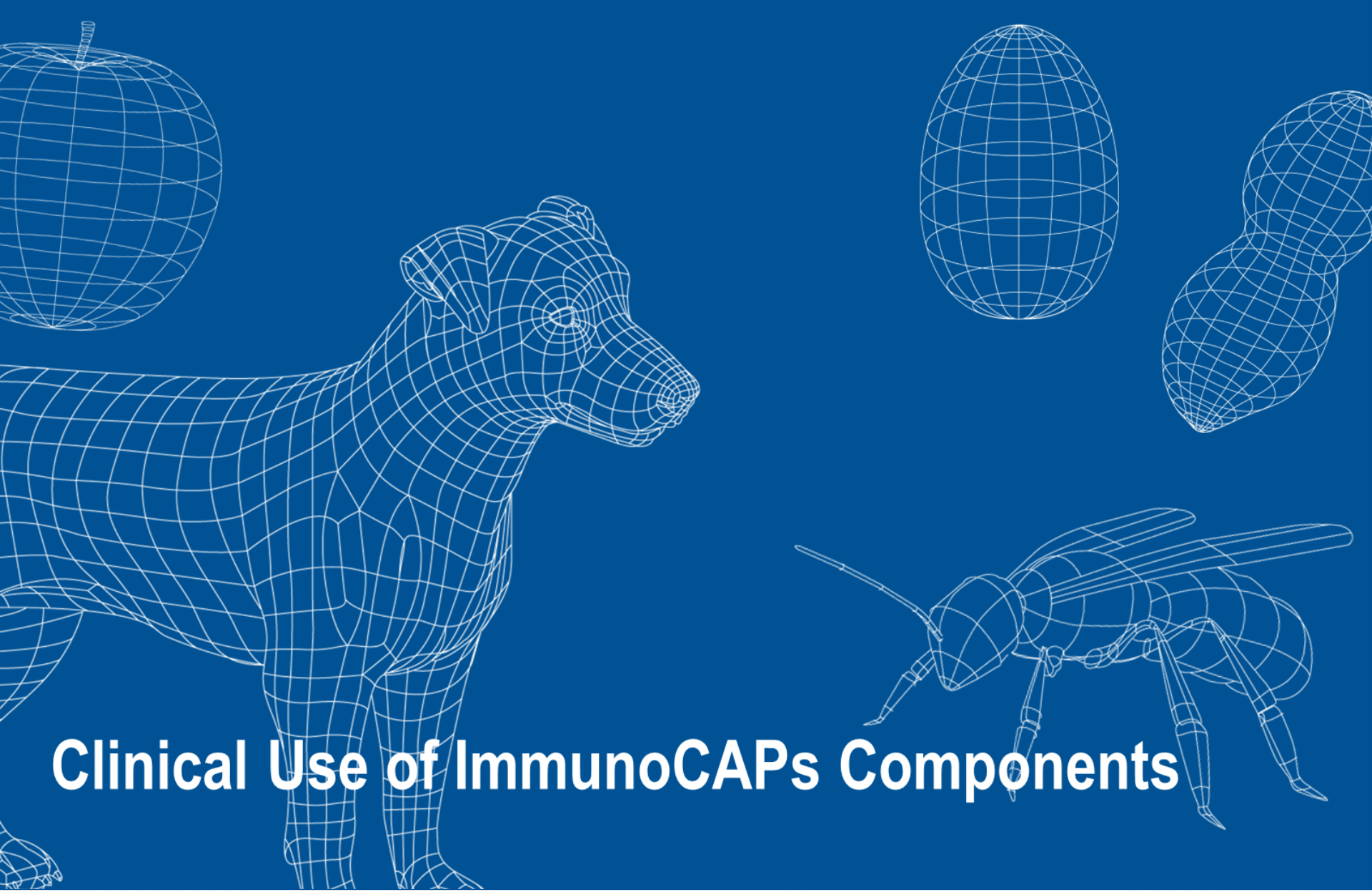
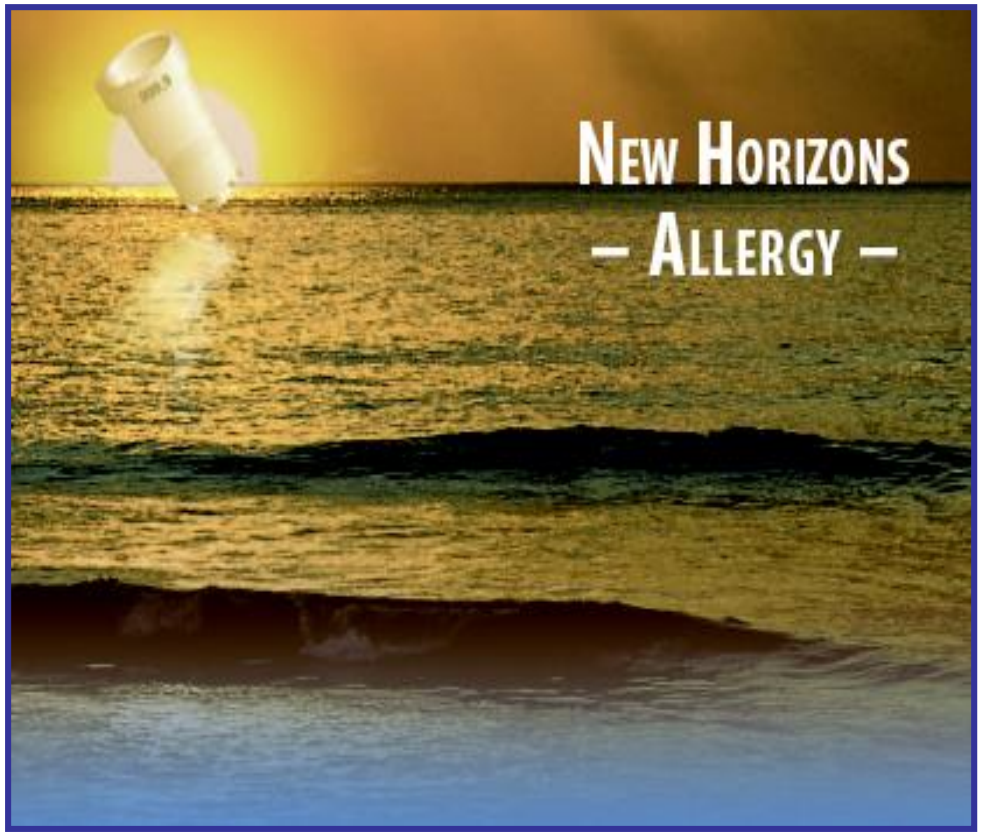


