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Go molecular!

The algorithms

ThermoFisher SCIENTIFIC

Look deeper with the help of ImmunoCAP Allergen Component tests

ImmunoCAP™ Allergen Component tests give you:

- The confidence to differentiate between high risk allergy and cross-reactive allergy in combination with the clinical history
- Access to approximately 100 clinically validated allergen component tests
- Consistent results, from extensive quality control processes, which ensure you get the same allergen of the same quality no matter when and where you practice

Patient symptoms and history should always guide the use of these testing algorithms. Results of allergy testing should be interpreted in the context of a patient's clinical symptoms and history.

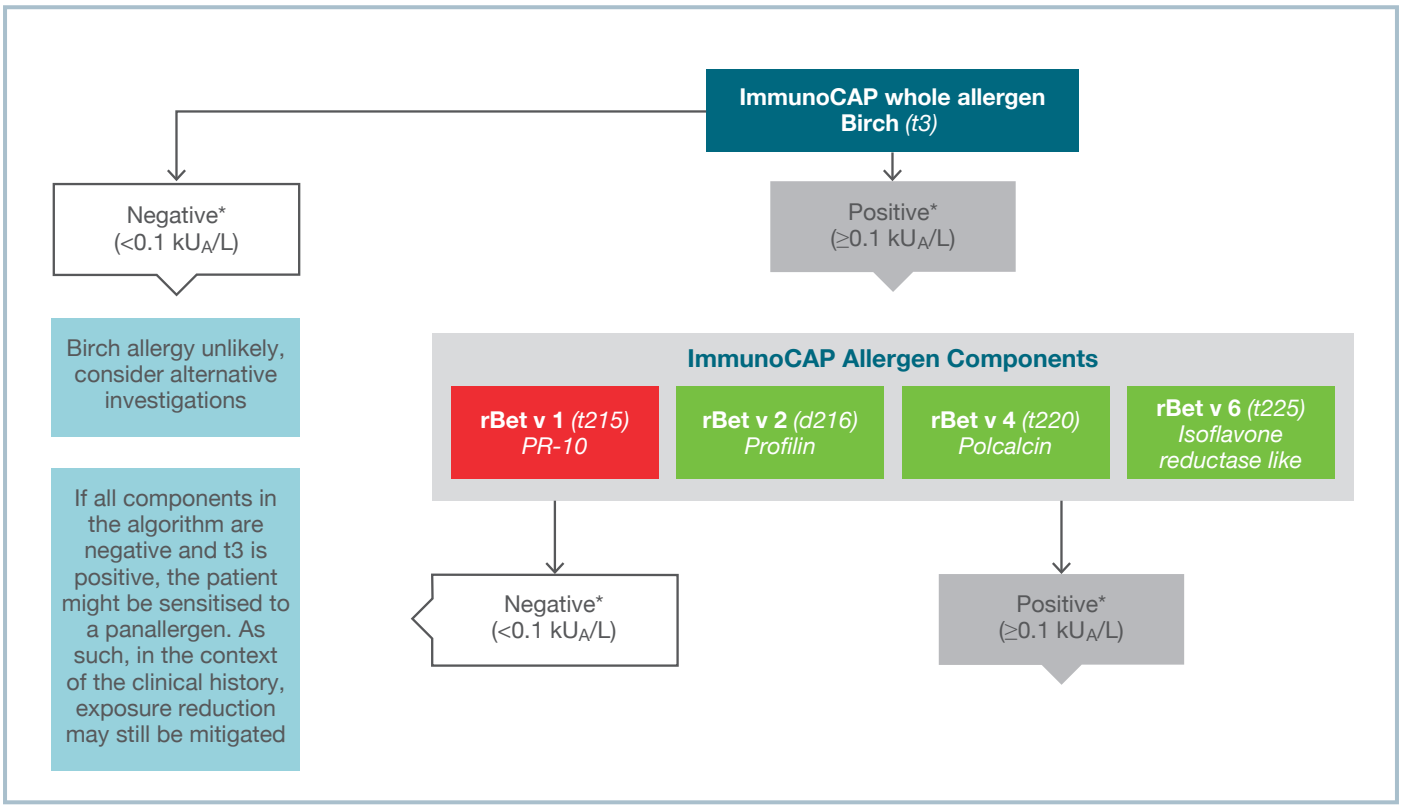
There are a number of resources where you can find more detailed information on ImmunoCAP Allergen Components and their clinical utility:

Visit **https://whichimmunocap.com**

Consult Go Molecular guidebooks 1 and 2
(available from: https://allergyai.com)

Contact your Thermo Fisher Scientific Account Manager

Birch



Interpreting results

Primary allergy - suitable for AIT[1-12]

- Primary Birch sensitisation is likely
- Likely cross-reaction with other PR-10 allergens, e.g., fruits, nuts, vegetables

Management considerations

- Birch pollen exposure reduction
- Consider targeted antihistamines around birch season
- Consider prescription of AIT
- Consider assessing risk of reaction to fruits, nuts and vegetables

Cross-reactive sensitisation[1,3-12]

- Sensitisation to cross-reactive minor allergens – not suitable for AIT

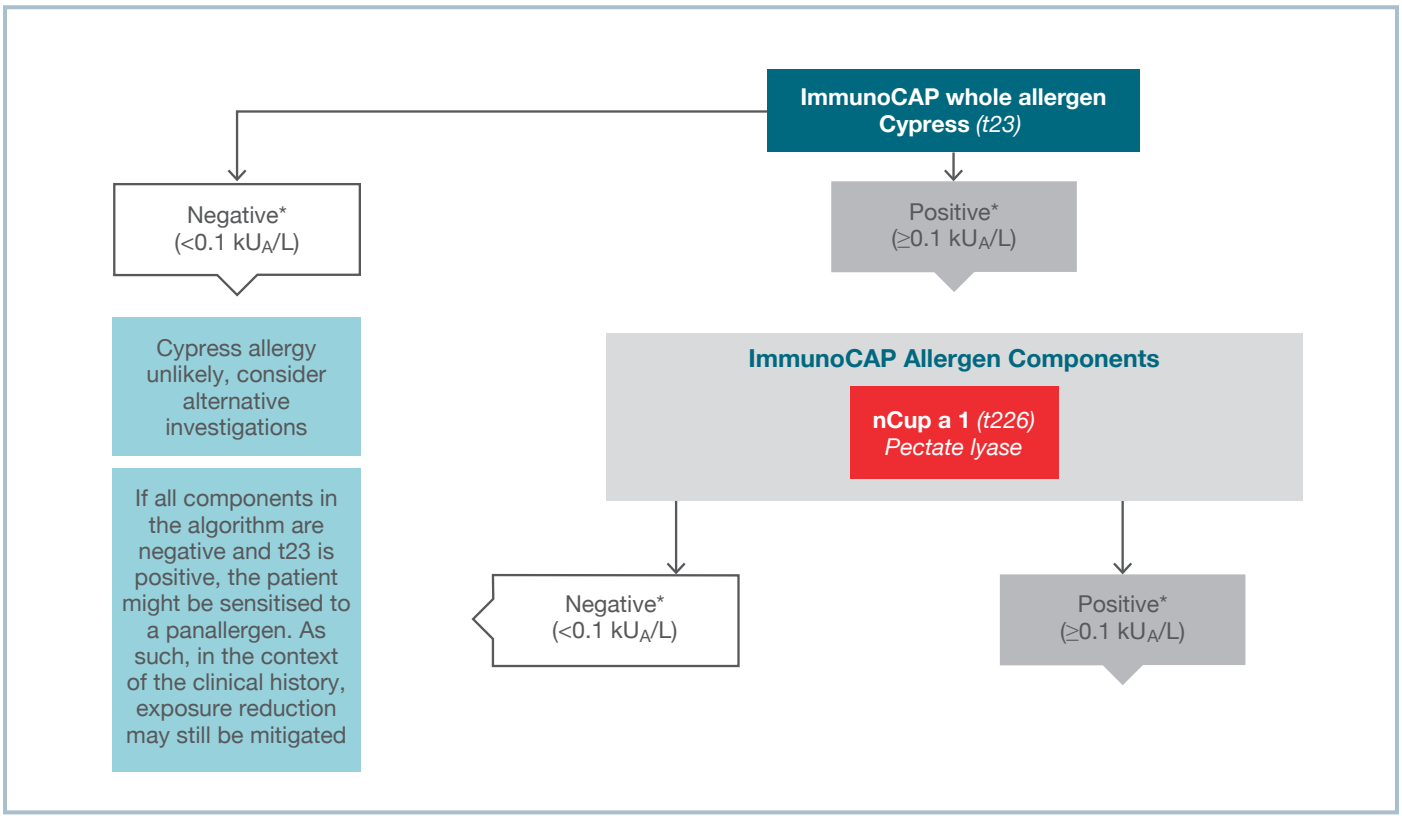
Management considerations

- Birch pollen exposure reduction
- Consider targeted antihistamines around birch season
- Consider further investigations to identify the primary allergen

*Results should be interpreted in the context of the history.
ImmunoCAP Allergen t3, Common silver birch; ImmunoCAP Allergen t215, Allergen component rBet v 1 PR-10, Birch; ImmunoCAP Allergen t216, Allergen component rBet v 2 Profilin, Birch; ImmunoCAP Allergen t220, Allergen component rBet v 4, Birch; ImmunoCAP Allergen t225, Allergen component rBet v 6, Birch

1. Barber D *et al.* Understanding patient sensitization profiles in complex pollen areas: a molecular epidemiological study. Allergy. 2008 Nov; 63(11):1550–8. **2.** Andersson K *et al.* Characteristics and immunobiology of grass pollen allergens. International Archives of Allergy & Immunology. 2003;130(2): 87–107. **3.** Hatzler L *et al.* Molecular spreading and predictive value of preclinical IgE response to Phleum pratense in children with hay fever. J Allergy Clin Immunol. 2012 Oct;130(4):894–901 e5. **4.** Matricardi PM *et al.* EAACI Molecular Allergology User's Guide. Pediatric allergy and immunology: official publication of the European Society of Pediatric Allergy and Immunology. 2016;27 Suppl 23:1-250. **5.** Sekerkova A *et al.* Detection of Phl p 1, Phl p 5, Phl p 7 and Phl p 12 specific IgE antibodies in the sera of children and adult patients allergic to Phleum pollen. Allergol Int. 2012 Jun; 61(2):339–46. **6.** Tripodi S *et al.* Molecular profiles of IgE to Phleum pratense in children with grass pollen allergy: Implications for specific immunotherapy. J Allergy Clin Immunol. 2012 Mar;129(3): 834–9 e8. **7.** Cipriani F *et al.* Diagnostic relevance of IgE sensitization profiles to eight recombinant Phleum pratense molecules. Allergy 2017;Oct 20. doi: 10.1111/all.13338. [Epub ahead of print]. **8.** Hauser M *et al.* Panallergens and their impact on the allergic patient. Allergy Asthma Clin Immunol. 2010;6(1):1. **9.** Schmid-Grendelmeier P. Recombinant allergens – routine diagnostics or still only science? Der Hautarzt 2010;61(11):946-953. **10.** Focke M *et al.* (2008) Heterogeneity of commercial timothy grass pollen extracts. Clin Exp Allergy 38(8):1400–1408. **11.** Walker SM *et al.* Immunotherapy for allergic rhinitis. Clin Exp Allergy. 2011 Sep; 41(9): 1177– 200. **12.** Valenta R. *et al.* Component-resolved diagnosis to optimize allergen-specific immunotherapy in the Mediterranean area. J Investig Allergol Clin Immunol. 2007;17 Suppl 1:36–40.

