening infections in humans and in recent years, the mortality and morbidity associated with NTMs has increased especially in immunocompromised patients worldwide. Treatment of NTMs is specific to each species and therefore a clear distinction between the present species is of extreme importance.

Reliable and rapid molecular diagnostics are the basis of an adequate therapy that is given by the VisionArray® MYCO Chip 2.0.

Chip Description

The VisionArray® MYCO Chip 2.0 is designed to detect several clinically relevant mycobacterial species. All capture sequences and the positive control are set up on the Chip as duplicates and the guide dots as triplicates. The signals are visible on the Chip as dark blue areas. The automated evaluation of the results is performed by a VisionArray® Software.



GD Guide Dot + Positive Control

M. tuberculosis (MTC) complex

1	M. tuberculosis complex (ITS Region)
2	M. tuberculosis complex (IS6110 Region)

Nontuberculous Mycobacteria (NTM)

3	M. abscessus	11	M. kansasii
4	M. avium / M. intracellulare complex	12	M. malmoense
5	M. chelonae	13	M. marinum / M. ulcerans
6	M. chimaera	14	M. scrofulaceum / M. parascrofulaceum
7	M. fortuitum	15	M. simiae
8	M. genavense	16	M. smegmatis
9	M. gordonae	17	M. szulgai
10	M. haemophilum	18	M. xenopi

References
Griffith DE, et al. (2007) Am J Respir Crit Core Med 175: 367-416.
Gupta RS, et al. (2018) Front Microbiol 9: 67.
Oren A & Carrity GM (2019) Int J Syst Evol Microbiol 69: 597-9.
Perez-Martinez I, et al. (2013) BMC Res Notes 6: 531.
Simons S, et al. (2011) Emerg Infect Dis 17: 343-9.
Tortoli E (2009) Clin Microbiol Infect 15: 906-10.

Prod. No.	Product	Tests
VA-0005-10	VisionArray MYCO Chip 2.0 Incl. 10 pieces CE IVD	10

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

VisionArray® FUNGI Chip 1.0

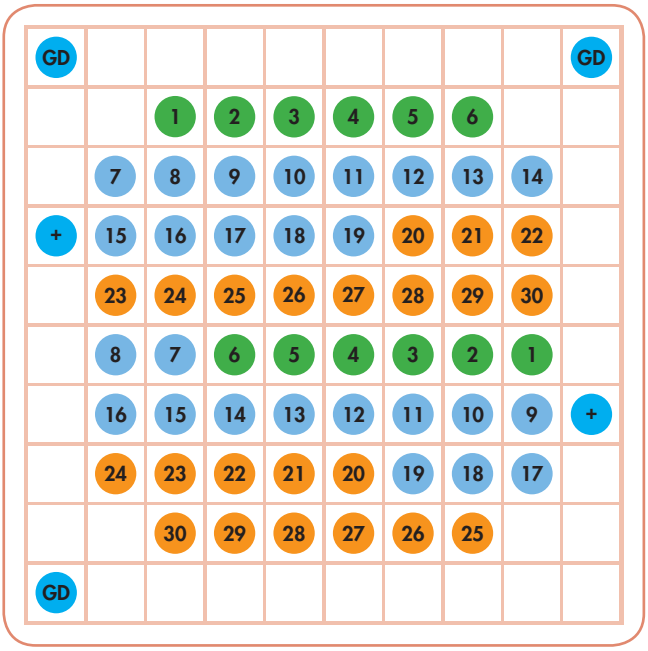
RUO

Introduction

The VisionArray® FUNGI Chip 1.0 is intended to be used for the qualitative detection and genotyping of PCR-amplificates of 30 clinically relevant fungi genotypes that have been produced with the help of the VisionArray® FUNGI PreCise Master Mix 1.0 (Prod. No. ES-0009-50) from formalin-fixed, paraffin-embedded specimens. The chip is intended to be used in combination with a VisionArray® Software.