# Clinical Use of ImmunoCAPs Components

ImmunoCAP®
ALLERGEN COMPONENTS

# The use of components in allergy diagnostics: (CRD) MA





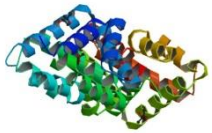

ImmunoCAP Molecular Allergology



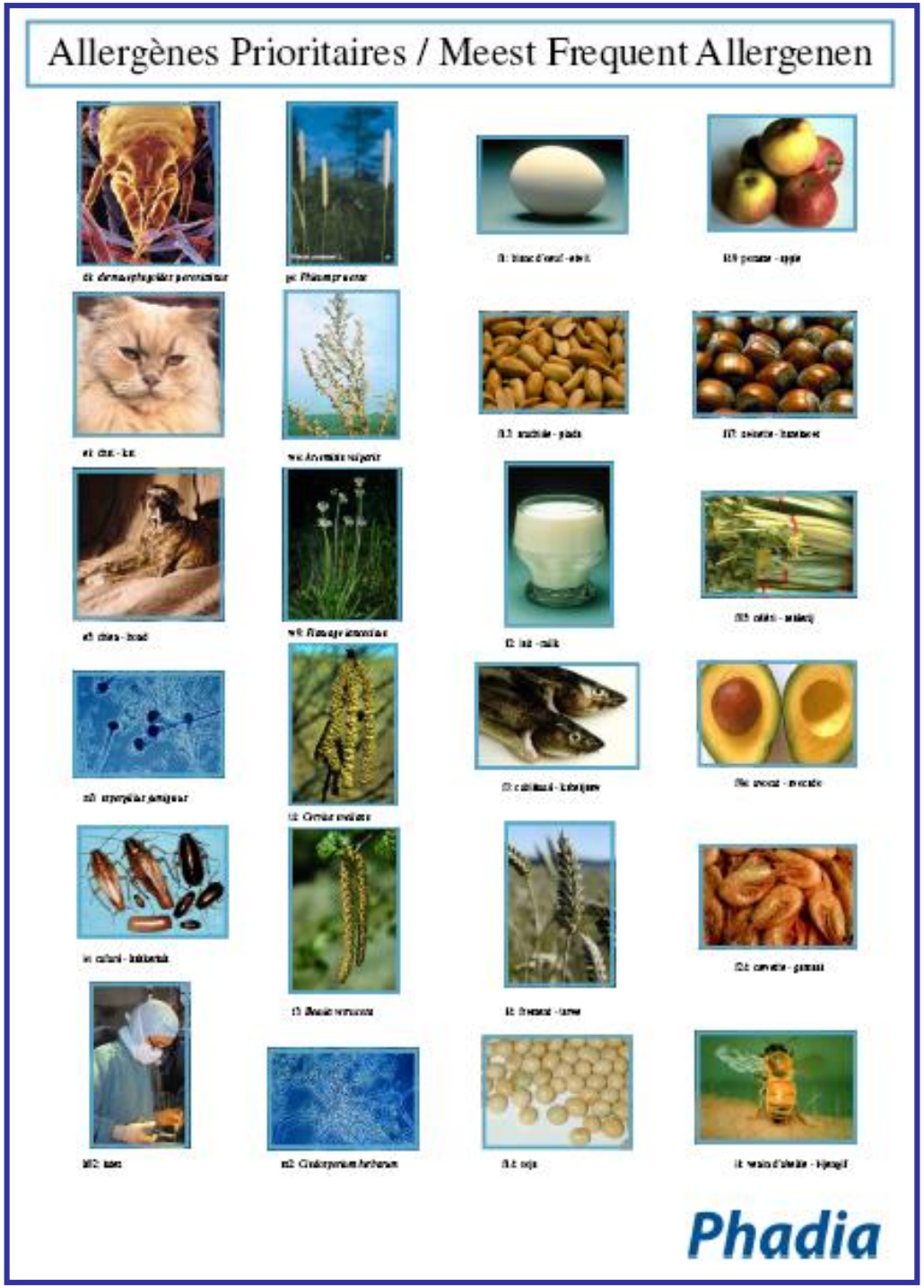
Der p1



Der p2

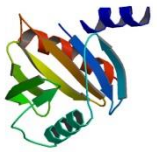


Fel d1





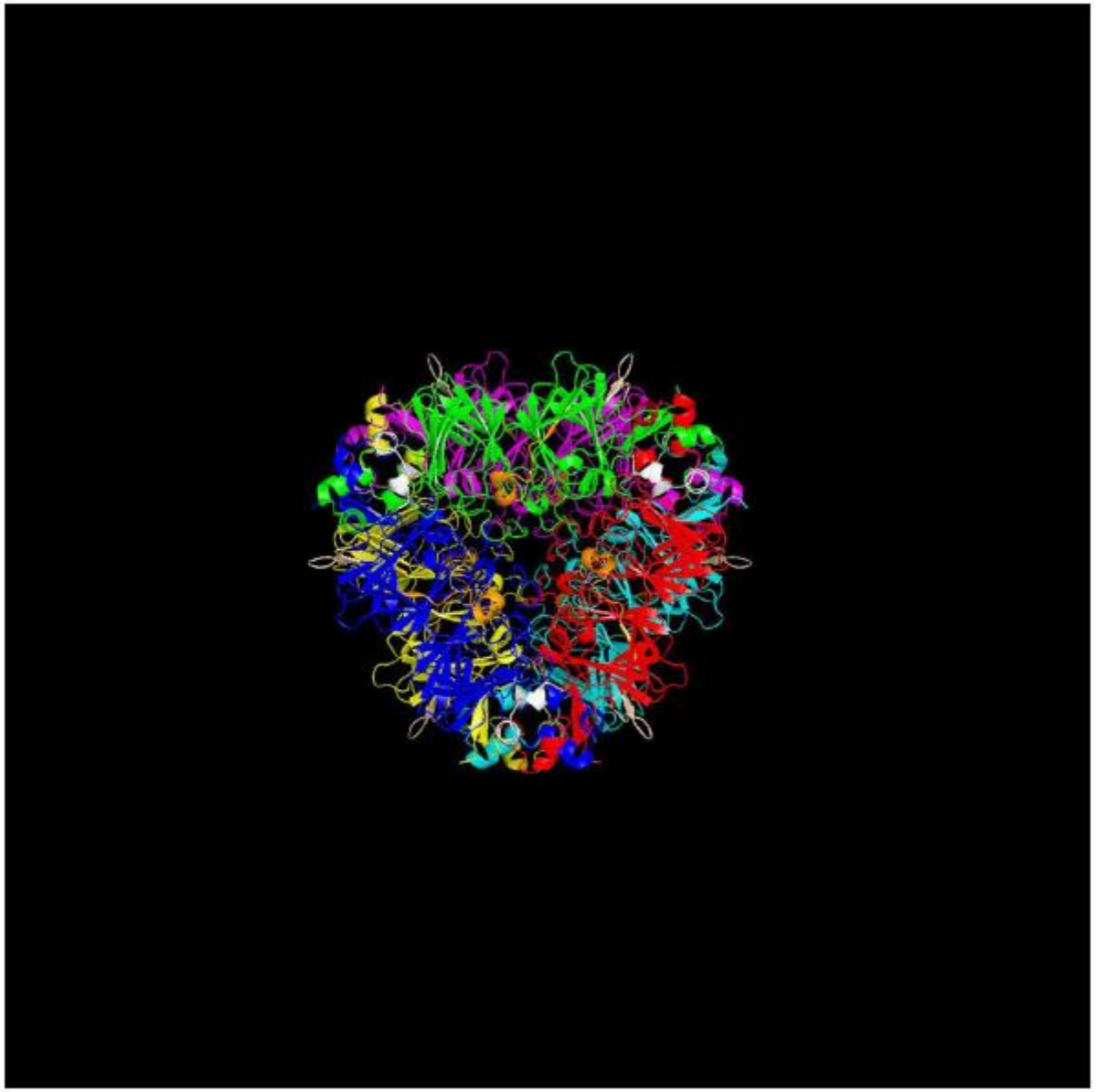

Bet v1

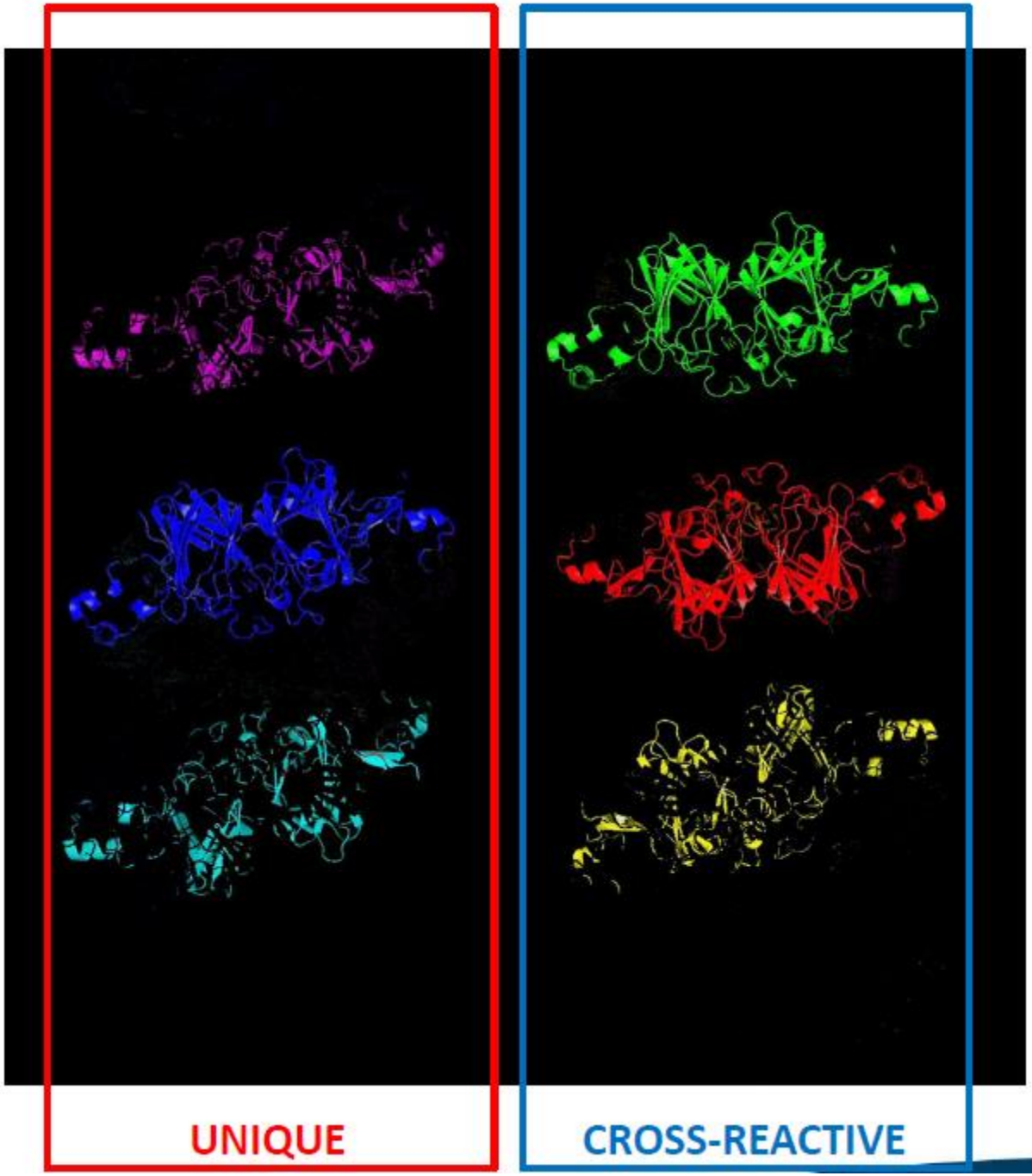


Bet v2

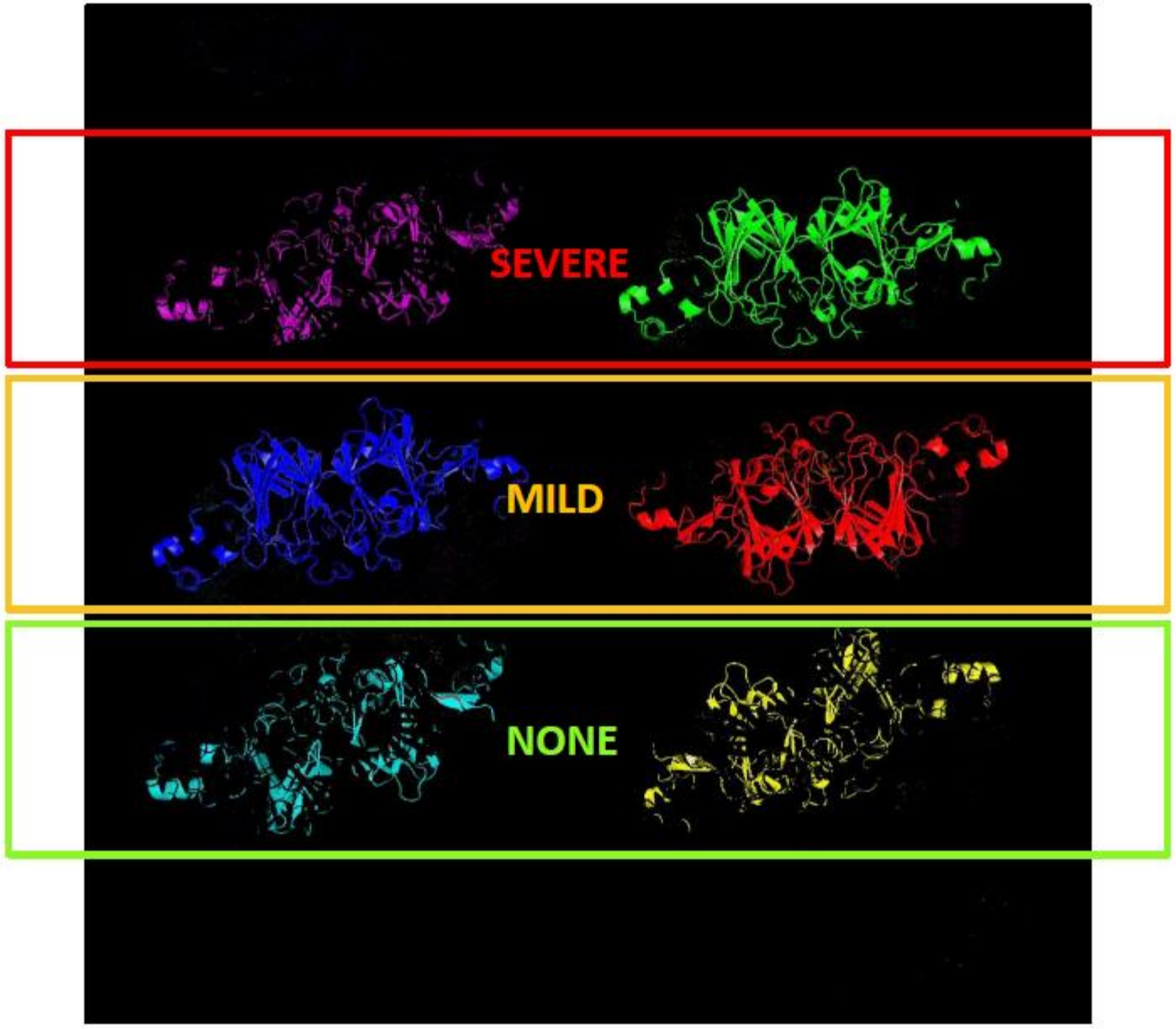


Bet v4




UNIQUE
CROSS-REACTIVE




SEVERE
MILD
NONE

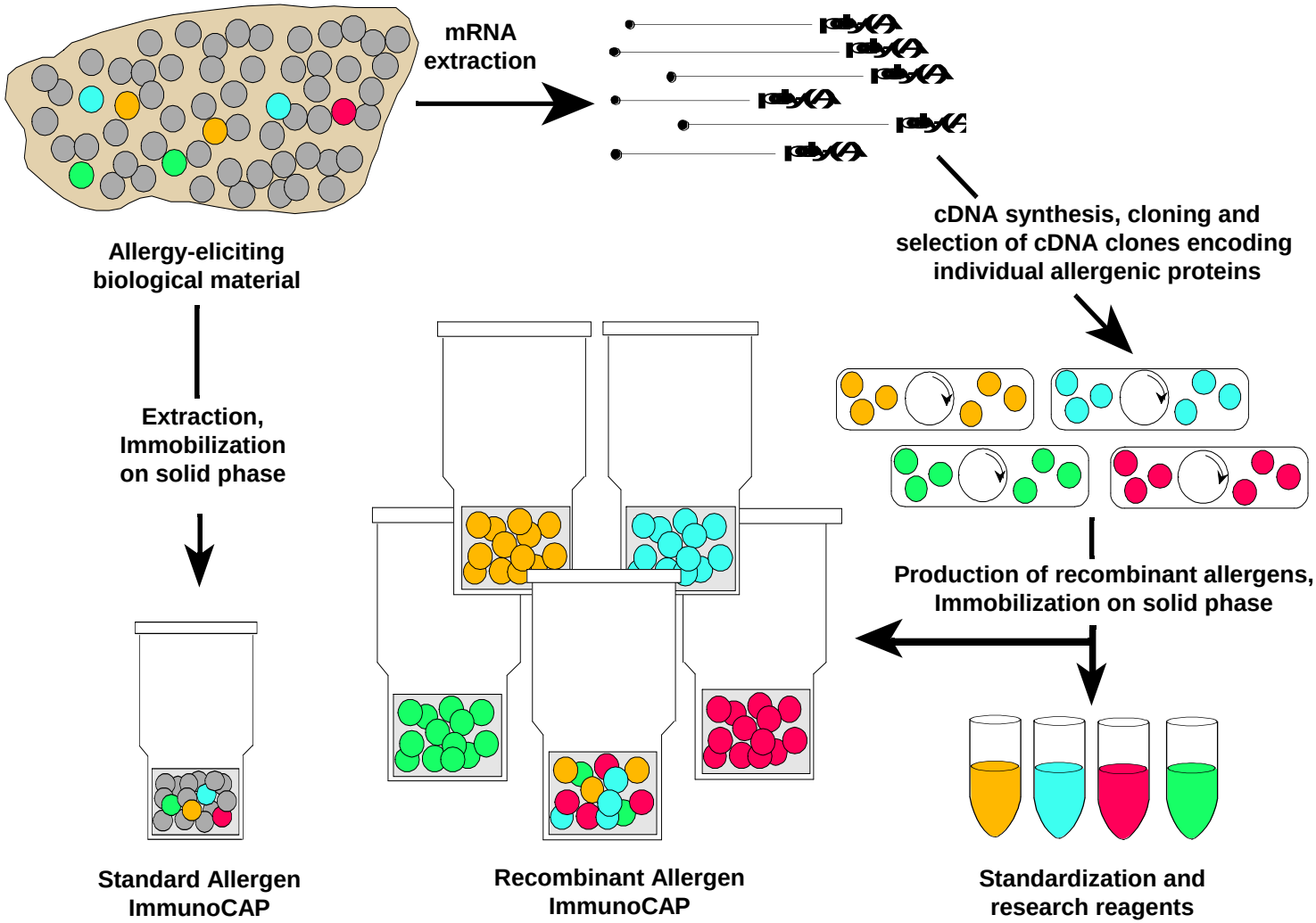
# Specific components

## - indicate genuine sensitization




Gal d 1 = *Gallus domesticus*, allergen # 1

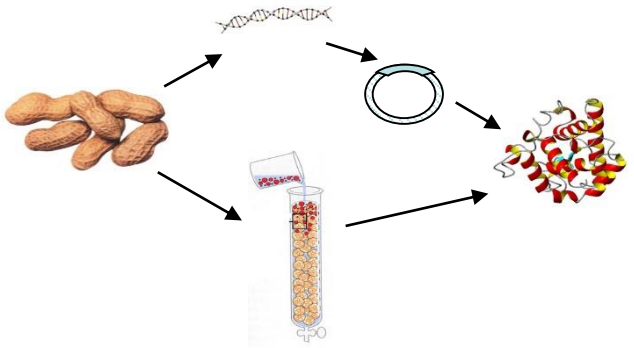