Cypress



Interpreting results

Primary allergy - suitable for AIT[1-9]

- Primary Cupressace tree allergy is likely

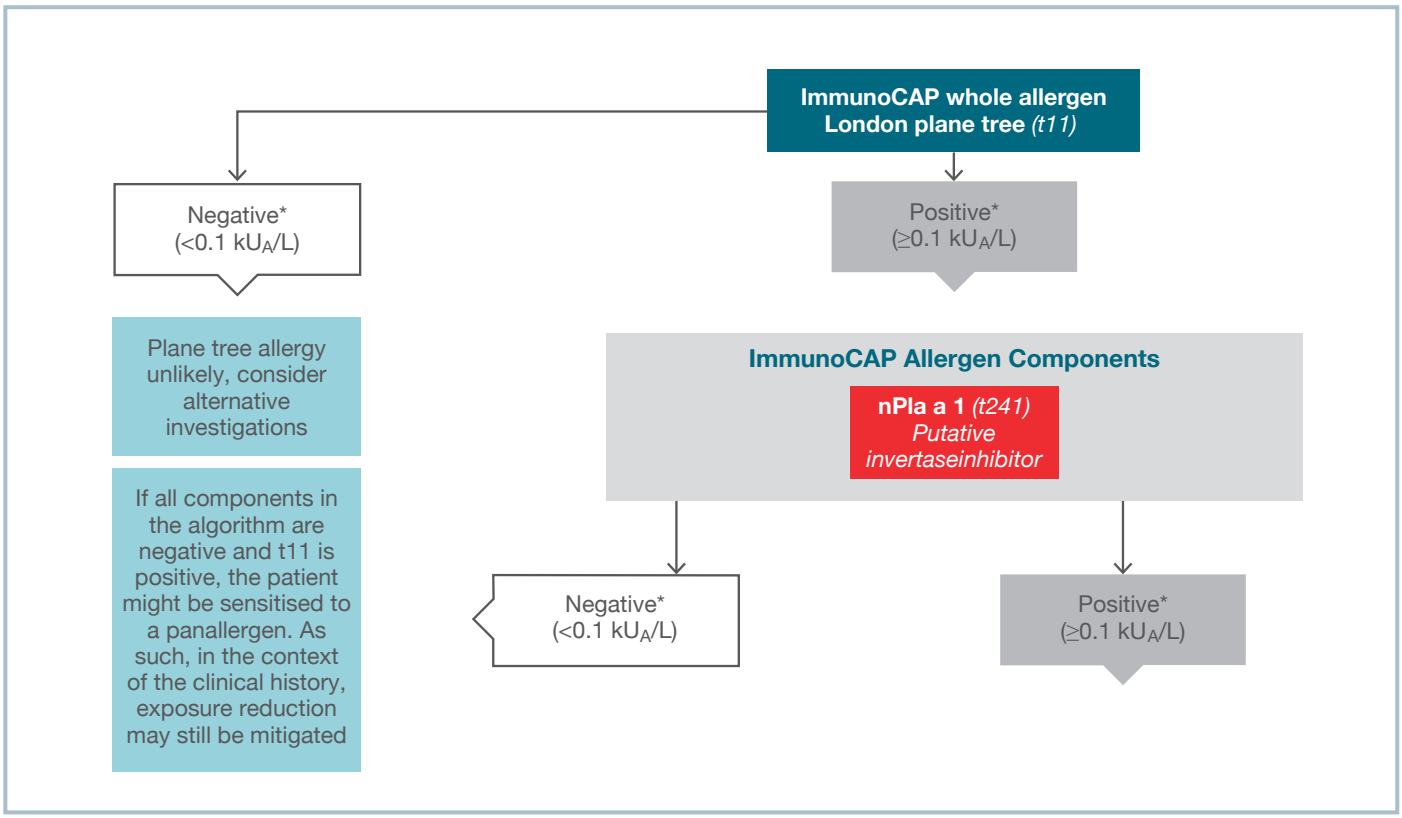
Management considerations

- Cypress pollen exposure reduction
- Consider AIT

*Results should be interpreted in the context of the history.
ImmunoCAP Allergen t23, Italian/Mediterranean/Funeral cypress; ImmunoCAP Allergen t226, Allergen component nCup a 1, Cypress

1. Matricardi PM, *et al.* EAACI Molecular Allergology User's Guide. Pediatric allergy and immunology: official publication of the European Society of Pediatric Allergy and Immunology. 2016;27 Suppl 23:1-250. **2.** Arilla MC, *et al.* Int Arch Allergy Immunol. 2004 May;134(1):10-6. Epub 2004 Mar 25. **3.** Domínguez-Ortega J, *et al. Allergy Rhinol (Providence).* 2016 Jan 1;7(4):200-206. **4.** Aceituno E, *et al. Clin Exp Allergy* 2000;30:1750–1758. **5.** Asam C, *et al. Allergy* 2015:70:1201-1211. **6.** Schmid-Grendelmeier P. Hautarzt. 2010; 61(11): 946–53. **7.** Canonica GW, *et al. AWAO -ARIA- GA2LEN concenus document on molecular-based allergy diagnostics World Allergy Organization Journal* 2013;6(1):17. 7. **8.** Asero R. *Eur Ann Allergy Clin Immunol.* 2012;44(5):183-7. **9.** Kleine-Tebbe J and Jakob T Editors: Molecular Allergy Diagnostics. Innovation for a Better Patient Management. Springer International Publishing Switzerland 2017. ISBN 978-3-319- 42498-9 ISBN 978-3-319-42499-6 (eBook), DOI 10.1007/978-3-319-42499-6

London plane tree



Interpreting results

Primary allergy - suitable for AIT[1-8]

- Primary London plane tree allergy is likely

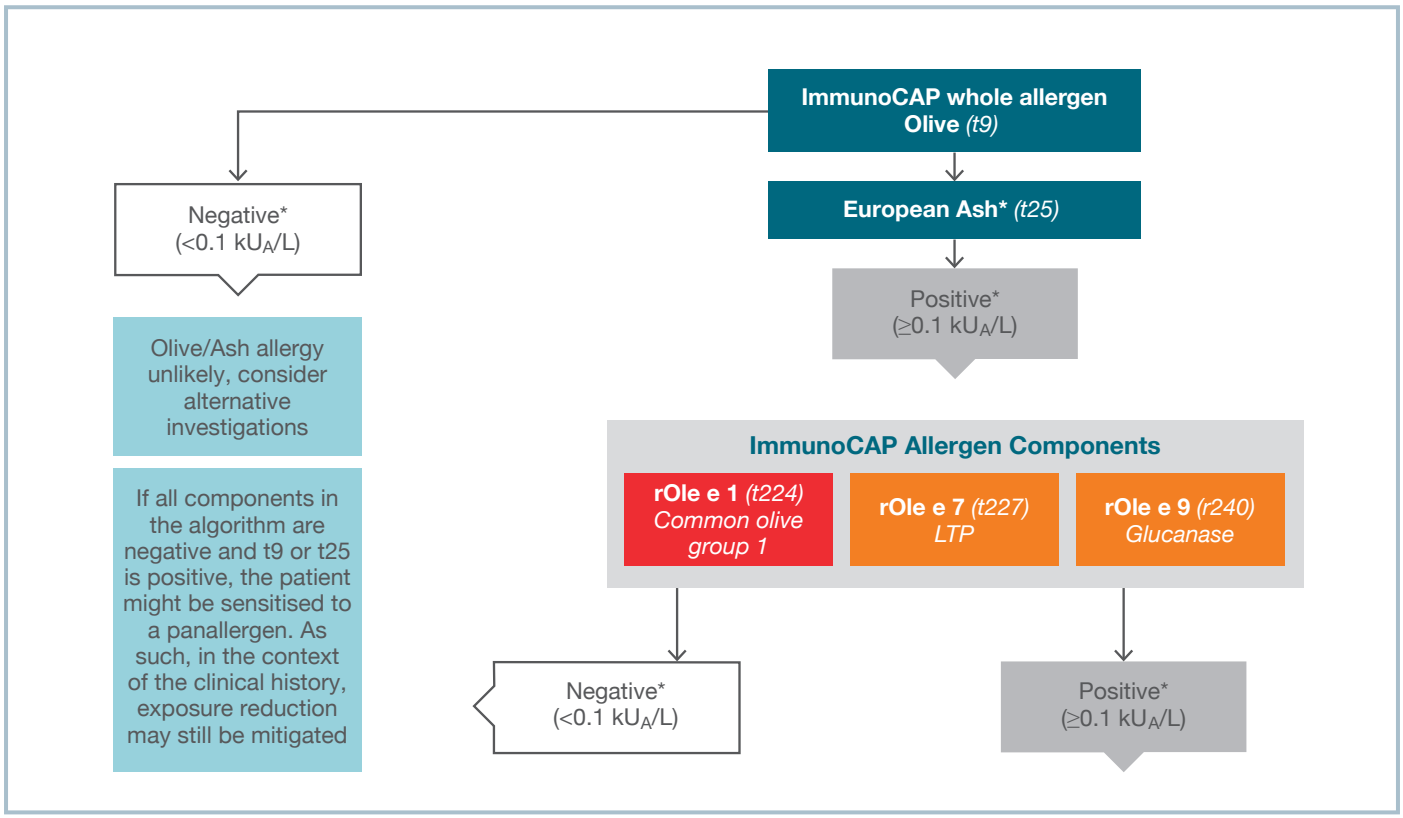
Management considerations

- Plane tree pollen exposure reduction
- Consider AIT

*Results should be interpreted in the context of the history.
ImmunoCAP Allergen t11, Maple leaf sycamore, London plane; ImmunoCAP Allergen t241, Allergen component rPla a 1, Maple leaf sycamore, London plane

1. Matricardi PM, *et al.* EAACI Molecular Allergology User's Guide. Pediatric allergy and immunology: official publication of the European Society of Pediatric Allergy and Immunology. 2016;27 Suppl 23:1-250. **2.** Asturias JA, *et al. Allergy* 2002;57(3):221–7. **3.** Asturias J, *et al. Clin Exp Allergy* 2003;33(7):978-985. **4.** Asam C, *et al. Allergy* 2015:70:1201-1211. **5.** Schmid-Grendelmeier P. Hautarzt. 2010; 61(11): 946–53. **6.** Canonica GW, *et al. AWAO -ARIA- GA2LEN concenus document on molecular-based allergy diagnostics World Allergy Organization Journal* 2013;6(1):17. 7. **7.** Asero R. *Eur Ann Allergy Clin Immunol.* 2012;44(5):183-7. **8.** Kleine-Tebbe J and Jakob T Editors: Molecular Allergy Diagnostics. Innovation for a Better Patient Management. Springer International Publishing Switzerland 2017. ISBN 978-3-319- 42498-9 ISBN 978-3-319-42499-6 (eBook), DOI 10.1007/978-3-319-42499-6

Olive tree



Interpreting results

Primary allergy - suitable for AIT[1-8]

- Primary Olive/Ash allergy is likely
- Likely cross-reaction with other PR-10 allergens, e.g., fruits, nuts, vegetables

Management considerations

- Tree pollen exposure reduction
- Consider prescription of AIT

Risk of severe symptoms in high pollen exposure[1, 3-8]

- Minor allergens, specific to olive, associated with a more severe phenotype in areas with heavy olive pollen exposure

Management considerations

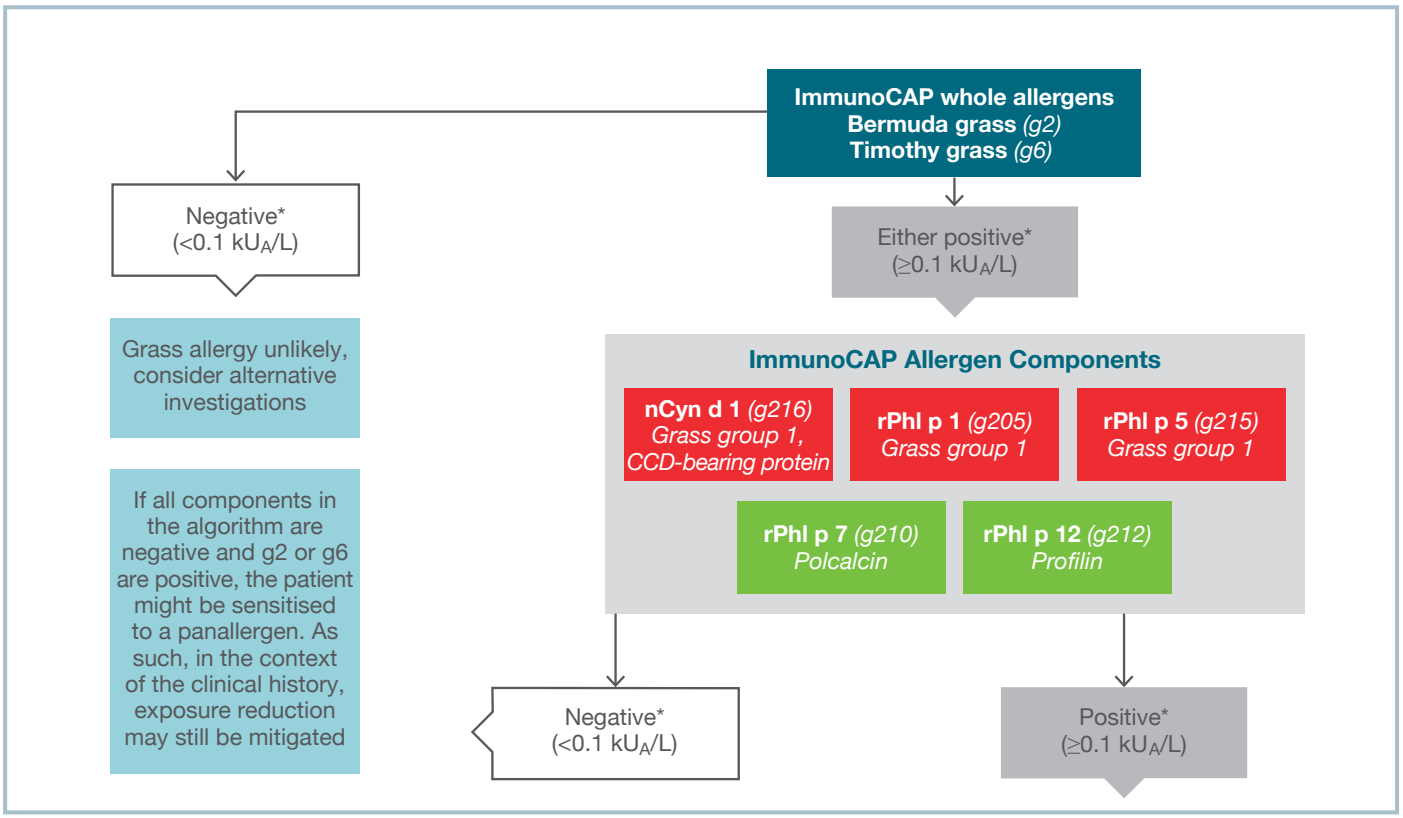
- Olive exposure reduction

Fra e 1 is the major allergen for ash pollen-sensitisation, however, cross-reactivity between Fra e 1and Ole e 1 in olive is so pronounced that Ole e 1 serves as a very good marker allergen for the diagnosis of ash pollen allergy[1]