Chip Description

The components of the product are the chip as well as the VisionArray® FUNGI Chip File 1.0. Positioning of the capture sequences on the chip:



GD Guide Dot + Positive Control

Aspergillus

1	Aspergillus flavus	4	Aspergillus niger
2	Aspergillus fumigatus	5	Aspergillus terreus
3	Aspergillus nidulans / quadrilineatus	6	Aspergillus versicolor

Candida

7	Candida albicans	14	Meyerozyma guilliermondii
8	Candida auris	15	Nakaseomyces glabratus
9	Candida dubliniensis	16	Pichia fermentans
10	Candida parapsilosis	17	Pichia kudriavzevii
11	Candida tropicalis	18	Pichia norvegensis
12	Clavispora lusitaniae	19	Wickerhamomyces anomalus
13	Kluyveromyces marxianus		

Other

20	Cryptococcus neoformans	26	Purpureocillium lilacinum
21	Fusarium spp.	27	Rhizomucor pusillus
22	Lichtheimia corymbifera	28	Rhizopus spp.
23	Mucor spp.	29	Scedosporium spp.
24	Paecilomyces variotii	30	Trichophyton/Microsporum
25	Pneumocystis jirovecii		

Prod. No.	Product	Tests
VA-0006-10	VisionArray FUNGI Chip 1.0 RUO	10

RUO *For Research Use Only. Not for use in diagnostic procedures.*

VisionArray® PCR and Detection

VisionArray® Detection Kit

For hybridization and detection of PCR products on VisionArray® Chips

Prod. No.	Product	Tests
VK-0003-50	VisionArray Detection Kit CE IVD Incl. Hybridization Solution, 1 ml; Detection Solution, 5 ml; Blue Spot Solution, 5 ml; 100x Wash Buffer, 250 ml	50

VisionArray® PCR Reagents

For contamination-free amplification and biotinylation of target sequences with a high quality heat stable Taq polymerase

Prod. No.	Product	Tests
ES-0007-50	VisionArray HPV PreCise Master Mix CE IVD Containing VisionArray HPV Primer; dNTP/dUTP Solution; PreCise Taq DNA Polymerase; PCR-Buffer; $MgCl_2$; Uracil-DNA Glycosylase	50
ES-0008-50	VisionArray MYCO PreCise Master Mix 2.0 CE IVD Containing VisionArray MYCO Primer; dNTP/dUTP Solution; PreCise Taq DNA Polymerase; PCR-Buffer; $MgCl_2$; Uracil-DNA Glycosylase	50

VisionArray® PCR Reagents for Research Use Only

For contamination-free amplification and biotinylation of target sequences with a high quality heat stable Taq polymerase

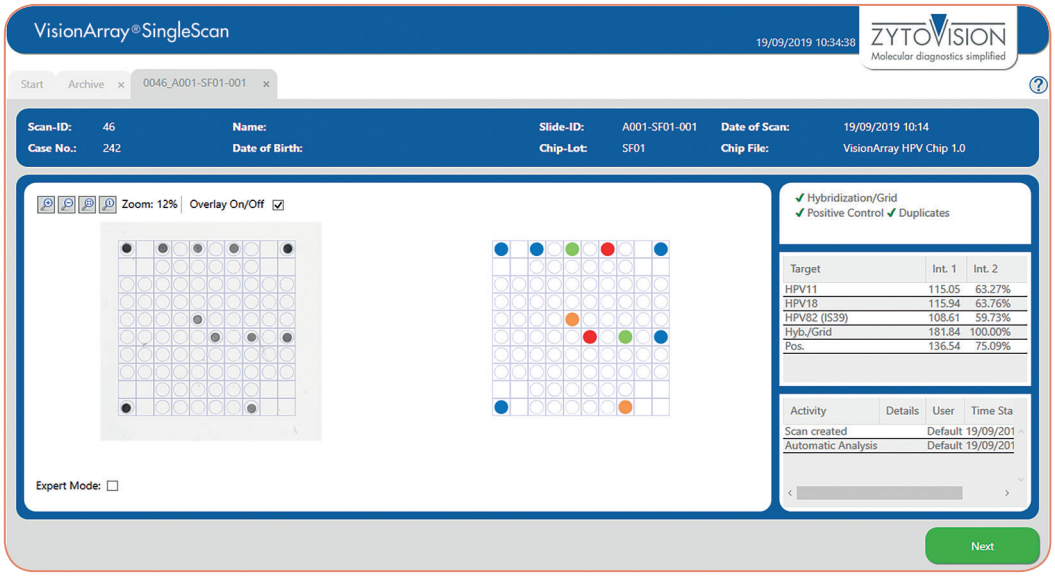
Prod. No.	Product	Tests
ES-0009-50	VisionArray FUNGI PreCise Master Mix 1.0 RUO Containing VisionArray FUNGI Primer; dNTP/dUTP Solution; PreCise Taq DNA Polymerase; PCR-Buffer; $MgCl_2$; Uracil-DNA Glycosylase	50