# Single, purified/recombinant allergen components

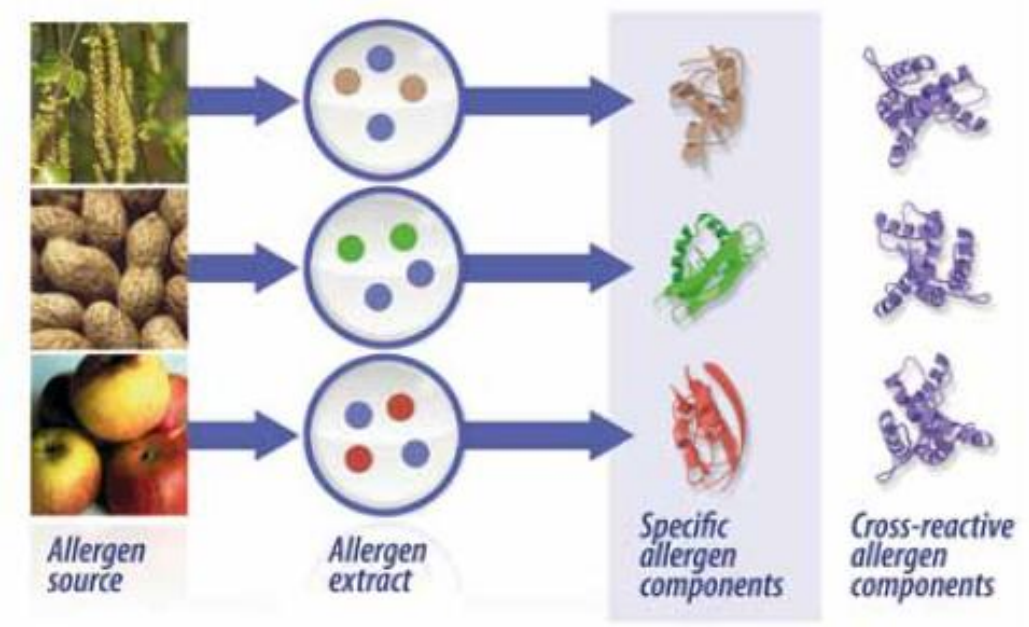


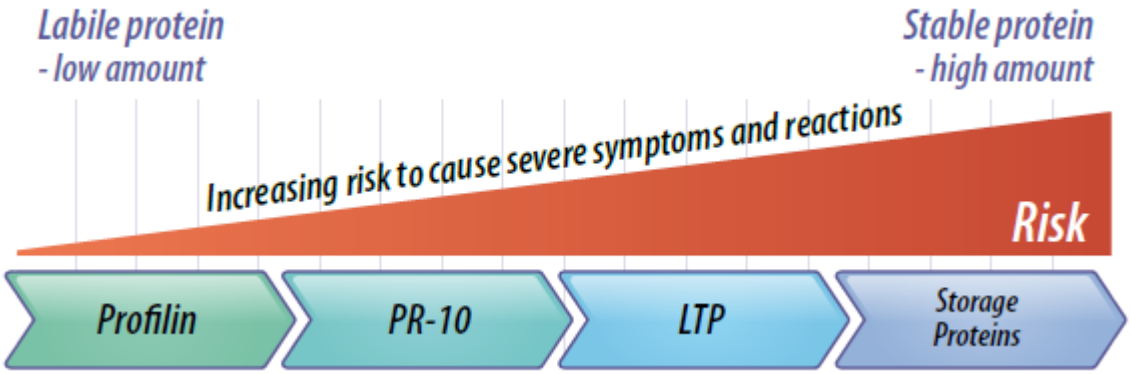
# Nomenclature of components

| | |
|---|---|
| • t3: *Betula verucosa* | Bet v 1, 2, 4, 6, 7 |
| • g6: *Phleum pratense* | Phl p 1,..5,…7…12 |
| • d1: *Dermato. pteronys*. | Der p 1, 2, 3,….10,.. |
| • e1: *Felis domesticus* | Fel d 1, 2, 3… |
| • f13 : *Arachis hypogaea* | Ara h 1, 2 , 3, …..8, |

Preceded by:
**r** : **recombinant** protein **rBet v 1**
**n** : **natural purified** protein **nDer p1**

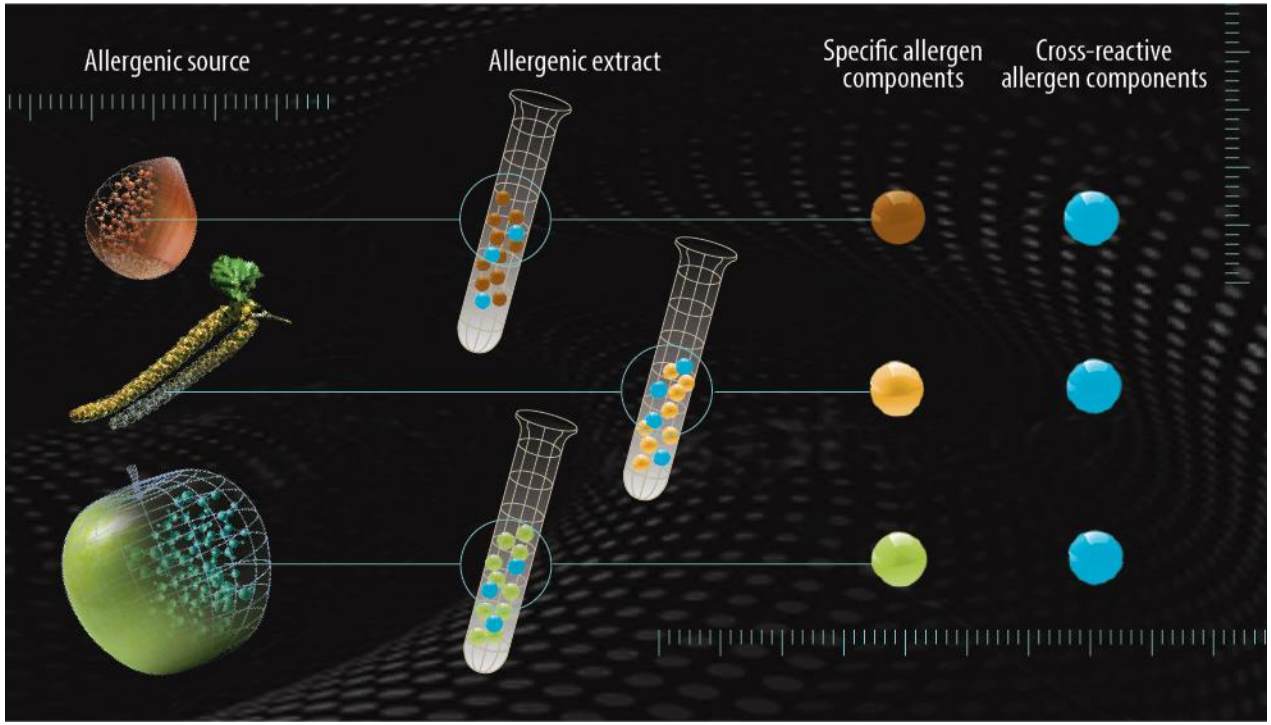



Allergen source
Allergen extract
Specific allergen components
Cross-reactive allergen components