*Results should be interpreted in the context of the history.
ImmunoCAP Allergen t9, Olive; ImmunoCAP Allergen t25, European ash; ImmunoCAP Allergen t224, Allergen Component rOle e 1, Olive; ImmunoCAP Allergen t227, Allergen component nOle e 7 LTP, Olive; ImmunoCAP Allergen t240, Allergen Component rOle e 9, Olive

1. Matricardi PM *et al.* EAACI Molecular Allergology User's Guide. *Pediatric allergy and immunology: official publication of the European Society of Pediatric Allergy and Immunology.* 2016;27 Suppl 23:1-250. **2.** Gadermaier G *et al.* Allergens of weed pollen: An overview on recombinant and natural molecules. Methods 2014;66;55-66. **3.** Hirschwehr R *et.al,* Identification of common allergenic structures in mugwort and ragweed pollen. J Allergy Clin Immunol 1998;101(2 Pt 1):196 206. **4.** Asero R *et al.* Concomitant sensitization to ragweed and mugwort pollen: who is who in clinical allergy? Ann Allergy Asthma Immunol 2014;113:307-313. **5.** Fuchs T *et.al* Natural latex, grass pollen, and weed pollen share IgE epitopes. *J Allergy Clin Immunol* 1997;100(3):356-64. **6.** Helbling A. Food allergy. [German] Ther Umsch 1994;51(1):31-7. **7.** Egger M *et al.* Pollen food syndromes associated with weed pollinosis: an update from the molecular point of view. *Allergy* 2006;61:461-476. **8.** van Toorenenbergen AW et al. Demonstration of spice-specific IgE in patients with suspected food allergies. *J Allergy Clin Immunol* 1987;79(1):108-13.

Grass



Interpreting results

Primary allergy - suitable for AIT[1-15]

- nCyn d 1: Primary sensitisation to Bermuda grass is likely when CCD sensitisation is excluded
- rPhl p 1 or rPhl p 5: Primary Timothy grass sensitisation is likely
- Sensitisation to Phl p 1 usually preceded other grass pollen component sensitisation in the development of rhinitis symptoms

Management considerations

- Grass pollen exposure reduction
- Targeted antihistamines around Bermuda or Timothy grass pollen season
- Consider prescription of AIT

Cross-reactive sensitisation[7-15]

- Sensitisation to cross-reactive minor allergens – not suitable for AIT

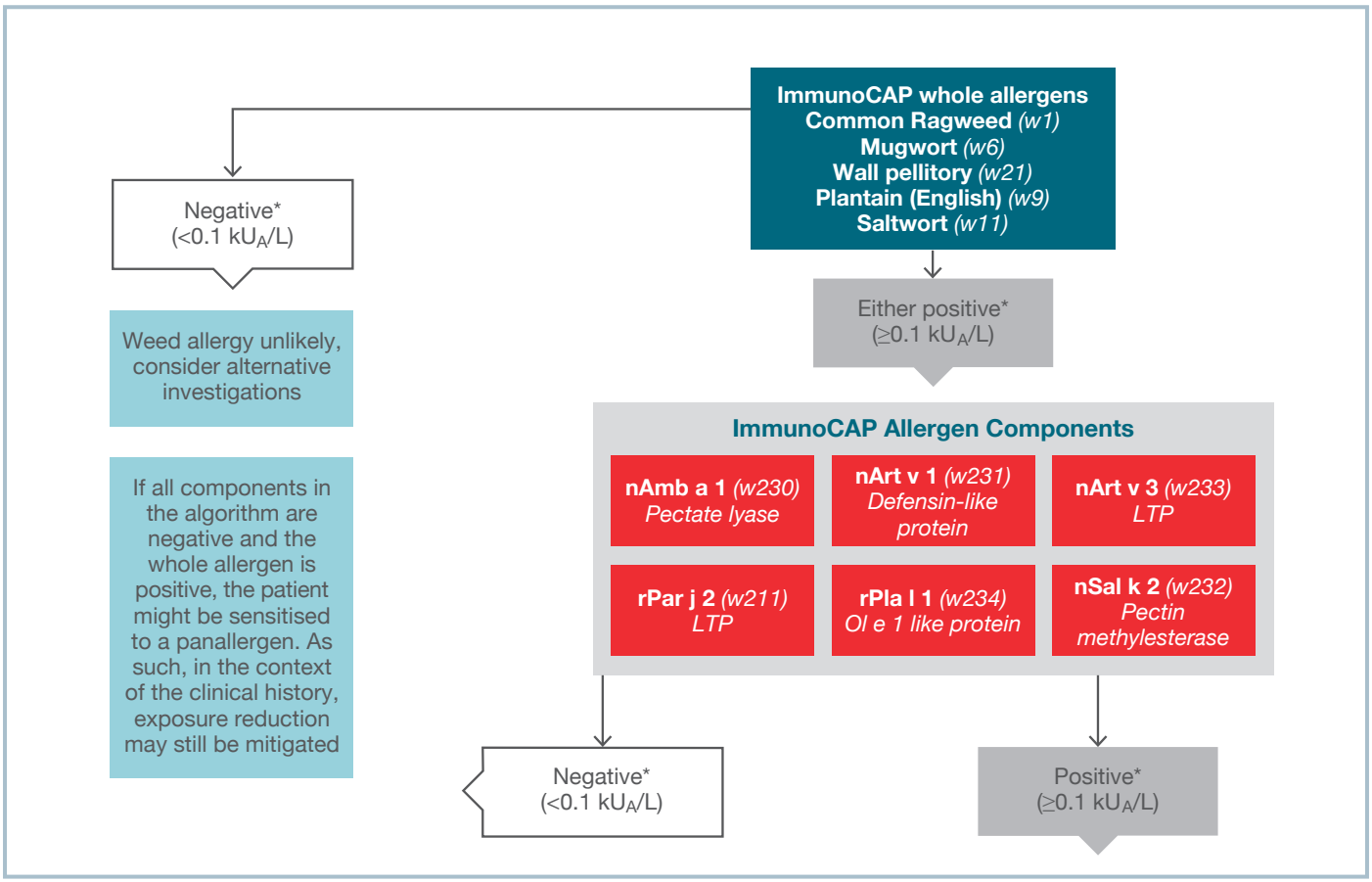
Management considerations

- Bermuda/Timothy grass pollen exposure reduction
- Consider targeted antihistamines around Bermuda/ Timothy grass season
- Consider further investigations to identify the primary allergen

*Results should be interpreted in the context of the history.
ImmunoCAP Allergen g2, Bermuda grass; ImmunoCAP Allergen g6, Timothy grass; ImmunoCAP Allergen g216, Allergen component nCyn d 1, Bermuda grass; ImmunoCAP Allergen g205, Allergen component rPhl p 1, Timothy; ImmunoCAP Allergen g215, Allergen component rPhl p 5b, Timothy; ImmunoCAP Allergen g212, Allergen component rPhl p 12 Profilin, Timothy; ImmunoCAP Allergen g210, Allergen component rPhl p 7, Timothy

1. Barber D *et al*. Understanding patient sensitization profiles in complex pollen areas: a molecular epidemiological study. Allergy. 2008 Nov; 63(11):1550–8. **2.** Andersson K *et al.* Characteristics and immunobiology of grass pollen allergens. *International Archives of Allergy & Immunology.* 2003;130(2): 87–107. **3.** Hatzler L *et al*. Molecular spreading and predictive value of preclinical IgE response to Phleum pratense in children with hay fever. *J Allergy Clin Immunol.* 2012 Oct;130(4):894–901 e5. **4.** Matricardi PM *et al.* EAACI Molecular Allergology User's Guide. Pediatric allergy and immunology: official publication of the European Society of Pediatric Allergy and Immunology. 2016;27 Suppl 23:1-250. **5.** Sekerkova A *et al.* Detection of Phl p 1, Phl p 5, Phl p 7 and Phl p 12 specific IgE antibodies in the sera of children and adult patients allergic to Phleum pollen. Allergol Int. 2012 Jun; 61(2):339–46. **6.** Tripodi S *et al.* Molecular profiles of IgE to Phleum pratense in children with grass pollen allergy: Implications for specific immunotherapy. *J Allergy Clin Immunol.* 2012 Mar;129(3): 834–9 e8. **7.** Cipriani F *et al.* Diagnostic relevance of IgE sensitization profiles to eight recombinant Phleum pratense molecules. *Allergy* 2017;Oct 20. doi: 10.1111/all.13338. [Epub ahead of print]. **8.** Hauser M *et al.* Panallergens and their impact on the allergic patient. *Allergy Asthma Clin Immunol*. 2010;6(1):1. **9.** Schmid-Grendelmeier P. Recombinant allergens – routine diagnostics or still only science? *Der Hautarzt* 2010;61(11):946-953. **10.** Focke M *et al.* (2008) Heterogeneity of commercial timothy grass pollen extracts. *Clin Exp Allergy* 38(8):1400–1408. **11.** Walker SM *et al*. Immunotherapy for allergic rhinitis. *Clin Exp Allergy.* 2011 Sep; 41(9): 1177–200. **12.** Valenta R. *et al.* Component-resolved diagnosis to optimize allergen-specific immunotherapy in the Mediterranean area. *J Investig Allergol Clin Immunol.* 2007;17 Suppl 1:36–40. **13.** Canonica GW, *et al.* AWAO -ARIA- GA2LEN concenus document on molecular-based allergy diagnostics World Allergy Organization Journal 2013;6(1):17. 7. **14.** Asero R. Component-resolved diagnosis-assisted prescription of allergen-specific immunotherapy: a practical guide Eur Ann Allergy Clin Immunol. 2012;44(5):183-7. **15.** Kleine-Tebbe J and Jakob T Editors: Molecular Allergy Diagnostics. Innovation for a Better Patient Management. Springer International Publishing Switzerland 2017. ISBN 978-3-319-42498-9 ISBN 978-3-319- 42499-6 (eBook), DOI 10.1007/978-3-319-42499-6.

Weed



Interpreting results

Primary allergy - suitable for AIT[1-13]