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

RUO *For Research Use Only. Not for use in diagnostic procedures.*

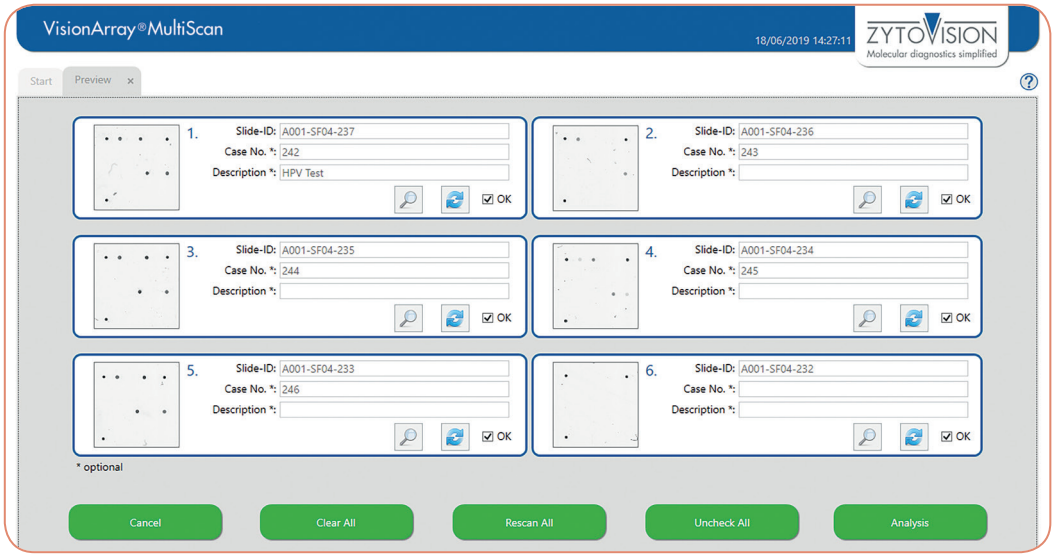
VisionArray® SingleScan Software

- Simple visualization and quick analysis of the VisionArray® Chip data
- Analysis of a Chip and the report of the results can be achieved in just a few minutes
- Program navigation is easy and intuitive for the user



VisionArray® MultiScan Software

- Simple visualization and quick analysis of up to 6 VisionArray® Chips simultaneously
- All available VisionArray® Chips can be automatically detected by the software offering maximum flexibility
- Analysis of the Chips and the report of the results can be achieved in just a few minutes



Prod. No.	Product
E-4301-1	VisionArray SingleScan Software CE IVD
E-4302-1	VisionArray MultiScan Software CE IVD

IVD *labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.*

Product Use

All products manufactured and/or distributed by ZytoVision GmbH should be used in accordance with the labeled intended use of the given product. Products labeled as CE/IVD are *in vitro* diagnostic medical devices according to the European Directive 98/79/EC or the In Vitro Diagnostic Medical Devices Regulation (EU) 2017/746 (IVDR). For every product, the currently applicable regulation can be found on the respective product site at www.zytovision.com. Products labeled as "for research use only" should be used for research applications, not for diagnostic procedures.