Labile protein
- low amount
Stable protein
- high amount
Increasing risk to cause severe symptoms and reactions
Risk
Profilin
PR-10
LTP
Storage Proteins

# Component - Resolved Diagnostics (CRD)

- **Predict cross-reactivity In Vitro & In Vivo**
- **Tailor-made immunotherapy**
- **Predict severity of reactions**



# Aanvraagformulier "ImmunoCAP™ Allergietesten"

**Phadia**

**"ImmunoCAP™"**

☐ Bepaling van totaal IgE

Uitslag: kU/l

Mengsel uitslag: - ± +

Allergenen uitslag: kU/l

Labo:

Datum ontvangst aanvraag:

Patiënt naam:

adres:

Geboortedatum:

Geslacht:

Afnamedatum: uur:

**Grassen**

- ☐ gx3 Mengsel van grassen *(g1 -g5 -g6 -g12 -g13)*
- ☐ g1 Reukgras *Anthoxanthum odoratum*
- ☐ g2 Handjesgras *Cynodon dactylon*
- ☐ g3 Kropaar *Dactylis glomerata*
- ☐ g4 Beemdgras *Festuca elatior*
- ☐ g5 Engels raaigras *Lolium perenne*
- ☐ g6 Timotheegras *Phleum pratense*
  - ☐ g205 rPhl p1 *Phleum pratense*
  - ☐ g215 rPhl p 5 *Phleum pratense*
  - ☐ g210 rPhl p 7 Calc Bind Prot *Phleum pratense*
  - ☐ g212 rPhl p 12 Profiline *Phleum pratense*
  - ☐ g213 Mix rPhl p 1, rPhl p 5b *Phleum pratense*
  - ☐ g214 Mix rPhl p 7, rPhl p 12 *Phleum pratense*
- ☐ g8 Veldbeemdgras *Poa pratensis*
- ☐ g12 Rogge *Secale cereale*
- ☐ g13 Witbol *Holcus lanatus*
- ☐ g14 Haver *Avena sativa*
- ☐ g15 Tarwe *Triticum sativum*
- ☐ g201 Gerst *Hordeum vulgare*
- ☐ g202 Maïs *Zea mays*

**Kruidachtigen**

- ☐ wx5 Mengsel van kruiden *(w1 -w6 -w7 -w8 -w12)*
- ☐ wx6 Mengsel van kruiden *(w9 -w10 -w11 -w18*
- ☐ w1 Alsem ambrosia *Ambrosia elatior (artemisiifolia)*
- ☐ w3 Driedelige ambrosia *Ambrosia trifida*
- ☐ w5 Absintalsem *Artemisia absinthium*
- ☐ w6 Bijvoet *Artemisia vulgaris*
  - ☐ w231 nArt v 1 *Artemisia vulgaris*
  - ☐ w233 nArt v 3 LTP *Artemisia vulgaris*
- ☐ w7 Margriet *Chrysanthemum leucanthemum*
- ☐ w8 Paardebloem *Taraxacum vulgare*
- ☐ w9 Smalle weegbree *Plantago lanceolata*
- ☐ w10 Melganzenvoet *Chenopodium album*
- ☐ w11 Loogkruid *Salsola kali (pestifer)*
- ☐ w12 Guldenroede *Solidago virgaurea*
- ☐ w17 Ganzenvoet *Kochia scoparia*
- ☐ w18 Zuring *Rumex acetosella*
- ☐ w20 Netel *Urtica dioica*
- ☐ w21 Glaskruid *Parietaria judaica*

**Bomen**

- ☐ tx5 Mengsel van bomen *(t2 -t4 -t8 -t12 -t14)*
- ☐ tx6 Mengsel van bomen *(t1 -t3 -t5 -t7 -t10)*
- ☐ t1 Vederesdoorn *Acer negundo*
- ☐ t2 Grauwe els *Alnus incana*
- ☐ t3 Ruwe berk *Betula verrucosa*
  - ☐ t215 rBet v 1 PR10 *Betula verrucosa*
  - ☐ t216 rBet v 2 Profiline *Betula verrucosa*
  - ☐ t220 rBet v 4 Calc Bind Prot *Betula verrucosa*
- ☐ t4 Hazelaar *Corylus avellana*
- ☐ t5 Beuk *Fagus grandifolia*
- ☐ t6 Jeneverbesstruik *Juniperus sabinoides*
- ☐ t7 Eik *Quercus alba*
- ☐ t8 Iep *Ulmus americana*
- ☐ t9 Olijfboom *Olea europaea*
  - ☐ t224 nOle e1 *Olea europaea*
- ☐ t10 Californische notelaar *Juglans californica*
- ☐ t11 Plataan *Platanus acerifolia*
- ☐ t12 Wilg *Salix caprea*
- ☐ t14 Populier *Populus deltoides*
- ☐ t16 Den *Pinus strobus*
- ☐ t17 Japanse ceder *Cryptomeria japonica*
- ☐ t18 Eucalyptus *Eucalyptus spp.*
- ☐ t19 Mimosastruik *Acacia longifolia*
- ☐ t23 Cipres *Cupressus sempervirens*
- ☐ t25 Es *Fraxinus excelsior*
- ☐ t208 Lindeboom *Tilia cordata*
- ☐ t209 Haagbeuk *Carpinus betulus*
- ☐ t210 Liguster *Ligustrum vulgare*

**Schimmels & gisten**

- ☐ mx1 Mengsel van schimmels *(m1 -m2 -m3 -m6)*
- ☐ m1 Penicillium notatum
- ☐ m2 Cladosporium herbarum *(Hormodendrum)*
- ☐ m3 Aspergillus fumigatus
  - ☐ m218 rAsp f 1 *Aspergillus fumigatus*
  - ☐ m219 rAsp f 2 *Aspergillus fumigatus*
  - ☐ m220 rAsp f 3 *Aspergillus fumigatus*
  - ☐ m221 rAsp f 4 *Aspergillus fumigatus*
  - ☐ m222 rAsp f 6 MNSOD *Aspergillus fumigatus*
- ☐ m4 Mucor racemosus
- ☐ m5 Candida albicans (yeast)
- ☐ m6 Alternaria alternata (A. tenuis)
  - ☐ m229 rAlt a 1 Alternaria alternata
- ☐ m7 Botrytis cinerea
- ☐ m8 Helminthosporium halodes
- ☐ m9 Fusarium moniliforme
- ☐ m10 Stemphylium botryosum
- ☐ m11 Rhizopus nigricans
- ☐ m12 Aureobasidium pullulans
- ☐ m15 Trichoderma viride
- ☐ m16 Curvularia lunata
- ☐ m70 Pityrosporum orbiculare
- ☐ m207 Aspergillus niger

**Mijten**

- ☐ d1 Huismijten *Dermatophagoides pteronyssinus*
  - ☐ d202 nDer p1 *Dermatophagoides pteronyssinus*
  - ☐ d203 rDer p2 *Dermatophagoides pteronyssinus*
  - ☐ d205 rDer p10 Tropomyosine *Dermatophagoides pteronyssinus*
- ☐ d2 Huismijten *Dermatophagoides farinae*
- ☐ d3 Huismijten *Dermatophagoides microceras*
- ☐ d74 Huismijten *Euroglyphus maynei*
- ☐ d70 Hooimijten *Acarus siro*
- ☐ d71 Hooimijten *Lepidoglyphus destructor*
- ☐ d72 Hooimijten *Tyrophagus putrescentiae*
- ☐ d73 Hooimijten *Glycyphagus domesticus*

**Huisstof**

- ☐ h1 Huisstof
- ☐ h2 Huisstof

**Vertebra**

- ☐ ex1 Mengsel van epithelen *(e1 -e3 -e4 -e5)*
- ☐ e1 Kat, epitheel
  - ☐ e94 rFel d 1
  - ☐ e220 rFel d 2 Serum albumine
- ☐ e5 Hond, haar en huidschilfers
  - ☐ e101 rCan f 1 Lipocalin
  - ☐ e102 rCan f 2 Lipocalin
  - ☐ e221 nCan f 3 Serum albumine
- ☐ e3 Paard, haar en huidschilfers
- ☐ e4 Rund, haar en huidschilfers
- ☐ e80 Geit, epitheel
- ☐ e81 Schaap, epitheel
- ☐ e83 Varken, epitheel
- ☐ e82 Konijn, epitheel
- ☐ e6 Cavia, epitheel
- ☐ e84 Hamster, epitheel
- ☐ e88 Muis
- ☐ e71 Muis, epitheel
- ☐ e72 Muis, urineproteïnen
- ☐ e76 Muis, serumproteïnen
- ☐ e87 Rat
- ☐ e73 Rat, epitheel
- ☐ e74 Rat, urineproteïnen
- ☐ e75 Rat, serumproteïnen

- ☐ e201 Kanarie, pluimen
- ☐ e77 Parkiet, faeces
- ☐ e78 Parkiet, pluimen
- ☐ e79 Parkiet, serumproteïnen
- ☐ e213 Papegaai, pluimen
- ☐ e7 Duif, faeces
- ☐ e70 Ganz, vederen
- ☐ e85 Kip, pluimen
- ☐ e86 Eend, pluimen
- ☐ e89 Kalkoen, pluimen

# background

## Symptoms:

- Both Adam and Ben have suffered from recurrent, severe rhino-conjunctivitis for the last 6 years in early spring (Feb–May).

| | Adam | Ben |
|---|---|---|
| **Skin Prick Test results:** | | |
| Birch | +3 | +3 |
| Grass | +3 | +3 |
| **ImmunoCAP sIgE results:** | | |
| Birch | 15 $kU_A/l$ | 8.5 $kU_A/l$ |
| Grass | 6.3 $kU_A/l$ | 11.3 $kU_A/l$ |
| Diagnosis: | Grass and birch allergy | Grass and birch allergy |
| Treatment: | Antihistamines + SIT | Antihistamines + SIT |

Comment: SIT is considered. For optimal choice of SIT treatment the IgE profile is investigated at the molecular level.