- Primary weed allergy is likely

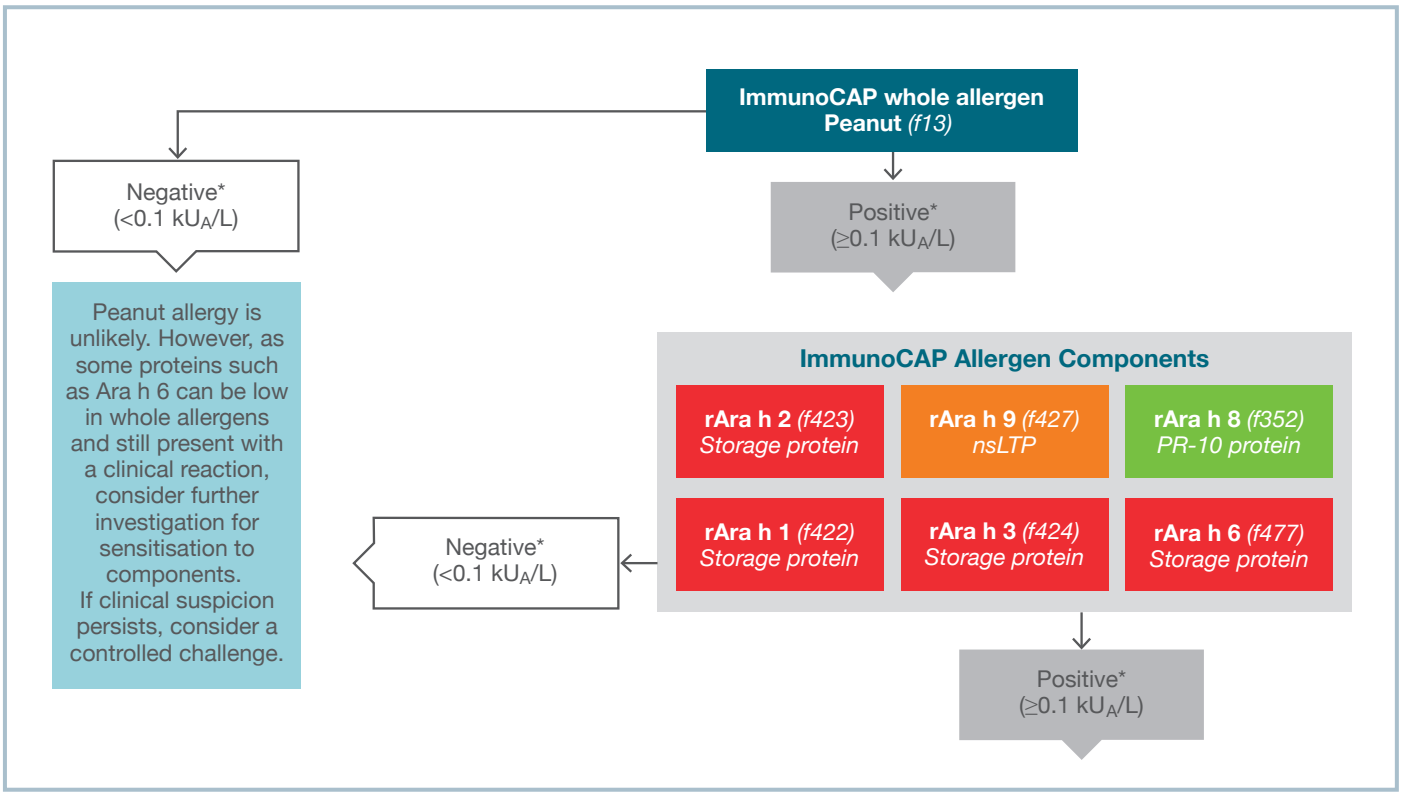
Management considerations

- Weed pollen exposure reduction
- Consider prescription of AIT

*Results should be interpreted in the context of the history.
ImmunoCAP Allergen w2, Western ragweed; ImmunoCAP Allergen w6, Mugwort; ImmunoCAP Allergen w21, Wall pellitory; ImmunoCAP Allergen w9, Plantain (English), Ribwort; ImmunoCAP Allergen w11, Saltwort (prickly), Russian thistle; ImmunoCAP Allergen w230, Allergen component nArnb a 1, Ragweed; ImmunoCAP Allergen w231, Allergen component nArt v 1, Mugwort; ImmunoCAP Allergen w233, Allergen component nArt v 3 LTP, Mugwort; ImmunoCAP Allergen w211, Allergen component rPar j 2 LTP, Wall pellitory; ImmunoCAP Allergen w234, Allergen component rPla l 1, Plantain; ImmunoCAP Allergen w232, Allergen component nSal k 1, Saltwort

1. Matricardi PM *et al.* EAACI Molecular Allergology User's Guide. Pediatric allergy and immunology: official publication of the European Society of Pediatric Allergy and Immunology. 2016;27 Suppl 23:1-250. **2.** Gadermaier G *et al.* Allergens of weed pollen: An overview on recombinant and natural molecules. Methods 2014;66;55-66. **3.** Hirschwehr R *et.al,* Identification of common allergenic structures in mugwort and ragweed pollen. *J Allergy Clin Immunol* 1998;101(2 Pt 1):196 206. **4.** Asero R *et al.* Concomitant sensitization to ragweed and mugwort pollen: who is who in clinical allergy? *Ann Allergy Asthma Immunol* 2014;113:307-313. **5.** Fuchs T et.al Natural latex, grass pollen, and weed pollen share IgE epitopes. *J Allergy Clin Immunol* 1997;100(3):356-64. **6.** Helbling A. Food allergy. [German] Ther Umsch 1994;51(1):31-7. **7.** Egger M *et al.* Pollen food syndromes associated with weed pollinosis: an update from the molecular point of view. *Allergy* 2006;61:461-476 **8.** van Toorenenbergen AW *et al.* Demonstration of spice-specific IgE in patients with suspected food allergies. *J Allergy Clin Immunol* 1987;79(1):108-13. **9.** Jensen-Jarolim E *et al.* Characterization of allergens in Apiaceae spices: anise, fennel, coriander and cumin. *Clin Exp Allergy* 1997;27(11):1299-306. **10.** Schmid-Grendelmeier P. Recombinant allergens. For routine use or still only science? Hautarzt. 2010; 61(11): 946–53. **11.** Canonica GW, et al. AWAO -ARIA- GA2LEN concenus document on molecular-based allergy diagnostics World Allergy Organization Journal 2013;6(1):17. 7. **12.** Asero R. Component-resolved diagnosis-assisted prescription of allergen-specific immunotherapy: a practical guide Eur Ann Allergy Clin Immunol. 2012;44(5):183-7. **13.** Kleine-Tebbe J and Jakob T Editors: Molecular Allergy Diagnostics. Innovation for a Better Patient Management. Springer International Publishing Switzerland 2017. ISBN 978-3-319- 42498-9 ISBN 978-3-319-42499-6 (eBook), DOI 10.1007/978-3-319-42499-6.

Peanut



Interpreting results

High risk of severe, systemic symptoms[1-14]

- Primary peanut allergy is likely –high risk of severe systemic symptoms, especially if Ara h 2 or Ara h 6 are positive

Management considerations

- Peanut avoidance
- Consider investigations for tree nut avoidance
- Consider, in context of other risk factors, prescription of an adrenaline autoinjector

Risk of local and systemic reactions[13-14]

- Primary peanut allergy is unlikely, this is likely a cross-reaction to other nsLTPs in stone fruits -which can increase the risk of systemic reactions

Management considerations

- Consider investigation for stone fruit sensitisation and subsequent avoidance
- Consider, in context of other risk factors, prescription of an adrenaline autoinjector

Risk of local reactions[13,14]

- If mono-sensitised, this is likely a cross-reactivity to birch pollen

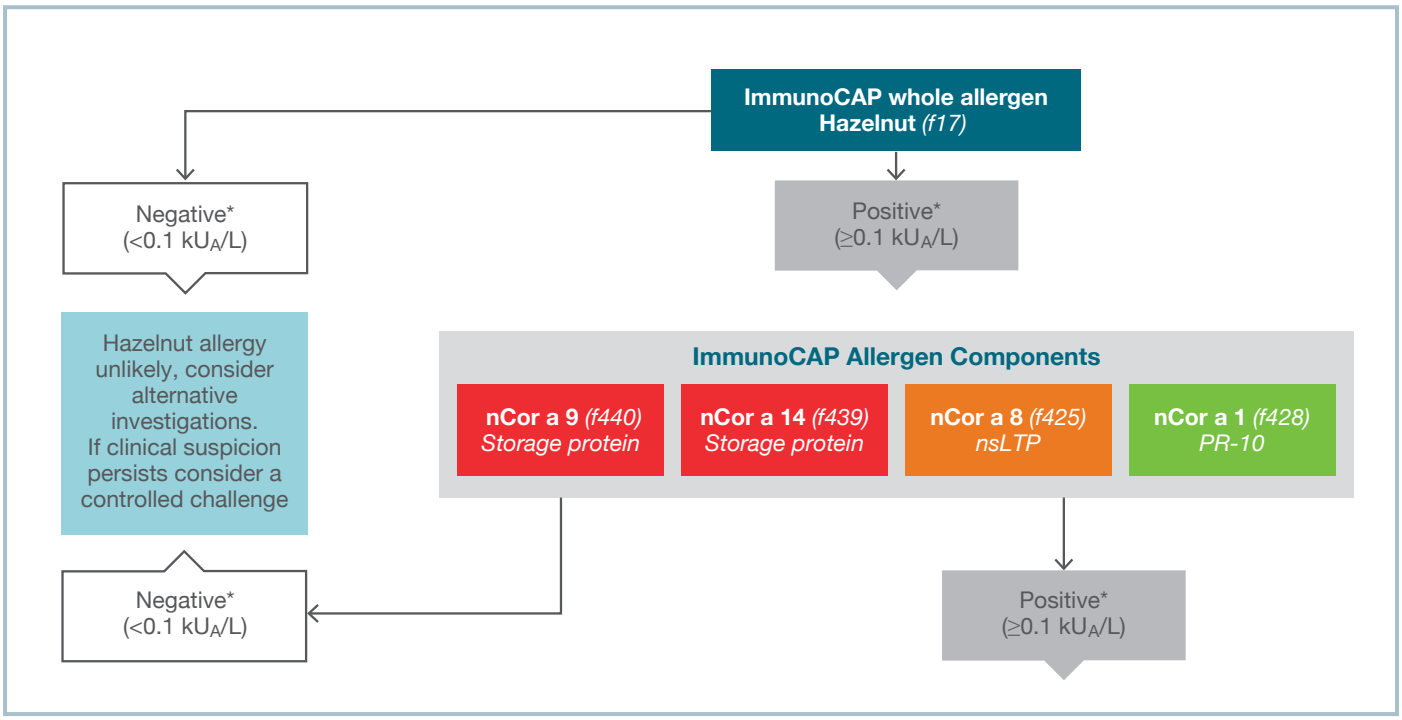
Management considerations

- Consider a controlled peanut challenge to rule out peanut allergy, and testing with Bet v 1 (PR-10; t215) to confirm birch sensitisation
- If Birch pollen sensitised and mono-sensitised to Ara h 8 consider seasonal antihistamines and/or immunotherapy

*Results should be interpreted in the context of the history.
If all components in the algorithm are negative and f13 is positive, the patient; might be sensitised to a panallergen such as profilin (Ara h 5) and CCD.29,30 ImmunoCAP Allergen f13, Peanut; ImmunoCAP Allergen f422, Allergen component rAra h 1 Peanut; ImmunoCAP Allergen f423, Allergen component rAra h 2 Peanut; ImmunoCAP Allergen f424, Allergen component rAra h 3 Peanut; ImmunoCAP Allergen f447, Allergen component rAra h 6 Peanut; ImmunoCAP Allergen f352, Allergen component rAra h 8 PR-10, Peanut; ImmunoCAP Allergen f427, Allergen component rAra h 9 L TP, Peanut

1. Nicolaou N *et al. J Allergy Clin Immunol* 2010;125:191-197. **2.** Sicherer SH, *et al. J Allergy Clin Immunol* 2010:125;1322-1326. **3.** Rona RJ *et al. J Allergy Clin Immunol* 2007;120(3):638-646. **4.** Lange L *et al. Allergo J Int* 2014; 23:158–63. **5.** Mortz CG *et al. Paediatr Allergy Immunol* 2005;16:501-506. **6.** Eller E and Bindslev-Jensen C. Allergy 2013;68(2):190-194. **7.** Dang TD, *et al. J Allergy Clin Immunol* 2012;129(4):1056-1063. **8.** Nicolaou N *et al. J Allergy Clin Immunol* 2011;127(3):684-685. **9.** Kukkonen AK *et al. Allergy* 2015 Oct;70(10):1239-45. **10.** Rajput S *et al. Journal of Allergy and Immunol* 2017, published on line June 14. **11.** Van Erp FC *et.al. Journal of Allergy and Immunol* 2016. Available online August 8, 2016. **12.** Klemans RJ *et al. Allergy.* 2014 Aug:69(8):1112-4. **13.** Matricardi PM *et al.* EAACI Molecular Allergology User's Guide. Pediatric allergy and immunology: official publication of the European Society of Pediatric Allergy and Immunology. 2016;27 Suppl 23:1-250. **14.** Kleine-Tebbe J and Jakob T Editors: Molecular Allergy Diagnostics. Innovation for a Better Patient Management. Springer International Publishing Switzerland 2017. ISBN 978-3-319-42498-9 ISBN 978-3-319-42499-6 (eBook), DOI 10.1007/978-3-319-42499-6

Hazelnut



Interpreting results

High risk if severe, systemic symptoms[1-9]

- Primary hazelnut allergy is likely – high risk of severe systemic symptoms

Management considerations

- Hazelnut avoidance
- Consider investigations for nut avoidance
- Consider, in context of other risk factors, prescription of an adrenaline autoinjector

Risk of local and systemic reactions[8-10]

- Primary hazelnut allergy is unlikely, this is likely a cross-reaction to other nsLTP stone fruits-which can increase the risk of systemic reactions

Management considerations

- Consider investigation for stone fruit sensitisation and subsequent avoidance
- Consider, in context of other risk factors, prescription of an adrenaline autoinjector

Risk of local reactions[8,9,11-14]

- If mono-sensitised, this is likely a cross-reactivity to PR-10-containing pollens and plant foods