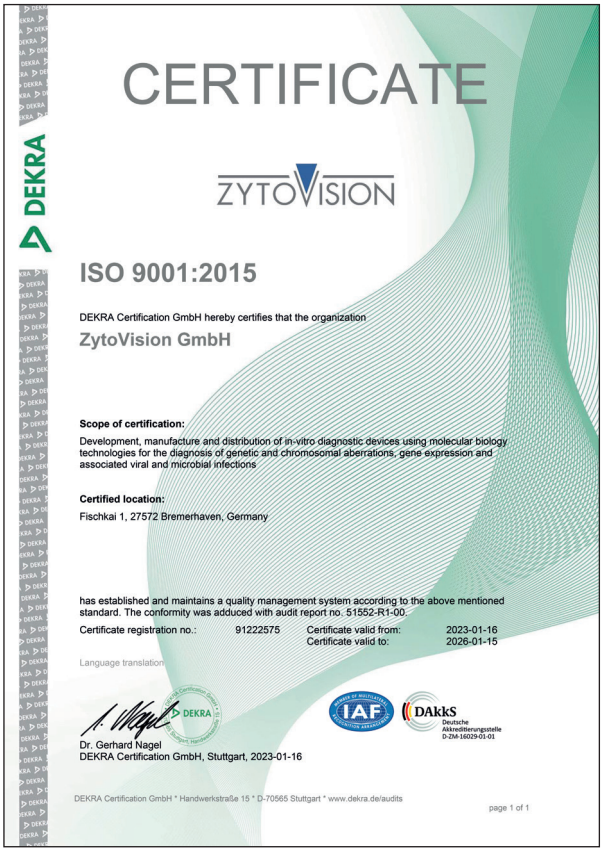
Trademarks

Zyto*Dot*®, Zyto*Fast*®, Zyto*Light*®, Zyto*Mation*®, *Flex*ISH®, Vision*Array*® and ZytoVision® are registered trademarks of ZytoVision GmbH.
CEN™, SPEC™, ZyBlack™, ZyBlue™, ZyGold™, ZyGreen™, ZyOrange™, ZyRed™, Zyto*Dot*® 2C™, TriCheck™, DuraTect™ and DistinguISH™ are trademarks of ZytoVision GmbH. TexasRed® is a registered trademark of Molecular Probes, Inc., Eugene, OR. BOND™ is a trademark of Leica Biosystems and its affiliates.

CE Marking & ISO Certificates

All probes in this catalog are manufactured by ZytoVision GmbH, Bremerhaven, Germany.

Product development and manufacturing of all products by ZytoVision GmbH is carried out according to ISO 9001 and ISO 13485 regulations, for which ZytoVision GmbH holds certificates. These certificates were issued and are annually monitored by DEKRA Certification GmbH, Germany. DEKRA Certification GmbH (Notified Body 0124) was in October 2019 the first designated Notified Body in Europe for conformity assessment procedures under the In-vitro-Diagnostic Medical Device Regulation (IVDR) (EU) 2017/746 for medical diagnostic devices. Current certificates can be downloaded at www.zytovision.com.



CERTIFICATE

DEKRA

ZYTOVISION

ISO 9001:2015

DEKRA Certification GmbH hereby certifies that the organization

ZytoVision GmbH

Scope of certification:

Development, manufacture and distribution of in-vitro diagnostic devices using molecular biology technologies for the diagnosis of genetic and chromosomal aberrations, gene expression and associated viral and microbial infections

Certified location:

Fischkai 1, 27572 Bremerhaven, Germany

has established and maintains a quality management system according to the above mentioned standard. The conformity was adduced with audit report no. 51552-R1-00.