# current visit

## ImmunoCAP Allergen Components test results

| | Adam, results ($kU_A/l$) | Ben, results ($kU_A/l$) |
|---|---|---|
| Bet v 1 | 10.1 | <0.1 |
| Bet v 2 (profilin) | <0.1 | 6.3 |
| Bet v 4 (polcalcin) | 5.2 | <0.1 |
| Bet v 6 | <0.1 | <0.1 |
| Phl p 1 | <0.1 | 7.3 |
| Phl p 5 | <0.1 | <0.1 |
| Phl p 7 (polcalcin) | 5.8 | <0.1 |
| Phl p 12 (profilin) | <0.1 | 5.7 |

| | | |
|---|---|---|
| Diagnosis: | Birch pollen allergy | Grass pollen allergy |
| Treatment: | Birch pollen SIT treatment | Grass pollen SIT treatment |

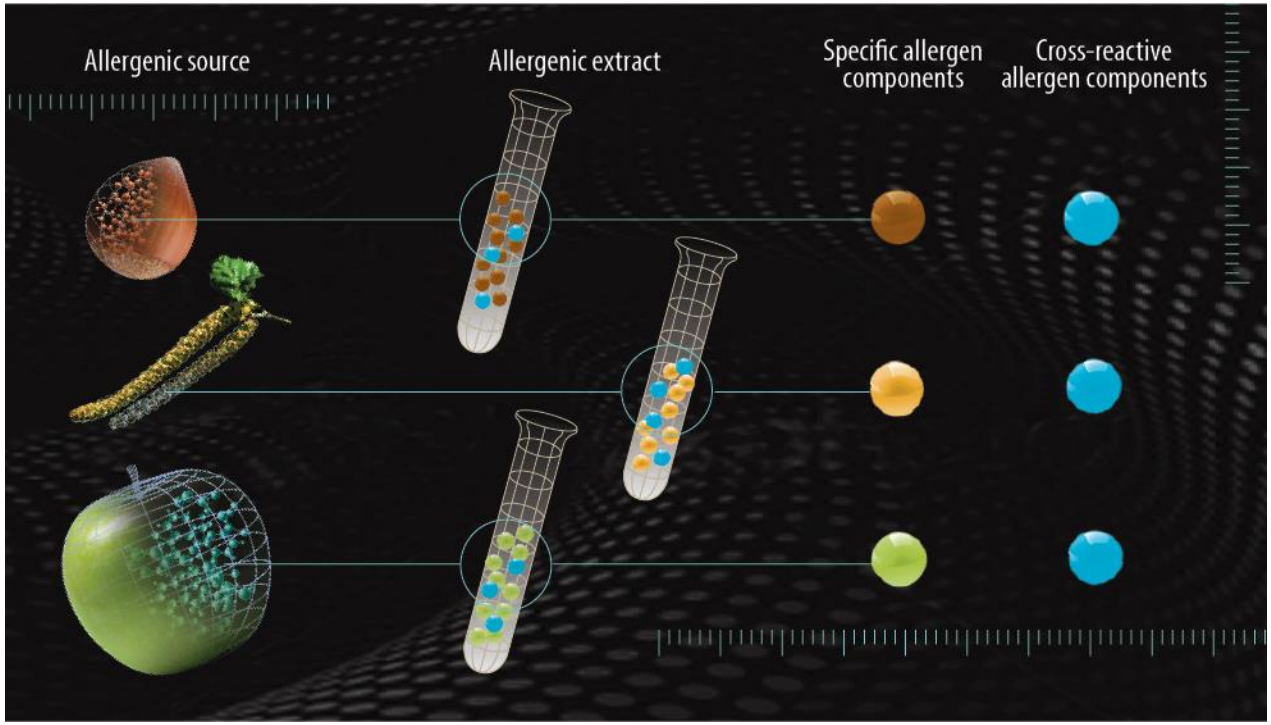
## Interpretation of the ImmunoCAP Allergen Components results

ADAM: The result for the specific birch pollen component, Bet v 1, indicates that birch pollen SIT is appropriate. The IgE response to the cross-reacting polcalcins (Bet v 4 and Phl p 7) explains the positive grass extract result.

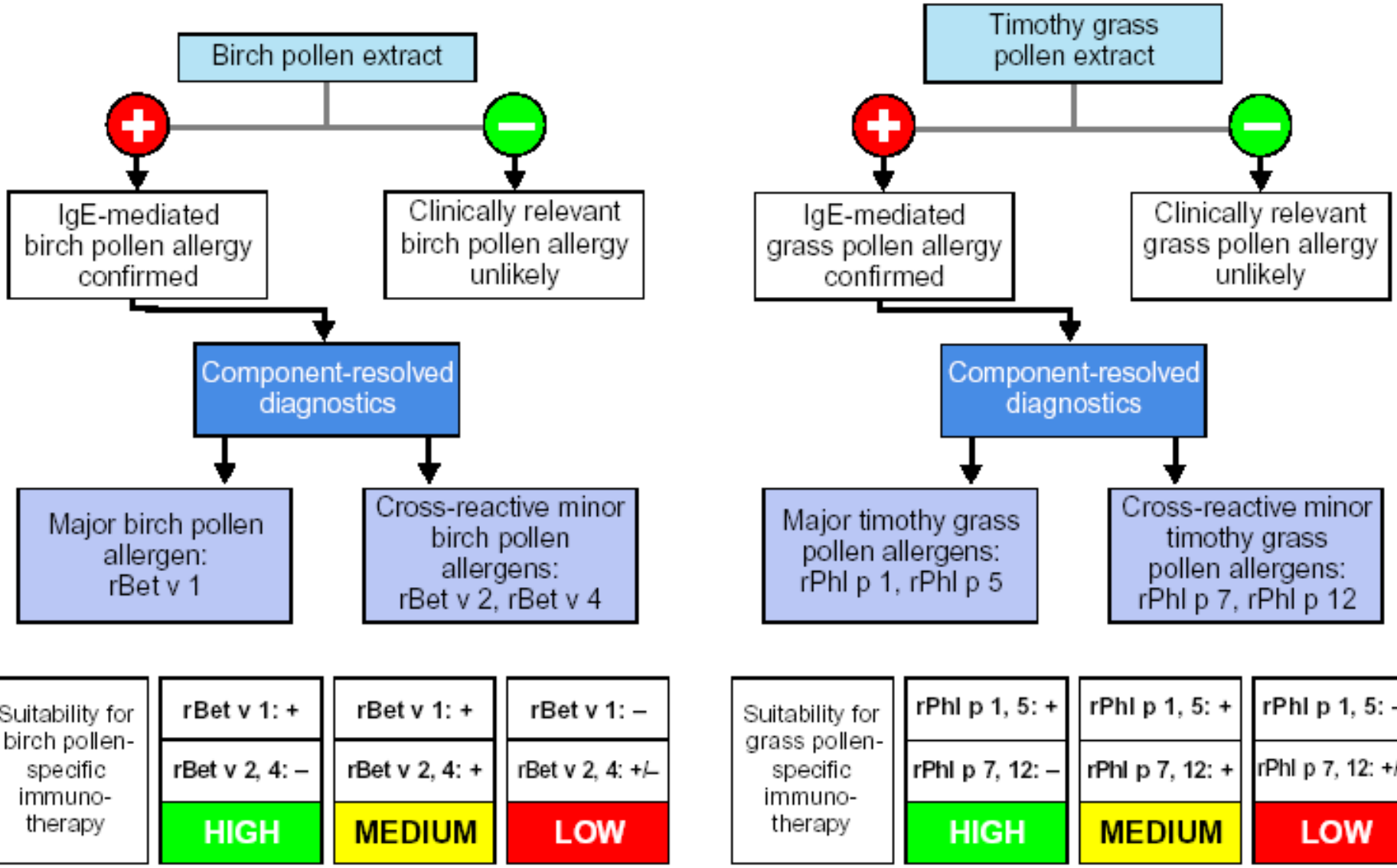
BEN: Absense of IgE antibodies to Bet v 1 indicate that that the pollen sensitization is not originating from birch pollen. For Ben Phl p 1 is the triggering allergen and grass pollen SIT is thus chosen. The IgE response to the cross-reacting profilin (Bet v 2 and Phl p 12) explain the positive birch extract result.

# Component - Resolved Diagnostics (CRD)

- **Predict cross-reactivity In Vitro & In Vivo**
- **Tailor-made immunotherapy**
- **Predict severity of reactions**

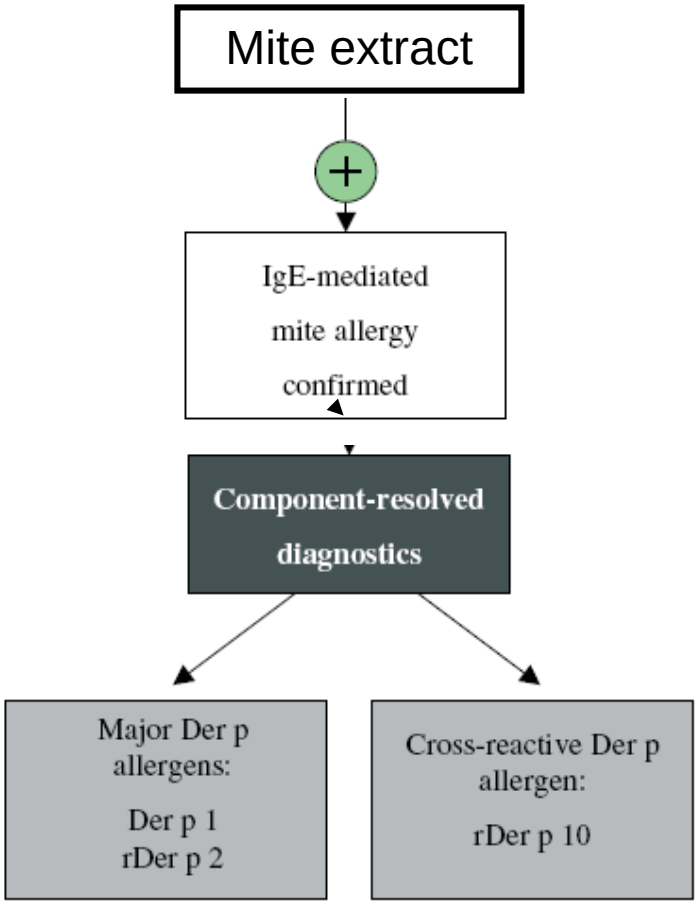


# Immunotherapy?




| Suitability for birch pollen-specific immuno-therapy | rBet v 1: + <br> rBet v 2, 4: – <br> HIGH | rBet v 1: + <br> rBet v 2, 4: + <br> MEDIUM | rBet v 1: – <br> rBet v 2, 4: +/– <br> LOW |
|---|---|---|---|

| Suitability for grass pollen-specific immuno-therapy | rPhl p 1, 5: + <br> rPhl p 7, 12: – <br> HIGH | rPhl p 1, 5: + <br> rPhl p 7, 12: + <br> MEDIUM | rPhl p 1, 5: – <br> rPhl p 7, 12: +/– <br> LOW |
|---|---|---|---|