Management considerations

- Hazelnut avoidance

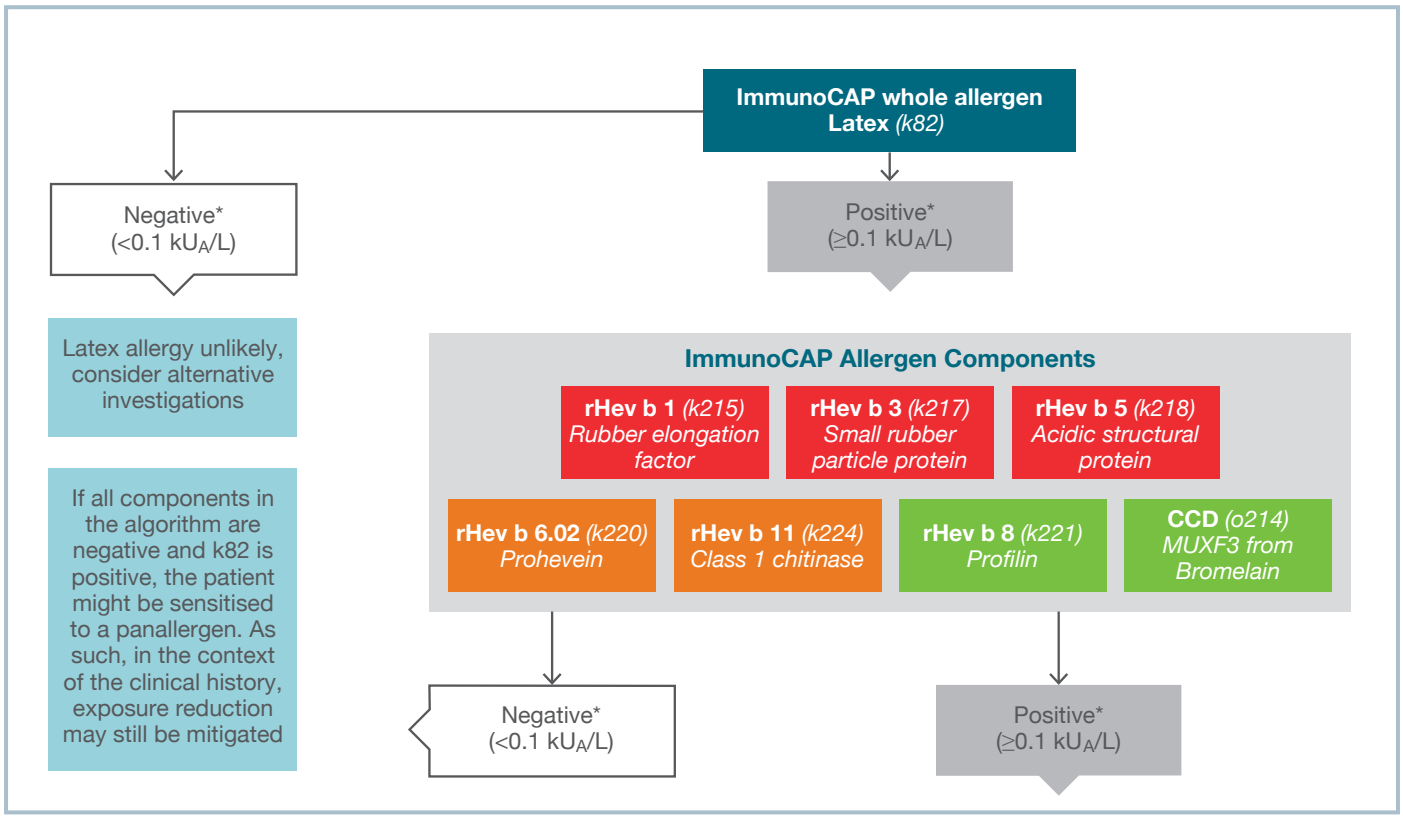
If all components in the algorithm are negative and f17 is positive, the patient might be sensitised to a panallergen

*Results should be interpreted in the context of the history.

ImmunoCAP Allergen f17, Hazel nut; ImmunoCAP Allergen f440, Allergen component nCor a 9, Hazel nut; ImmunoCAP Allergen f439, Allergen component rCor a 14, Hazel nut; ImmunoCAP Allergen f428, Allergen component rCor a 1 PR-10, Hazel nut; ImmunoCAP Allergen f425, Allergen component rCor a 8 LTP, Hazel nut

1. Faber M, *et al. Int Arch Allergy Immunol* 2014;164:200–206. **2.** Kattan DJ, *et al. J Allergy Clin Immunol Pract* 2014;2(5): 633–634. **3.** Carraro S, *et al. Pediatric Allergy and Immunol* 2016;27(3):322- 4. **4.** Eller E, *et al. Allergy* 2016;71: 556–562. **5.** Beyer K, *et al. Allergy* 2015;70: 90–98. **6.** Masthoff L, *et al. J Allergy Clin Immunol* 2013 Aug;132(2):393-9. **7.** Brandström J, *et al. Clin Exp Allergy* 2015;45(9):1412-8. **8.** Matricardi PM, *et al.* EAACI Molecular Allergology User's Guide. Pediatric allergy and immunology: official publication of the European Society of Pediatric Allergy and Immunology. 2016;27 Suppl 23:1-250. **9.** Kleine-Tebbe J and Jakob T Editors: Molecular Allergy Diagnostics. Innovation for a Better Patient Management. Springer International Publishing Switzerland 2017. ISBN 978-3-319- 42498-9 ISBN 978-3-319-42499-6 (eBook), DOI 10.1007/978-3-319-42499-6. **10.** Flinterman AE, *et al. J Allergy Clin Immunol* 2008;121(2):423-428. **11.** Hansen KS, *et al. Allergy* 2003;58(2):132-138. **12.** Anhoej C, *et al. Allergy* 2001;56(6):548-552. **13.** Kalyoncu AF, *et al. Allergol Immunopathol (Madr)* 1995;23(2):94-95. **14.** Bindslev-Jensen C, *et al. Allergy* 1991;46(8): 610-613.

Latex



Interpreting results

Primary allergy[1-3]

- Primary latex allergy is likely

Management considerations

- Latex exposure reduction

Primary allergy and risk of cross-reaction [2-7]

- Primary latex allergy is likely
- Associated with latex-food allergy, e.g. cross reaction with banana, avocado, kiwi and chestnut

Management considerations

- Avoidance not normally necessary, although the primary sensitisers should be identified

Cross-reaction[2,3,8-11]

- Seldom of clinical importance

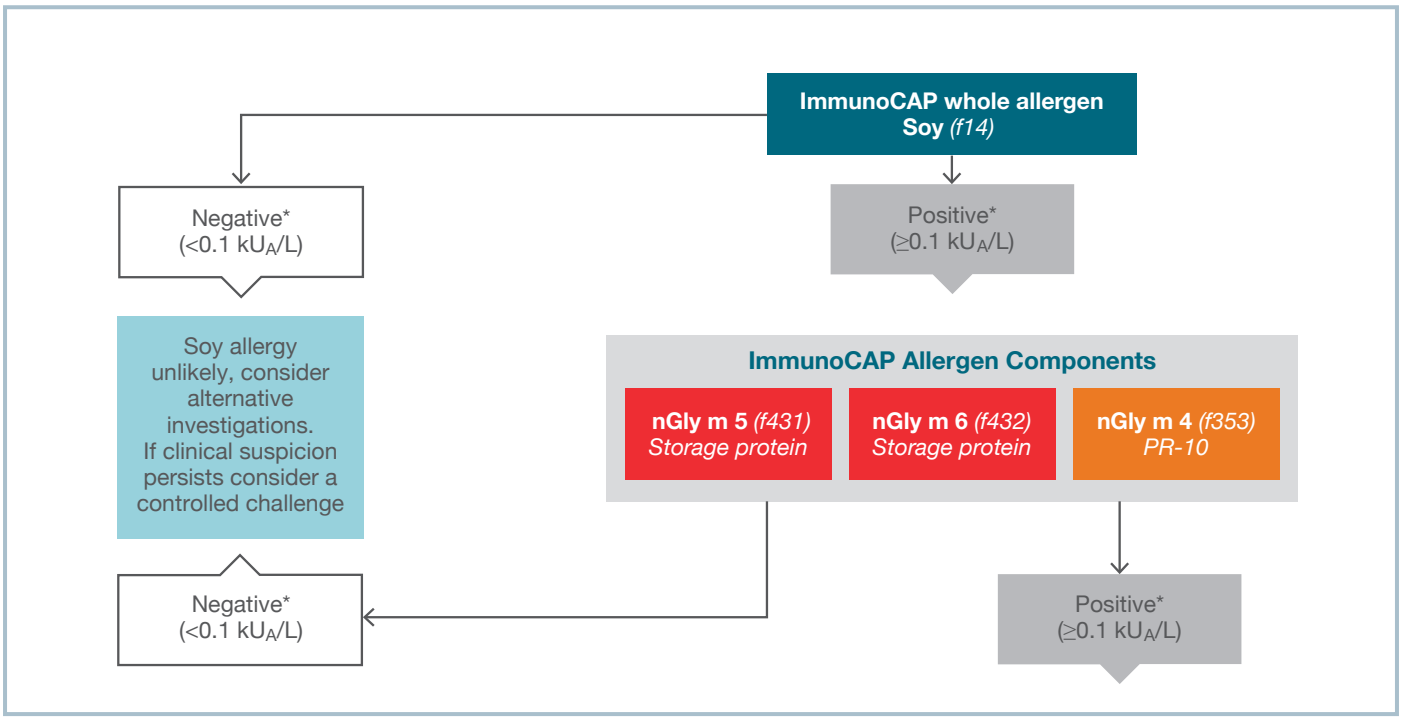
Management considerations

- Birch pollen exposure reduction
- Consider targeted antihistamines around birch season
- Consider further investigations to identify the primary allergen

*Results should be interpreted in the context of the history.
ImmunoCAP Allergen k82, Latex; ImmunoCAP Rare Allergen k215, Allergen component rHev b 1 Latex; ImmunoCAP Rare Allergen k217, Allergen component rHev b 3 Latex; ImmunoCAP Allergen k218, Allergen component rHev b 5 Latex; ImmunoCAP Rare Allergen k220, Allergen component rHev b 6.02 Latex; ImmunoCAP Rare Allergen k221, Allergen component rHev b 8 Profilin, Latex; ImmunoCAP Rare Allergen k224, Allergen component rHev b II Latex; ImmunoCAP Allergen o214, Allergen component MUXF3 CCD, Bromelain

1. Wagner B, *et al. J Allergy Clin Immunol* 2001;108(4):621-627. **2.** Matricardi PM, *et al.* EAACI Molecular Allergology User's Guide. Pediatric allergy and immunology: official publication of the European Society of Pediatric Allergy and Immunology. 2016;27 Suppl 23:1-250. **3.** Kleine-Tebbe J and Jakob T Editors: Molecular Allergy Diagnostics. Innovation for a Better Patient Management. Springer International Publishing Switzerland 2017. ISBN 978-3-319-42499-6 (eBook), DOI 10.1007/978-3-319-42499-6. **4.** Sutherland MF, *et al. Clin Exp Allergy* 2002;32(4):583-589. **5.** Rozynek P, *et al. Clin Exp Allergy* 1998;28(11):1418- 1426. **6.** Raulf-Heimsoth M, *et al. Allergy* 2004;59(7):724-733. **7.** Vandenplas O, *et al. Allergy* 2016;71:840– 849. **8.** Ebo DG, *et al. Clin Exp Allergy* 2010;40(2):348-358. **9.** Schuler S, *et al. Clin Transl Allergy* 2013;3(1):11. **10.** Ott H, *et al. J Investig Allergol Clin Immunol* 2010;20(2):129-138. **11.** Garnier L, *et al. Eur Ann Allergy Clin Immunol* 2012;44(2):73–79.

Soy



Interpreting results

High risk if severe, systemic symptoms[1-4]

- Primary soy allergy is likely – high risk of severe systemic symptoms

Management considerations

- Soy avoidance
- Consider, in context of other risk factors, prescription of an adrenaline autoinjector

Risk of local and systemic reactions[3-6]

- If mono-sensitised, this is likely a cross-reactivity to PR-10-containing pollens and plant foods