Certificate registration no.: 91222575 Certificate valid from: 2023-01-16
Certificate valid to: 2026-01-15

Language translation

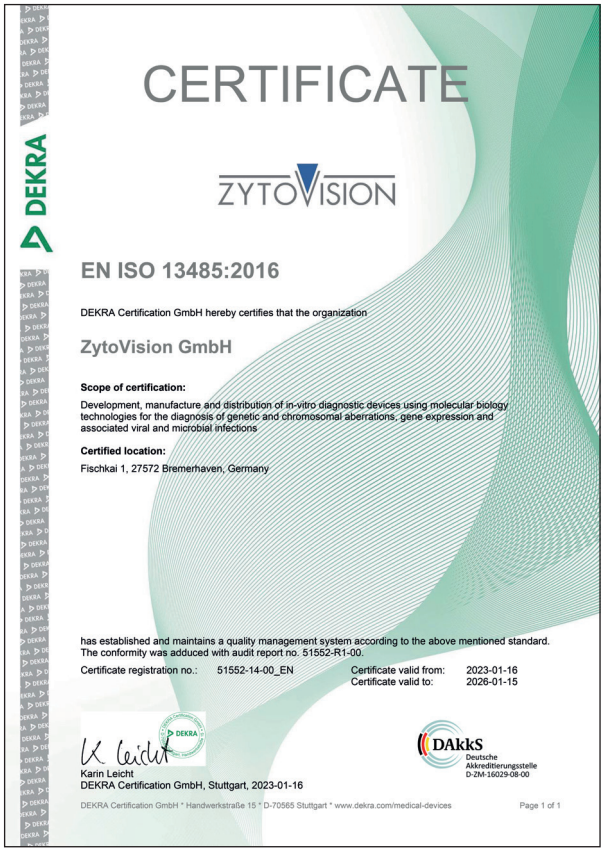
Dr. Gerhard Nagel
DEKRA Certification GmbH, Stuttgart, 2023-01-16

IAF

DAkkS Deutsche Akkreditierungsstelle D-ZM-16029-01-01

DEKRA Certification GmbH * Handwerkstraße 15 * D-70565 Stuttgart * www.dekra.de/audits

page 1 of 1



CERTIFICATE

DEKRA

ZYTOVISION

EN ISO 13485:2016

DEKRA Certification GmbH hereby certifies that the organization

ZytoVision GmbH

Scope of certification:

Development, manufacture and distribution of in-vitro diagnostic devices using molecular biology technologies for the diagnosis of genetic and chromosomal aberrations, gene expression and associated viral and microbial infections

Certified location:

Fischkai 1, 27572 Bremerhaven, Germany

has established and maintains a quality management system according to the above mentioned standard. The conformity was adduced with audit report no. 51552-R1-00.

Certificate registration no.: 51552-14-00_EN Certificate valid from: 2023-01-16
Certificate valid to: 2026-01-15

Karin Leicht
DEKRA Certification GmbH, Stuttgart, 2023-01-16

DAkkS Deutsche Akkreditierungsstelle D-ZM-16029-08-00

DEKRA Certification GmbH * Handwerkstraße 15 * D-70565 Stuttgart * www.dekra.com/medical-devices

Page 1 of 1

Index

Index

Index

Index

Prod. # M-5005

ZYTOVISION

Molecular diagnostics simplified

ZytoVision GmbH · Fischkai 1
27572 Bremerhaven · Germany
Phone: +49 (0)471/4832-300
Fax: +49 (0)471/4832-509
info@zytovision.com
www.zytovision.com

abacus dx

Distributed by Abacus dx:

1800 222 287 (AU) | 0800 222 170 (NZ)
info@abacusdx.com.au
abacusdx.com

Your local distributor