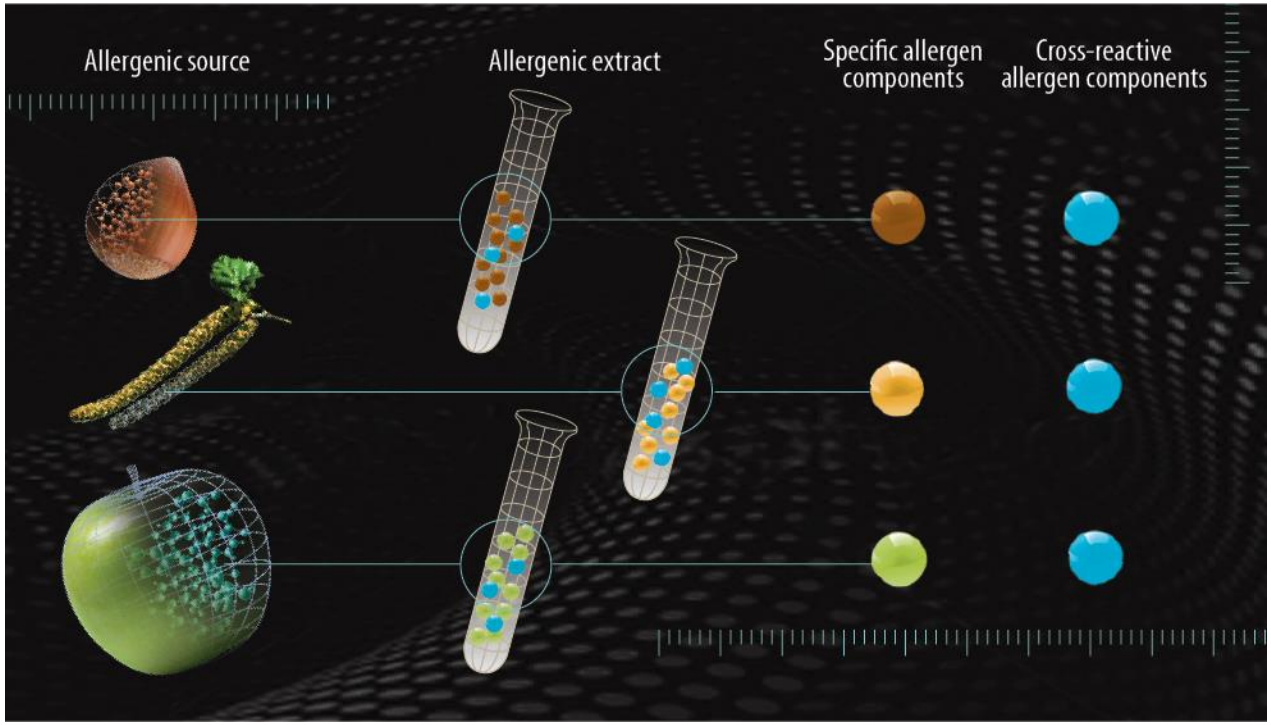

A possible decision tree for Der p-immunotherapy. Serological testing with mite allergen extracts (Der p, Der f, ) confirms IgE-mediated allergy. Componentresolved diagnosis (CRD) with major (Der p 1, Der p2) and cross-reactive (Der p 10) allergens may be performed to further determine suitability for Der p-specific immunotherapy.

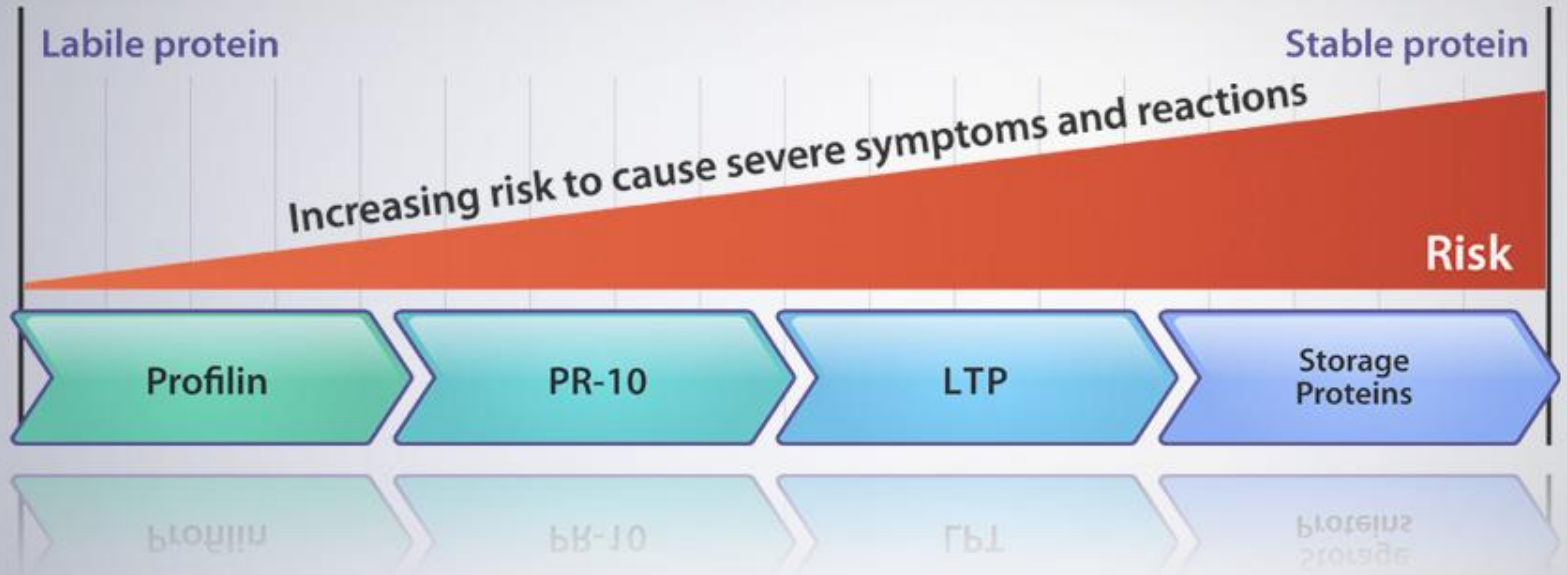
***Adapted from: G. Pittner et al.,***
*Clinical and Experimental Allergy, 2004; 34:597–603*

| Suitability for Der p-specific immuno-therapy | Der p 1, 2: + <br> Der p 10: – <br> **HIGH** | Der p 1, 2: + <br> Der p 10: + <br> **MEDIUM** | Der p 1, 2: – <br> Der p 10: +/– <br> **LOW** |
|---|---|---|---|

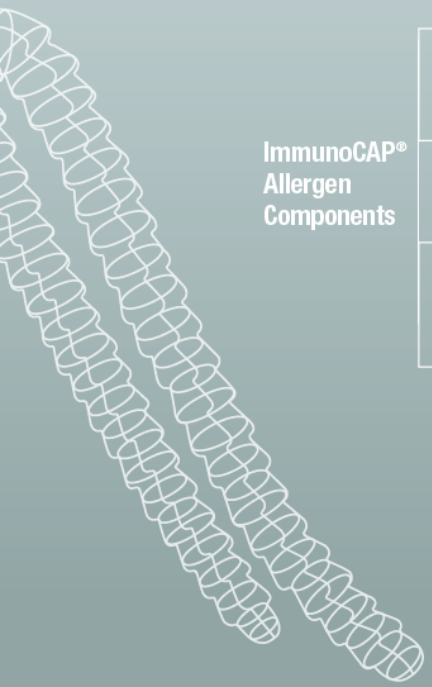
# Component - Resolved Diagnostics (CRD)

- **Predict cross-reactivity In Vitro & In Vivo**
- **Tailor-made immunotherapy**
- **Predict severity of reactions**




Labile protein
Stable protein
Increasing risk to cause severe symptoms and reactions
Risk
Profilin
PR-10
LTP
Storage Proteins

# Birch pollen components for a complete patient management



**ImmunoCAP® Complete Allergens**

| | |
|---|---|
| **Betula verrucosa** | t3, Birch. |

**ImmunoCAP® Allergen Components**

| | |
|---|---|
| **Bet v 1** | t 215, PR-10 protein (Pathogenesis-Related group 10).<br>Specific for birch.<br>Patients sensitized to Bet v 1 may also react to other PR-10 proteins, see table below.<br>Up to 95 % of birch pollen allergic patients have IgE antibodies to Bet v 1. |
| **Bet v 2** | t 216, Profilin.<br>A cross-reactive component present in pollen, plant foods and latex. High degree of similarity across species.<br>15–30 % of pollen-allergic patients are sensitized to Bet v 2. |
| **Bet v 4** | t 220, Polcalcin.<br>A cross-reactive component present in grass, tree and weed pollen. High degree of similarity across species.<br>About 10 % of pollen sensitized individuals have IgE antibodies to Bet v 4. |
| **Bet v 6** | t 225, Isoflavone reductase.<br>A cross-reactive component present in commonly known birch related foods.<br>Minor birch pollen allergen. |

## Examples of allergens containing Bet v 1-like (PR-10) proteins

| Trees | Fruits | Nuts & Legumes | Vegetablaes |
|---|---|---|---|
| Birch | Apple | Hazelnut | Carrot |
| Alder | Pear | Walnut | Celery |
| Beech | Peach | Almond | Parsley |
| Chestnut | Cherry | Peanut | Asparagus |
| Hazel | Kiwi | Soy bean | Potato |
| Hornbeam | Apricot | Kidney bean | |
| Oak | Strawberry | Pea | |

*Most PR-10 proteins are digestive and heat labile proteins, primarily localized to the pulp of the fruit.*

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# background

## Previous symptoms (5 years ago):

- Rhino-conjunctivitis during spring and early summer

| Previous visit | Nina | Peter |
|---|---|---|
| **Skin Prick Test results:** | | |
| Birch | +4 | +3 |
| **ImmunoCAP sIgE results:** | | |
| Birch | 16 kU/l | 12 kU/l |

Negative test results for grass, mugwort, cat, dog, mite

| | | |
|---|---|---|
| Diagnosis: | Birch pollen allergy | Birch pollen allergy |

Comment: Both Nina and Peter are diagnosed as birch pollen allergic, and they are both prescribed anti-histamines and local steroids to use during birch pollen season.