Management considerations

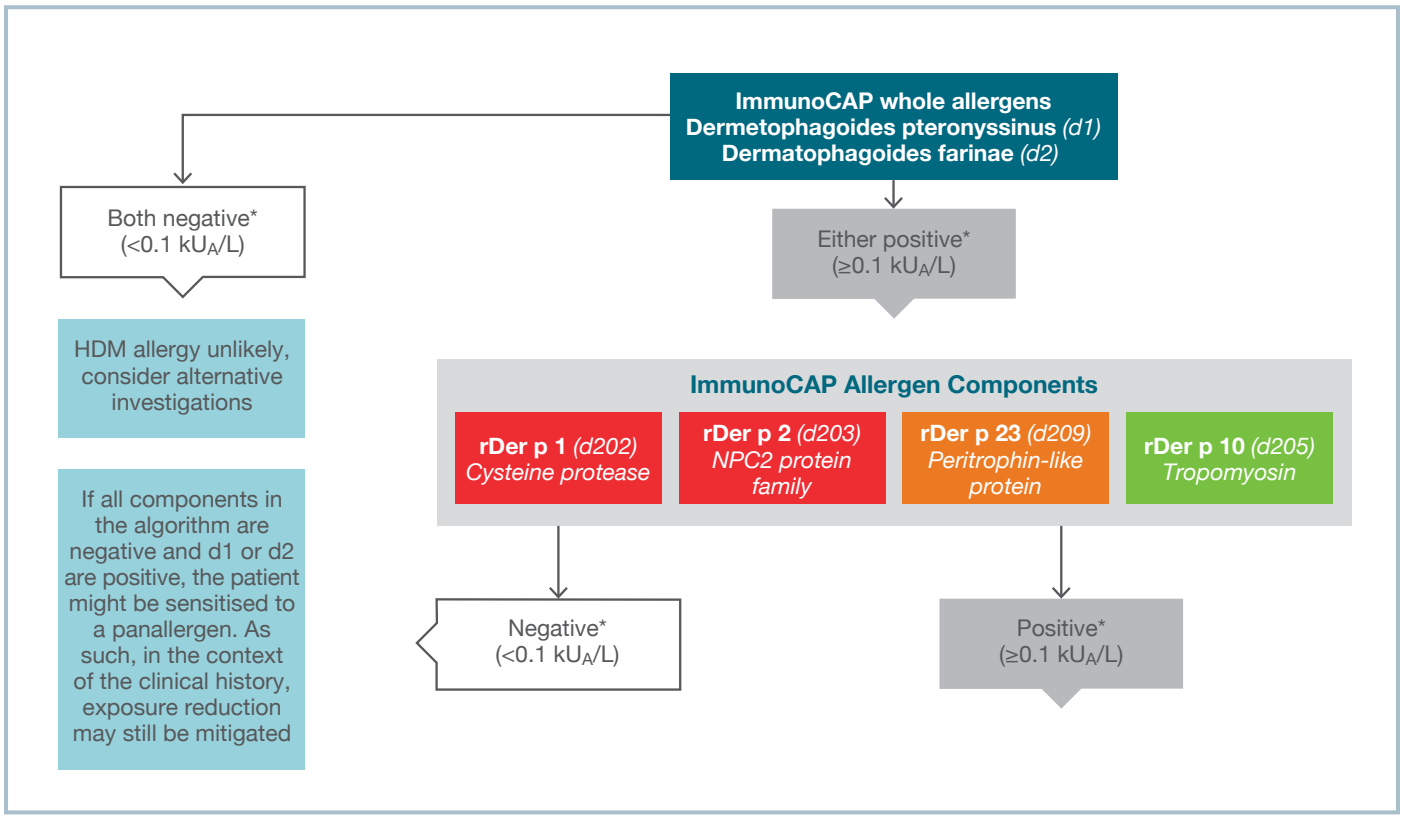
- Soy avoidance
- High loads can still lead to systemic reactions -consider confirming the soy allergen load, especially if the patient is sensitised to Bet v 1

If all components in the algorithm are negative and f14 is positive, the patient might be sensitised to a panallergen

*Results should be interpreted in the context of the history.
ImmunoCAP Allergen f14, Soybean; ImmunoCAP Allergen f431, Allergen component nGly m 5 beta-conglycinin, Soy; ImmunoCAP Allergen f432, Allergen component nGly m 6 Glycinin, Soy; ImmunoCAP Allergen f353, Allergen component rGly m 4 PR-10, Soy

1. Holzhauser T, *et al. J Allergy Clin Immunol* 2009;123(2);452-458. **2.** Ito T, *et al. J Allergy Clin Immunol* 2010;125;2 Suppl 1:AB88. **3.** Matricardi PM, *et al.* EAACI Molecular Allergology User's Guide. Pediatric allergy and immunology: official publication of the European Society of Pediatric Allergy and Immunology. 2016;27 Suppl 23:1-250 **4.** Kleine-Tebbe J and Jakob T Editors: Molecular Allergy Diagnostics. Innovation for a Better Patient Management. Springer International Publishing Switzerland 2017. ISBN 978-3-319- 42498-9 ISBN 978-3-319-42499-6 (eBook), DOI 10.1007/978-3-319-42499-6. **5.** Ebisawa M, *et al. J Allergy Clin Immunol* 2013;132:976-978 e1-5. **6.** Kosma P, *et al. Acta Paediatr.* 2011;100(2):305-306.

House dust mite



Interpreting results

Primary allergy - suitable for AIT[1-11]

- Primary HDM sensitisation is likely

Management considerations

- HDM exposure reduction
- Consider prescription of AIT

NOTE: Der p 2 may be under represented in AIT – Der p 2 sensitised patients may benefit from AIT based on purified mite body cultures or carefully standardised pharmaceuticals

Primary allergy - may not be suitable for AIT [1,3-12]

- Primary HDM allergy is likely

Management considerations

- HDM exposure reduction
- AIT may be ineffective –the amount of Der p 23 in faecal particles/bodies is low and may therefore be underrepresented in AIT

Cross-reaction[1,4,11]

- This is likely a cross-reactivity between HDM, crustaceans, insects and molluscs
- If Der p 10 is dominant, food allergy should be investigated

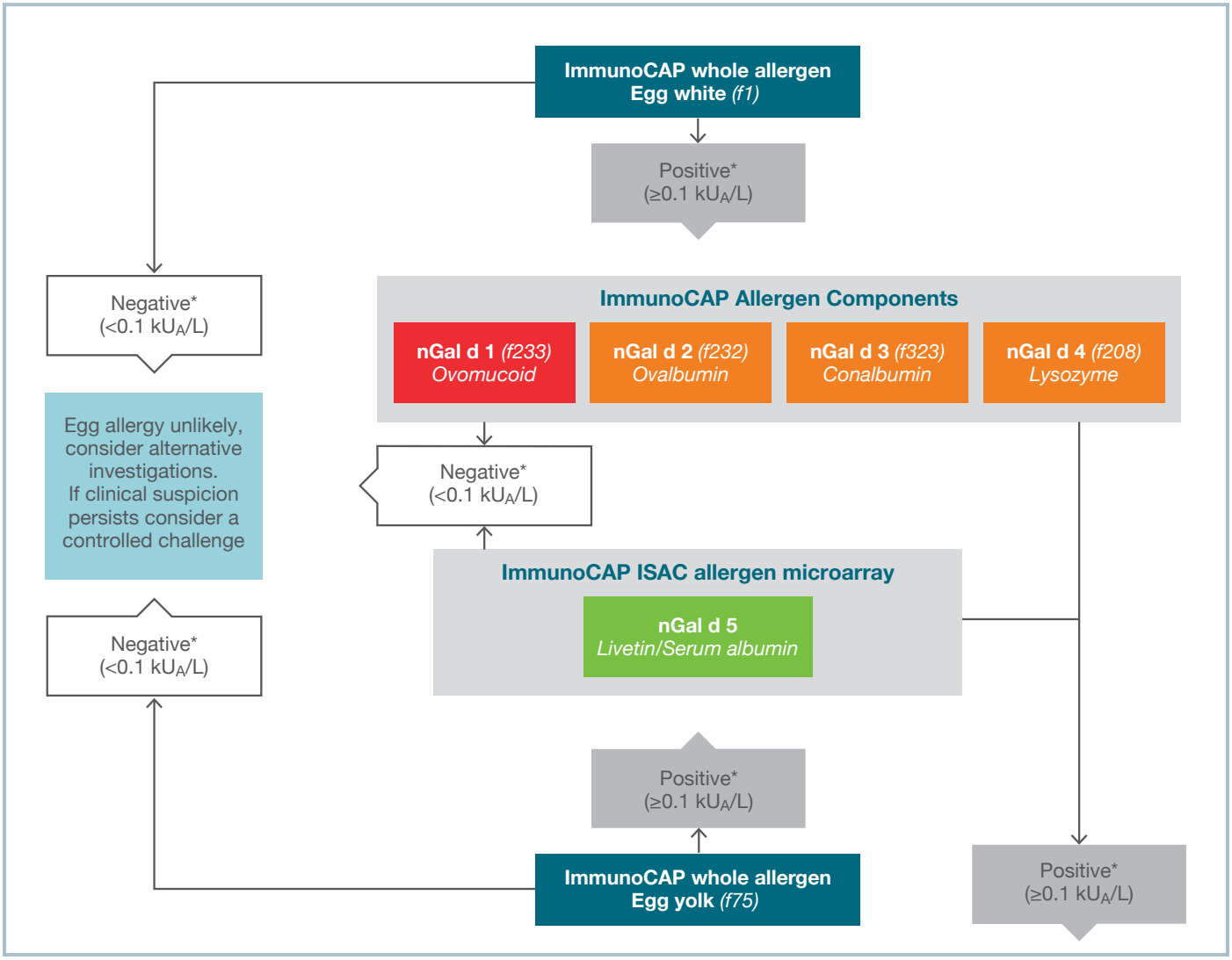
Management considerations

- Consider HDM exposure reduction
- Investigate shellfish allergy, history depending

*Results should be interpreted in the context of the history.
ImmunoCAP Allergen d1, House dust mite; ImmunoCAP Allergen d2, House dust mite; ImmunoCAP Allergen d202, Allergen component nDer p 1, House dust mite; ImmunoCAP Allergen d203, Allergen component rDer p 2, House dust mite; ImmunoCAP Allergen d209, Allergen component rDer p 23, House dust mite; mmunoCAP Allergen d205, Allergen component rDer p 10 Tropomyosin, House dust mite

1. Matricardi PM, *et al. EAACI Molecular Allergology User's Guide.* Pediatric allergy and immunology: official publication of the European Society of Pediatric Allergy and Immunology. 2016;27 Suppl 23:1-250. **2.** Nolte H, *et al.* Annals of allergy, asthma & immunology: official publication of the American College of Allergy, Asthma, & Immunology. 2016;117(3):298-303. **3.** Becker S, *et al. Int Arch Allergy Immunol.* 2016;170(2):132-7. **4.** Casset A, *et al. Int Arch Allergy Immunol.* 2012;159(3):253-62. **5.** Posa D, *et al. J Allergy Clin Immunol* 2017;139:541-549. **6.** Resch Y, *et al. The Journal of allergy and clinical immunology.* 2015;136(4):1083- 91. **7.** Canonica GW, *et al. AWAO -ARIA- GA2LEN* concenus document on molecular-based allergy diagnostics World Allergy Organization Journal 2013;6(1):17. 7. **8.** Asero R. *Eur Ann Allergy Clin Immunol.* 2012;44(5):183-7. **9.** Schmid-Grendelmeier P, *et al. Der Hautarzt* 2010;61(11):946-953. **10.** Thomas WR. Current allergy and asthma reports. 2016;16(9):69. **11.** Kleine-Tebbe J and Jakob T Editors: Molecular Allergy Diagnostics. Innovation for a Better Patient Management. Springer International Publishing Switzerland 2017. ISBN 978-3-319-42498-9 ISBN 978-3-319- 42499-6 (eBook), DOI 10.1007/978-3-319- 42499-6. **12.** Weghofer M, *et al. J Immunol.* 2013;190(7):3059-67.

Eggs



Interpreting results

Reaction to raw and cooked egg[1-11]

- Primary, persistent, egg allergy to both raw and cooked eggs is likely[1-11]

Management considerations

- Egg avoidance
- Consider, in context of other risk factors, prescription of an adrenaline autoinjector

Reaction to raw egg[1,5,9-11]

- Primary egg allergy is likely
- Likely to be tolerant to extensively heated egg if Gal d 1 is negative

Management considerations

- Avoidance of raw or lightly cooked egg – consider controlled challenge of cooked egg

Cross-reaction[12-14]

- Cross reaction to bird is likely

Management considerations

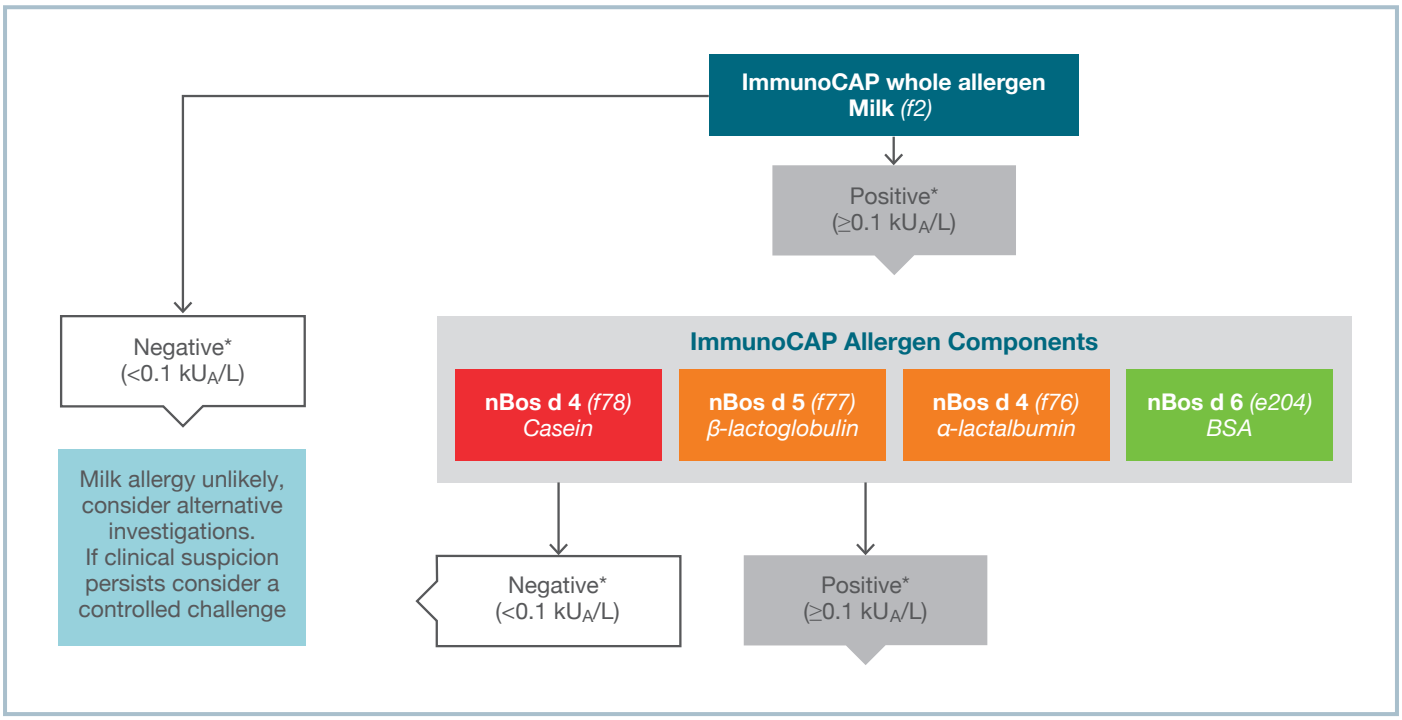
- Egg avoidance
- Consider risk of bird/egg syndrome