# current visit

## Current symptoms (today):

- Rhino-conjunctivitis during spring and early summer has become worse for Nina but remains stable for Peter.
- They are now both experiencing oral symptoms when eating apples; Nina gets intense oral itching while Peter gets oral swelling and throat discomfort.

## ImmunoCAP Allergen component test results

| | Nina, results ($kU_A/l$) | Peter, results ($kU_A/l$) |
|---|---|---|
| Birch | 22.4 | 15.8 |
| Apple | 16.2 | 12.7 |
| Bet v 1 | 21.1 | 14.6 |
| Bet v 2 | <0.1 | <0.1 |
| Bet v 4 | 0.2 | <0.1 |
| Mal d 1 | 15.3 | 8.2 |
| Mal d 3 | <0.1 | 6.4 |
| Phl p 12 | <0.1 | <0.1 |

| | | |
|---|---|---|
| Diagnosis: | Birch pollen allergy<br>Birch pollen-related apple allergy | Birch pollen allergy<br>LTP-dependent apple allergy |
| Management: | Avoid raw apples if unpleasant<br>Cooked apples may be tolerated | Avoid apples<br>Consider emergency medication<br>Be cautious with other fruits and nuts |

Nina´s symptoms from eating of apple are a consequence of her birch pollen allergy. She may in future experience symptoms also to other PR-10 containing plant foods, such as hazelnuts, pears, carrots or celery.

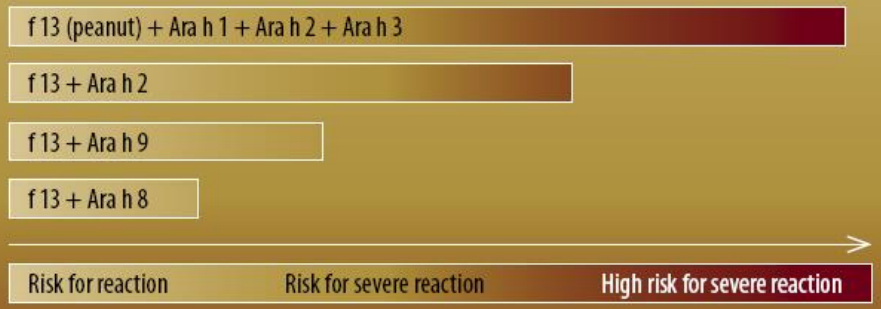
Peter has IgE antibodies to Mal d 3 and therefore his apple allergy could develop into systemic reactions.



PEANUT

# All available peanut components are needed for a complete risk assessment

## Risk assessment with ImmunoCAP® Molecular Allergology




**FACTORS TO CONSIDER:**

- Sensitization to several allergen components
- Local exposure
- Level of exposure
- Level of Specific IgE

**PROTEIN GROUPS:**

**Storage proteins:**
- Ara h 1
- Ara h 2
- Ara h 3
  - Associated with severe reactions
  - Stable to heat and digestion

**PR-10 protein:**
- Ara h 8
  - Associated with local reactions (e.g. OAS)
  - Labile to heat and digestion
  - Associated with allergy to birch and birch related tree pollens

**LTP:**
- Ara h 9
  - Associated with both severe and local reactions
  - Stable to heat and digestion
  - Associated with allergy to peach and peach related fruits

Phadia
Setting the Standard
www.phadia.com
ImmunoCAP® Molecular Allergology



## Previous symptoms:

- Eczema during infancy, outgrown at school age
- Rhinitis and conjunctivitis during pollen season, since school age

## Ongoing symptoms:

- Nasal obstruction in combination with irritated, itchy eyes and sometimes local reaction in the mouth

## Family history:

- None

| Previous visit | Caroline | Emma |
|---|---|---|
| (at 5 years) | | |
| SPT test results | Egg +1<br>Peanut +4 | Egg +1<br>Peanut +4 |
| Diagnosis: | Peanut and egg allergy | Peanut and egg allergy |
| Treatment: | Dietary restriction to peanut and egg | Dietary restriction to peanut and egg |

# SIMILAR CLINICAL HISTORY! CAN COMPONENT TESTING TELL TWO DIFFERENT STORIES?

Caroline and Emma, both 16 years old

## Peanut challenge outcome

| (at 16 years) | Caroline | Emma |
|---|---|---|
| Specific IgE test results: | Peanut: 26 kUA/l | Peanut: 28 kUA/l |
| Peanut challenge | No symptoms | Urticaria, rhinitis, cough, tired |
| Diagnosis: | No peanut allergy | Peanut allergy was confirmed |
| Treatment: | No dietary restriction to peanut | Dietary restriction to peanut remains |

## ImmunoCAP® Allergen component test results

| (at 16 years) | Caroline, results (kUA/l) | Emma, results (kUA/l) |
|---|---|---|
| f13, peanut | 26 | 28 |
| Ara h 1 | <0.1 | 2.1 |
| Ara h 2 | <0.1 | 12.3 |
| Ara h 3 | <0.1 | 3.3 |
| Ara h 8 | 33 | 10.3 |
| Diagnosis: | No peanut allergy | Peanut allergy was confirmed |
| Treatment: | No dietary restriction to peanut | Dietary restriction to peanut remains |

## Interpretation of the Allergen component test results

**Ara h 1, Ara h 2 and Ara h 3 – Storage proteins**

- The test results indicate an increased risk of severe reaction if eating peanuts, even small amounts = Emma´s situation

**Ara h 8 – PR-10 protein**

- The test results indicate a pollen-related food allergy that might result in local reactions in the mouth when eating peanuts = Caroline´s situation


Your child has a severe, life threatening nut allergy.
Oh no! What can I do?
Avoid nuts.
Does that include Grandpa?

# *Suspicion of hazelnut allergy*

*Is it allergy? Risk for severe reactions?*

**Test with ImmunoCAP® Allergen**
**Hazelnut (f17) + Cor a 8 (f425)**

| Hazelnut: neg<br>Cor a 8: neg | Hazelnut: pos<br>Cor a 8: neg | Hazelnut: pos<br>Cor a 8: pos |
|---|---|---|
| Very low risk for severe reactions to hazelnut | Risk for severe reactions to hazelnut | High risk for severe reactions to hazelnut |
| | Recommendations for further testing:<br>Risk grading:<br>Cor a 1 (f428) ●●<br>CCD (Ro214) ● | |



**Cor a 9**
**Cor a 14**

Cor a 1




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Cor a 8 en Cor a 9




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Immunologie
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WHICH WENT BAD FIRST, THE CHICKEN SALAD OR THE EGG SALAD?
GLENN

# Recommended test profile

**ImmunoCAP®**
**COMPLETE EXTRACTS**

Egg white (f1)

Egg yolk
(f75)

Further investigation:
chicken meat f83 (Suggestive of egg-bird syndrome)

**ImmunoCAP®**
**COMPONENTS**

Gal d 1 + Gal d 2 + Gal d 3 + Gal d 4
(f233) (f232) (f323) (k208)

**Gal d 1, Ovomucoid**
- Heat-stable and highly allergenic
- Risk for reaction to all forms of egg
- High levels indicate persistent allergy

**Gal d 2, Ovalbumin**
- Heat-labile
- Most abundant egg white protein
- Risk for clinical reaction to raw or slightly heated egg and certain vaccines

**Gal d 3, Conalbumin**
- Heat-labile
- Adds information on the complete egg sensitization profile
- Risk for clinical reaction to raw or slightly heated egg

**Gal d 4, Lysozyme**
- Risk for clinical reaction to raw or slightly heated egg
- Lysozyme is used as an additive in certain pharmaceutical products and foods

# background

## Previous symptoms:

- Severe eczema since 6-7 months of age
- Gastrointestinal symptoms

## Clinical history:

- Urticaria and wheezing when accidentally eating egg

## Family history:

- None

| Previous visit | Andrea | Sylvia |
|---|---|---|
| **(at 1 year)** | | |
| **Skin Prick Test results:** | Egg white +5<br>Milk negative | Egg white +4<br>Milk negative |
| **ImmunoCAP sIgE results:** | Egg white 20 kUA/l | Egg white 22 kUA/l |
| Diagnosis: | Egg allergy | Egg allergy |
| Treatment: | Dietary restriction to egg | Dietary restriction to egg |



# current visit

## ImmunoCAP® Allergen component test results

| (at 3 years) | Andrea, results (kUA/l) | Sylvia, results (kUA/l) |
|---|---|---|
| Egg white | 16 | 19 |
| Gal d 1 (Ovomucoid) | 0.4 | 16 |
| Gal d 2 (Ovalbumin) | 11.1 | 6.9 |
| Gal d 3 (Conalbumin) | 0.4 | 0.2 |
| Gal d 4 (Lysozyme) | 4.5 | 0.3 |

| | | |
|---|---|---|
| Diagnosis: | Likely tolerant to extensively heated egg | Egg allergy |
| Treatment: | Oral food challenge to confirm tolerance to cooked egg | Dietary restriction to all forms of egg remains |

## Interpretation of the Allergen component test results

- Significant levels of IgE to Gal d 1 indicates a risk for reaction to all forms of egg = Sylvia's situation
- Low level of sensitization to Gal d 1 indicates tolerance to cooked egg. An open challenge in the clinic with extensively heated egg may be performed to confirm the diagnosis = Andrea's situation


IT'S NOT GOOD NEWS... YOU'RE ALLERGIC TO DAIRY PRODUCTS.
DOCTOR

# MILK

## Recommended test profile

**ImmunoCAP® COMPLETE EXTRACT** → Milk (f2)

**ImmunoCAP® COMPONENTS**

| Bos d 4 (f76) | Bos d 5 (f77) | Bos d 6 (e204) | Bos d 8 (f78) | Bos d lactoferrin (f334) |
|---|---|---|---|---|

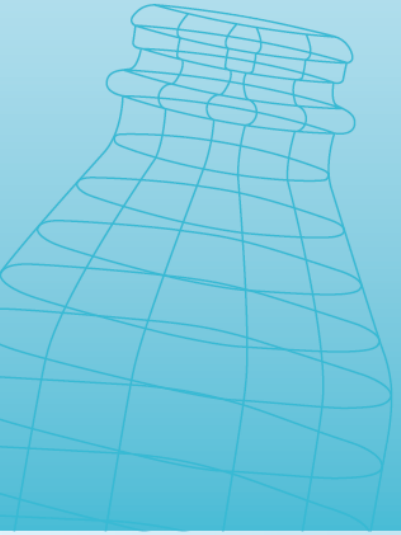
**Bos d 4, α-lactalbumin**
- Risk for reactions to fresh milk
- IgE levels fall as tolerance develops
- Heat labile protein

**Bos d 5, β-lactoglobulin**
- Risk for reactions to fresh milk
- IgE levels fall as tolerance develops
- Heat labile protein

**Bos d 6, BSA**
- Risk for reactions to fresh milk
- The main allergen in beef
- Heat labile protein

**Bos d 8, Casein**
- Risk for reactions to all forms of milk
- High levels are connected with persistent milk allergy
- IgE levels fall as tolerance develops
- Stable to heat and digestion

**Bos d lactoferrin**
- Risk for reactions to fresh milk
- Heat labile protein



# background

## Previous symptoms:

- Severe eczema since 2–3 months of age
- Stomach ache and loose stools

## Family history:

- None

| Previous visit | Antonio | Isabel |
|---|---|---|
| (at 6 months of age) | | |
| **Skin Prick Test** | | |
| Milk | +4 | +5 |
| Egg white | neg | neg |
| **ImmunoCAP® sIgE result:** | | |
| Milk (f2) $kU_A/l$ | 18 | 25 |
| Diagnosis: | Milk allergy | Milk allergy |
| Doctor's recommendations: | Dietary restrictions: Eliminate cow's milk from the diet and substitute milk for milk-free formula | Dietary restrictions: Eliminate cow's milk from the diet and substitute milk for milk-free formula |



# current visit

## ImmunoCAP Allergen component test results

| (at 18 months of age)) | Antonio, results ($kU_A/l$) | Isabel, results ($kU_A/l$) |
|---|---|---|
| Milk | 10.2 | 20.6 |
| Bos d 4 (α-lactalbumin) | 3.8 | 2.2 |
| Bos d 5 (β-lactoglobulin) | 0.7 | 1.0 |
| Bos d 6 (bovine serum albumin) | 3.6 | 0.3 |
| Bos d 8 (casein) | 1.4 | 21.5 |
| Bos d lactoferrin (transferrin) | 0.4 | <0.1 |

| | | |
|---|---|---|
| Diagnosis: | Likely tolerant to baked milk | Milk allergy |
| Doctor's recommendations: | Oral food challenge to confirm tolerance to milk | No challenge needed Dietary restriction to all forms of milk remains |

At 2 years of age Antonio can eat and drink milk in all forms, while Isabel is still on a milk free diet.

## Interpretation of the Allergen component test results

- Significant levels of IgE to Bos d 8 indicates a risk for reaction to all forms of milk = Isabel's situation.
- Low level of sensitization to Bos d 8 indicates tolerance to boiled milk. An open challenge in the clinic with baked milk may be performed to confirm the diagnosis = Antonio's situation.




**rHev b1, rHev b3, rHev b5, rHev b6.01, rHev b6.02, rHev b8, (rHev b9, rHev b11)**

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| Latex allergen | Molecular mass (Kda) | Protein name | Significance allergen | Significance Cross-reaction | IgE Binding Prevalence |
|---|---|---|---|---|---|
| **Hev b 1** | 14,6 | Rubber elongation factor | High (SB) | Not observed | HCW:52% SB:81% |
| **Hev b 2** | 34-36 | Beta-1,3-glucanase | Medium | Medium | HCW:65% SB:54% |
| **Hev b 3** | 24-27 | Small rubber particle protein | High (SB) | Not observed | HCW:13-20% SB:76-78% |
| **Hev b 4** | 50-57 | Beta-glucosidase | Not known | Not observed | Not Clear |
| **Hev b 5** | 16-24 | Acidic structural protein | High in all risk groups | Not observed (Homology Kiwi) | HCW:68-92% SB:33-56% |
| **Hev b 6.01** | 20 | Prohevein | High in all risk groups | High (Banana-kiwi-avocado) | LAP:75-83% |
| **Hev b 6.02** | 4,7 | Hevein | High in all risk groups | High (Banana-kiwi-avocado) | LAP:56% HCW:75% SB:27% |
| **Hev b 6.03** | 14 | C-domaine of prohevein | High | High (Homlogy plant stress proteins) | LAP:15-21% |
| **Hev b 7.01** | 42 | Patatin-like protein | Low-Medium | Unclear (Homology potato-tomato) | LAP:11-49% |
| **Hev b 7.02** | 44 | Patatin-like protein | Medium only in SB | Unclear (Homology potato-tomato) | SB:39.5% |
| **Hev b 8** | 14 | Profilin | Low | Medium panallergen | LAP:11% HCW:20-24% SB:6-12% |
| **Hev b 9** | 51 | Enolase | Low | Medium (Molds) | LAP:15% |
| **Hev b 10** | 26 | Manganese superoxyde dismutase | Low | Medium (Molds) | LAP:27% HCW:0% SB:10% |
| **Hev b 11** | 32 | Class I chitinase | Low | High (Fruits) | LAP:19-29% |
| **Hev b 12** | 9 | Lipid transfer protein | Low | Medium (fruits) panallergen | LAP:24% |
| **Hev b 13** | 42 | Esterase | High | Not determined | HCW:63% |

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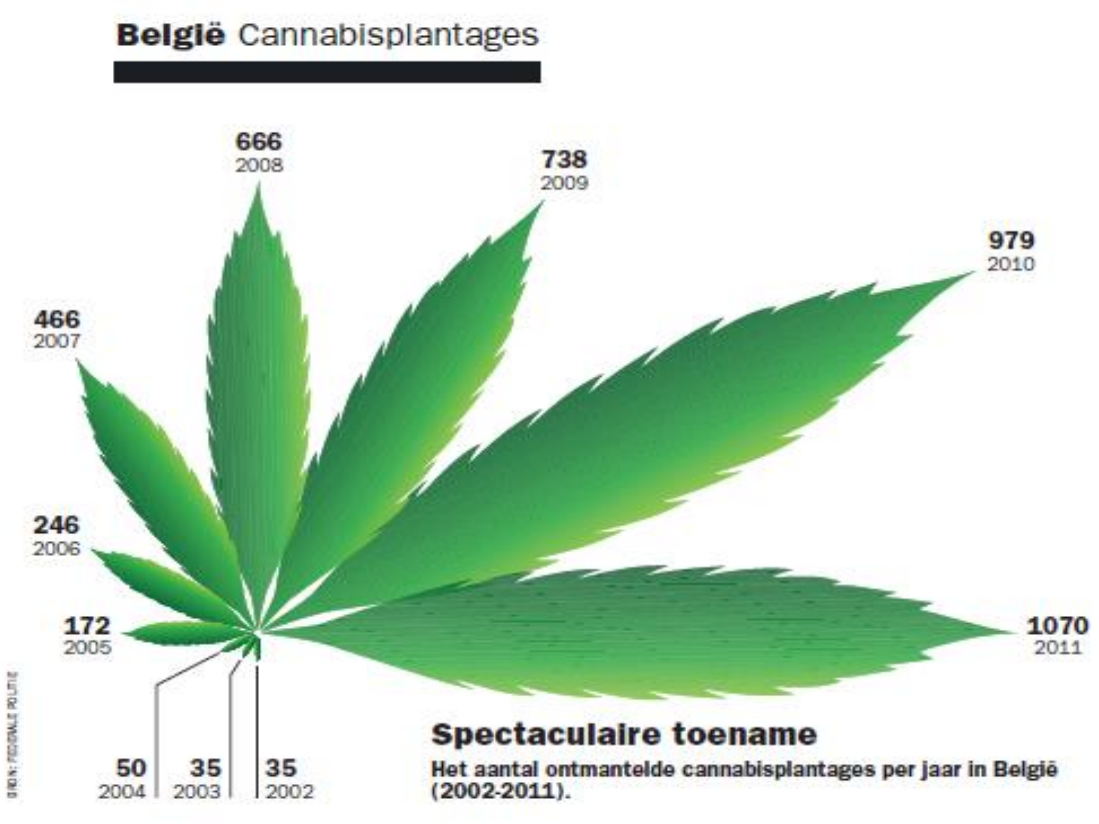
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# New Food Allergies in a European Non-Mediterranean Region: Is *Cannabis sativa* to Blame?

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Cit r 3



Pru av 3



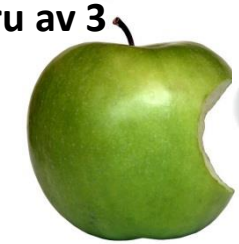
Cit s 3



Pru p 3



Tri a 14



Mal d 3



Lyc e 3

The “Can s 3 connection”





Hev b 12



Cor a 8, Jug r 3, …



Ara h 9



Mus a 3

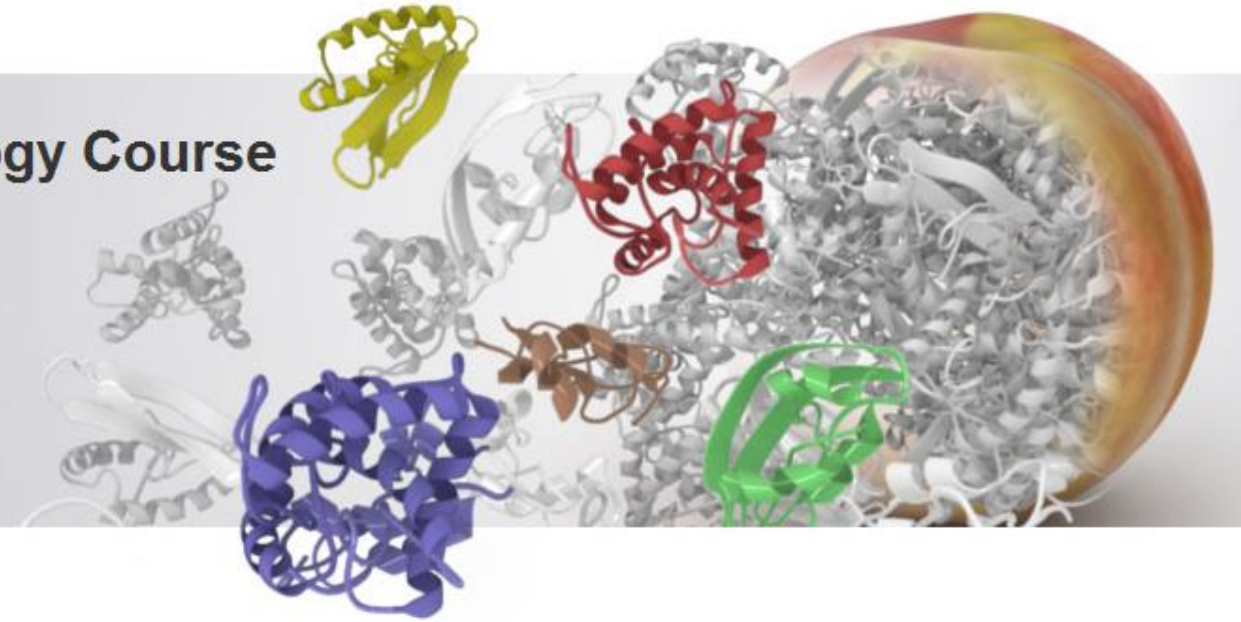




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**Select your prefered language:**

# Molecular Allergology




Introduction to Molecular Allergology




Specificity and cross-reactivity




Is there risk for systemic reactions?




How to better choose treatment




Patient cases