If all components in the algorithm are negative and f1 or f75 is positive, the patient might be sensitised to a panallergen such as YGP42 (Gal d 6)

*Results should be interpreted in the context of the history.
ImmunoCAP Allergen f1, Egg white; ImmunoCAP Allergen f233, Allergen component nGal d 1 Ovomucoid, Egg; ImmunoCAP Allergen f232, Allergen component nGal d 2 Ovalbumin, Egg; ImmunoCAP Allergen f323, Allergen component nGal d 3 Conalbumin, Egg; ImmunoCAP Allergen k208, Allergen component nGal d 4 Lysozyme, Egg; ImmunoCAP Allergen, Allergen component nGal d 5 Livetin/Serum albumin, Egg; ImmunoCAP Allergen f75, Egg yolk

1. Matricardi PM, *et al.* EAACI Molecular Allergology User's Guide. Pediatric allergy and immunology: official publication of the European Society of Pediatric Allergy and Immunology. 2016;27 Suppl 23:1-250. **2.** Ando H, *et al. J Allergy Clin Immunol* 2008;122:583- 588. **3.** Lemon-Mulé H, *et al. J Allergy Clin Immunol* 2008;122;977-983. **4.** Urisu A. J Allergy Clin Immunol 1997;100:171-176. **5.** Benhamou Senouf AH, *et al. Pediatr Allergy Immunol* 2015;26:12–17. **6.** Gray CL *et al. Pediatr Allergy Immunol* 2016;27:709-15. **7.** Bernhisel-Broadbent J *et al. J Allergy Clin Immunol* 1994;93;1047-1059. **8.** Jarvinen KM *et al. Allergy* 2007; 62:758-765. **9.** Benhamou AH *et al. Allergy* 2010; 65: 283-289. **10.** Gradman J *et al. Pediatr Allergy Immunol*. 2016 Dec;27(8):825-830. **11.** Kleine-Tebbe J and Jakob T Editors: Molecular Allergy Diagnostics. Innovation for a Better Patient Management. Springer International Publishing Switzerland 2017. ISBN 978-3-319- 42498-9 ISBN 978-3-319-42499-6 (eBook), DOI 10.1007/978-3-319-42499-6. **12.** Dhanapala P *et al*. Cracking the egg: An insight into egg hypersensitivity. *Mol Immunol.* 2015;66(2):375-83. **13.** De Silva C *et al*. Molecular and immunological analysis of hen's egg yolk allergens with a focus on YGP42 (Gal d 6). *Mol Immunol.* 2016; 71: 152-60. **14.** Hemmer W *et al.* Update on the bird-egg syndrome and genuine poultry meat allergy. Allergo J Int. 2016;25: 68-75.

Milk



Interpreting results

Reaction to raw and cooked milk[1-17]

- Primary, persistent, milk allergy to both raw and cooked milk is likely[1-17]

Management considerations

- Milk avoidance
- Consider, in context of other risk factors, prescription of an adrenaline autoinjector

Reaction to raw milk[1,10-12,17]

- Primary milk allergy is likely
- Likely to be tolerant to extensively cooked/baked milk if nBos d 6 is negative

Management considerations

- Avoidance of raw milk – consider controlled challenge of cooked/baked milk

Reaction to raw milk[1,10-12,17] and cross reaction to beef[18,19]

- Primary milk allergy is likely
- Likely to be tolerant to extensively cooked/baked milk if nBos d 8 is negative

Management considerations

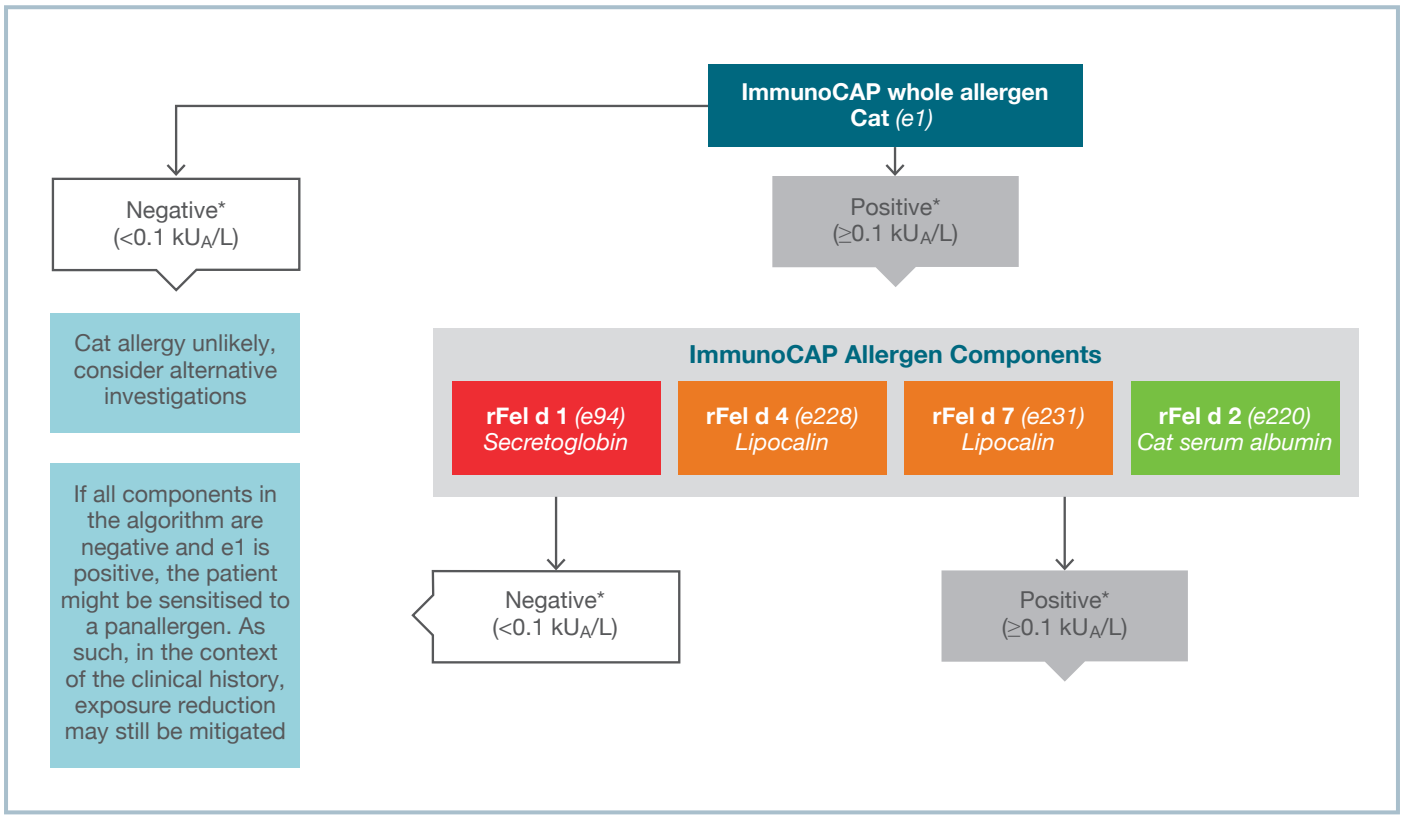
- Avoidance of raw milk – consider controlled challenge of cooked/baked milk
- Consider risk of concomitant beef allergy and risk of cross reaction with other serum albumins, e.g. pork (f26)/mutton (f88)

If all components in the algorithm are negative and f2 is positive, the patient might be sensitised to a panallergen

*Results should be interpreted in the context of the history.; ImmunoCAP Allergen f2, Milk; ImmunoCAP Allergen f76, Allergen component nBos d 4 Alpha-lactalbumin, Milk; ImmunoCAP Allergen f17, Allergen component nBos d 5 Beta-lactoglobulin, Milk; ImmunoCAP Allergen e204, Allergen component nBos d 6 BSA, Cow; ImmunoCAP Allergen f18, Allergen component nBos d 8 Casein, Milk

1. Matricardi PM, *et al.* EAACI Molecular Allergology User's Guide. Pediatric allergy and immunology: official publication of the European Society of Pediatric Allergy and Immunology. 2016;27 Suppl 23:1-250. **2.** Werfel T, *et al. J Allergy Clin Immunol* 1997;99 (1):124-133. **3.** Norgaard A, *et al. J Allergy Clin Immunol* 1996,97:237. **4.** Dupont D, *et al. Mol Nutr Food Res* 2010;54(11):1677-1689. **5.** Docena G, *et al. Allergy* 1996;51(6):412–416. **6.** Shek LP. Allergy 2005;60(7):912-919. **7.** Lam HY. Clin Exp Allergy 2008;38(6):995-1002. **8.** Bloom A, *et al. Pediatric Allergy and Immunology* 2015;25:740–746. **9.** Nowak-Wegrzyn AK, *et al. J Allergy Clin Immunol* 2008;122(2);342-347. **10.** Caubet JC, *et al. J Allergy Clin Immunol* 2012;131:222-224. **11.** Ito K, *et al. Clin Mol Allergy* 2012 Jan 2;10(1):1. doi: 10.1186/1476-7961-10-1. **12.** Bartuzi Z, *et al. Curr Allergy Asthma Rep.* 2017;17(7):46. **13.** Chatchatee P, *et al. Clin Exp Allergy* 2001;31:1256-62. **14.** Chatchatee P, *et al. J Allergy Clin Immunol* 2001;107:379-83. **15.** Cerecedo I, *et al. J Allergy Clin Immunol* 2008;122:589-594. **16.** Caubet JC, *et al. Allergy.* 2017 Mar 27. doi: 10.1111/all.13167. [Epub ahead of print] **17.** Kleine-Tebbe J and Jakob T Editors: Molecular Allergy Diagnostics. Innovation for a Better Patient Management. Springer International Publishing Switzerland 2017. ISBN 978-3-319- 42498-9 ISBN 978-3-319-42499-6 (eBook), DOI 10.1007/978-3-319-42499-6.

Cat



Interpreting results

Primary allergy - suitable for AIT[1-9]

- Primary cat allergy is likely

Management considerations

- Cat exposure reduction
- Consider AIT, especially if the patient experiences symptoms of asthma with indirect exposure

Primary allergy for cat - not suitable for AIT[1-4,8,9]

- Primary cat allergy is likely

Management considerations

- Cat exposure reduction
- Patients with asthma are at increased risk of severe symptoms
- Cross-reactivity with other furry animals is common, you may want to consider further investigations and a wider exposure reduction plan

Cross-reaction[8-12]

- Seldom of clinical importance
- If mono-sensitised, this is likely a cross-reaction with other serum albumins e.g. dog/horse

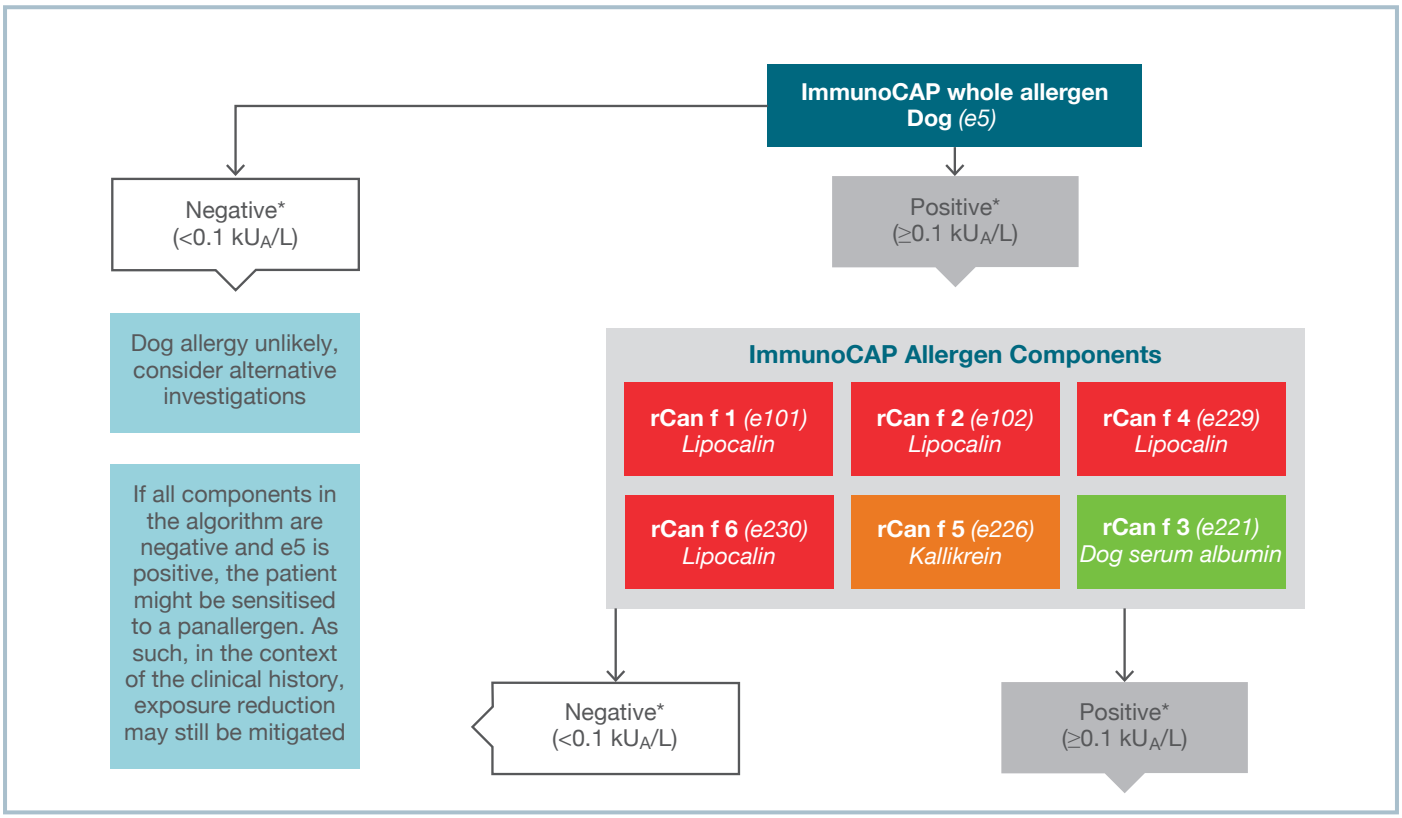
Management considerations

- Avoidance of mammalian pets
- Consider additional investigations in patients with moderate to high levels to exclude sensitisation to un-boiled milk and raw or medium cooked meat such as sausages, ham and steaks. Note, Fel d 2 can be a primary sensitised in Pork-Cat syndrome

*Results should be interpreted in the context of the history.
ImmunoCAP Allergen e1, Cat dander; ImmunoCAP Allergen e94, Allergen component rFel d 1 Cat; ImmunoCAP Allergen e220, Allergen component rFel d 2, Cat serum albumin; ImmunoCAP Allergen e228, Allergen component rFel d 4, Cat; ImmunoCAP Allergen e231, Allergen component rFel d 7, Cat

1. Nordlund B, *et al. Allergy* 2012;67:661-669. **2.** Konradsen JR, *et al. J Allergy Clin Immunol* 2015;135:616-25. **3.** Nagao M, *et al. Clin Mol Allergy* 2017;3;15:4. doi: 10.1186/s12948-017- 0061-8. eCollection 2017. **4.** Asarnoj A, *et al. J Allergy Clin Immunol.* 2016;137(3):813-21. **5.** Canonica GW, *et al.* AWAO -ARIA- GA2LEN concenus document on molecular-based allergy diagnostics *World Allergy Organization Journal* 2013;6(1):17. 7. **6.** Asero R. Eur Ann *Allergy Clin Immunol.* 2012;44(5):183-7. **7.** Schmid-Grendelmeier P, *et al. Der Hautarzt* 2010;61(11):946-953. **8.** Matricardi PM *et al.* EAACI Molecular Allergology User's Guide. Pediatric allergy and immunology: official publication of the European Society of Pediatric Allergy and Immunology. 2016;27 Suppl 23:1-250. **9.** Kleine-Tebbe J and Jakob T Editors: Molecular Allergy Diagnostics. Innovation for a Better Patient Management. Springer International Publishing Switzerland 2017. ISBN 978-3-319-42498-9 ISBN 978-3-319-42499-6 (eBook), DOI 10.1007/978-3-319-42499-6. **10.** Drouet M and Sabbah A. Monogr Allergy 1996; 32:164-73. **11.** Posthumous J, *et al. J Allergy Clin Immunol* 2013;131:924–925 (letter to the editor). **12.** Hilger C, *et al. Allergy* 1997;52:179-87.

Dog



Interpreting results

Primary allergy - suitable for AIT[1-8]

- Primary dog allergy is likely

Management considerations

- Dog exposure reduction
- Patients with asthma are at increased risk of severe symptoms
- Consider AIT
- Can f 1 and Can f 2 are indicators for successful AIT. However, Can f 4 and Can f 6 are commonly cross-reactive with other species (cat/horse) and less suitable for AIT. For these, further investigations should be considered and perhaps a broader animal avoidance plan

Primary allergy for male dogs - suitable for AIT[4,9-12]

- If monosensitised, primary dog allergy to male dogs is likely (30% of patients are mono-sensitised to Can f 5)

Management considerations

- Dog exposure reduction (may be able to tolerate female dogs if monosensitised)
- Patients with asthma are at increased risk of severe symptoms
- Consider AIT

Cross-reaction[4,8]

- Seldom of clinical importance
- If mono-sensitised, this is likely a cross-reaction with other serum albumins e.g. horse

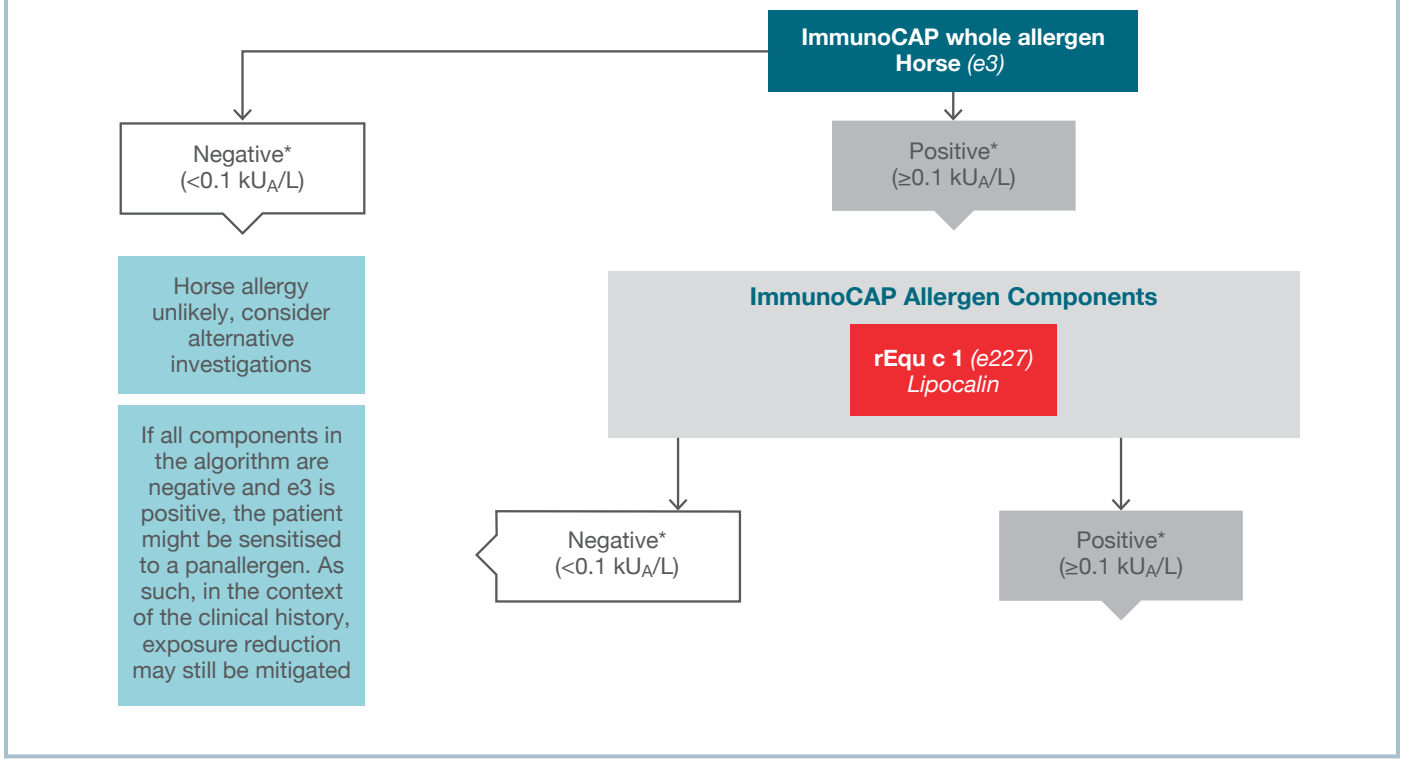
Management considerations

- Avoidance of mammalian pets
- Consider additional investigations in patients with moderate to high levels to exclude sensitisation to un-boiled milk and raw or medium cooked meat such as sausages, ham and steaks

*Results should be interpreted in the context of the history.
ImmunoCAP Allergen e5, Dog dander; ImmunoCAP Allergen e101, Allergen component rCan f 1, Dog; ImmunoCAP Allergen e102, Allergen component rCan f 2, Dog; ImmunoCAP Allergen e221, Allergen component nCan f 3, Dog serum albumin; ImmunoCAP Allergen e229, Allergen component rCan f 4, Dog; ImmunoCAP Allergen e226, Allergen component rCan f 5, Dog; ImmunoCAP Allergen e230, Allergen component rCan f 6, Dog

1. Nordlund B, *et al.* Allergy 2012:67:661–9. **2.** Nicholas C, *et al. Ann Allergy Asthma Immunol* 2010;105:228-33. **3.** Konradsen JR, *et al. Allergy Clin Immunol* 2015;135:616-25. **4.** Matricardi PM, *et al.* EAACI Molecular Allergology User's Guide. Pediatric allergy and immunology: official publication of the European Society of Pediatric Allergy and Immunology. 2016;27 Suppl 23:1-250. **5.** Canonica GW, *et al.* AWAO -ARIA- GA2LEN concenus document on molecular-based allergy diagnostics World Allergy Organization Journal 2013;6(1):17. 7. **6.** Asero R. Eur Ann *Allergy Clin Immunol.* 2012;44(5):183-7. **7.** Schmid-Grendelmeier P, *et al. Der Hautarzt* 2010;61(11):946-953 **8.** Kleine-Tebbe J and Jakob T Editors: Molecular Allergy Diagnostics. Innovation for a Better Patient Management. Springer International Publishing Switzerland 2017. ISBN 978-3-319- **9.** Mattsson L, *et.al. J Allergy Clin Immunol* 2009; 123(2):362-368. **10.** Basagaña M. Allergy Int Arch *Allergy Immunol* 2012;159:143–146. **11.** Kofler L, *et al.* Eur Ann *Allergy Clin Immunol* 2012 Apr;44(2):89-92. **12.** Schoos AM, *et al. J Allergy Clin Immunol Pract.* 2017 Nov-Dec;5(6):1754-1756. 42498-9 ISBN 978-3-319-42499-6 (eBook), DOI 10.1007/978-3-319-42499-6.

Horse



Interpreting results

Primary allergy - suitable for AIT[1-8]

- Primary horse allergy is likely

Management considerations

- Horse exposure reduction
- Consider AIT

*Results should be interpreted in the context of the history.
ImmunoCAP Allergen e3, Horse dander; ImmunoCAP Allergen e227, Allergen component rEqu c 1, Horse

1. Roberts G and Lack G. BMJ. 2000;321: 286-287 **2.** Konradsen JR, *et al. Allergy Clin Immunol* 2015;135:616-25. **3.** Nordlund B, *et al. Allergy* 2012:67:661–9. **4.** Matricardi PM, *et al*. EAACI Molecular Allergology User's Guide. Pediatric allergy and immunology: official publication of the European Society of Pediatric Allergy and Immunology. 2016;27 Suppl 23:1-250. **5.** Canonica GW, *et al.* AWAO -ARIA- GA2LEN concenus document on molecular-based allergy diagnostics *World Allergy Organization Journal* 2013;6(1):17. 7. **6.** Asero R. Eur Ann *Allergy Clin Immunol.* 2012;44(5):183-7. **7.** Schmid-Grendelmeier P, *et al. Der Hautarzt* 2010;61(11):946-953 **8.** Kleine-Tebbe J and Jakob T Editors: Molecular Allergy Diagnostics. Innovation for a Better Patient Management. Springer International Publishing Switzerland 2017. ISBN 978-3-319-42498-9 ISBN 978-3-319-42499-6 (eBook), DOI 10.11007/978-3-319-42499-6

Notes

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