

Asthma – An unsolved problem

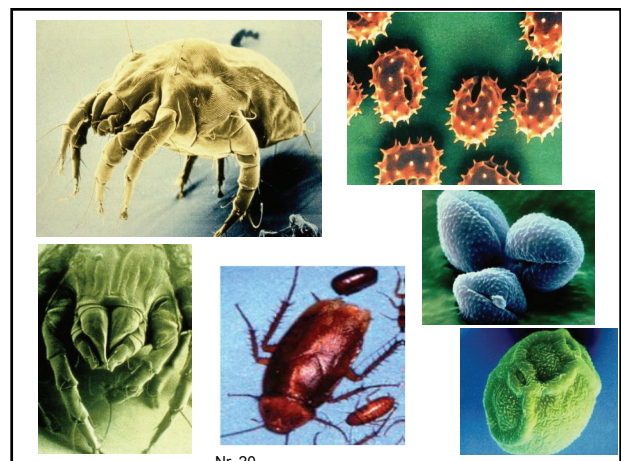
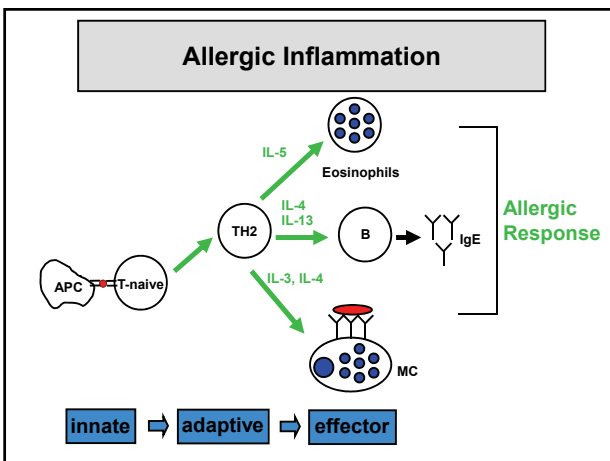
ASTHMA BY THE NUMBERS

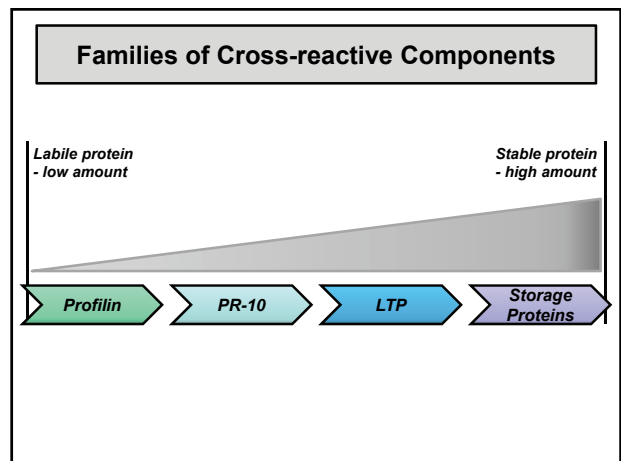
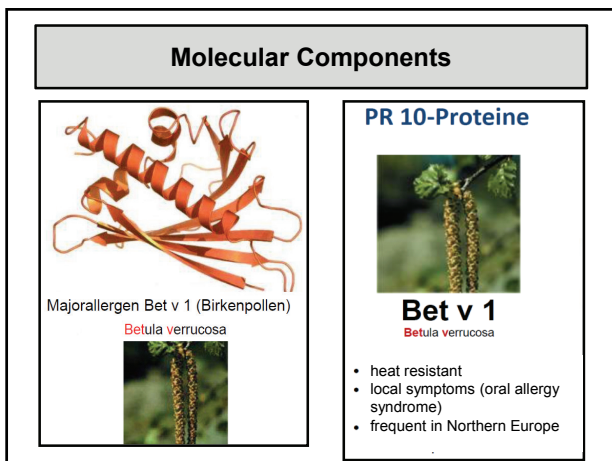
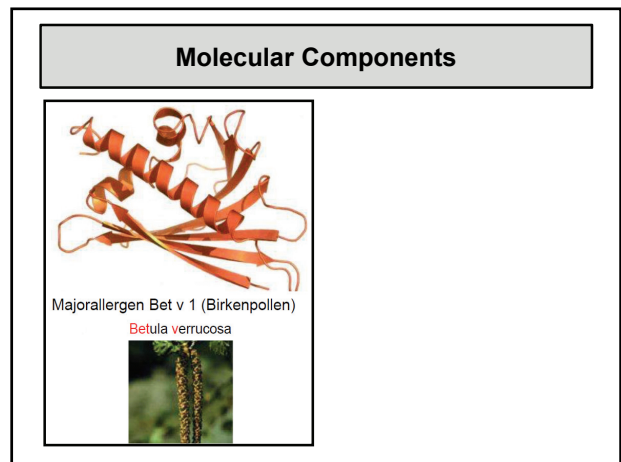
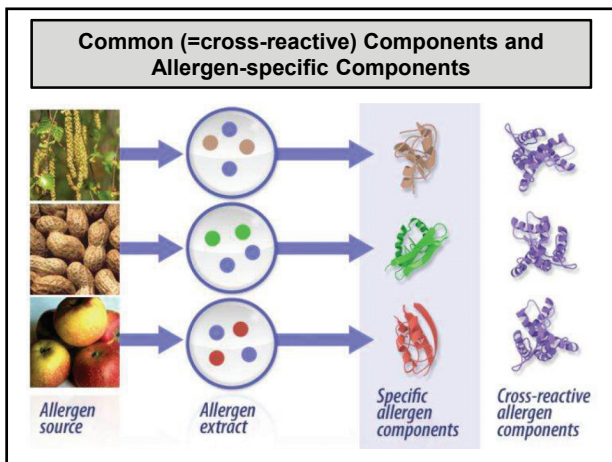
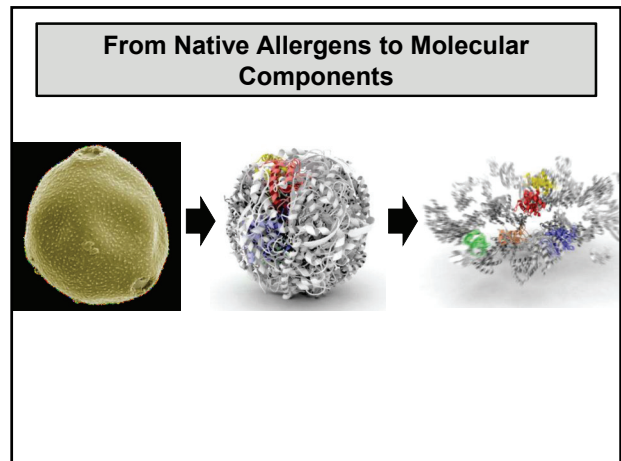
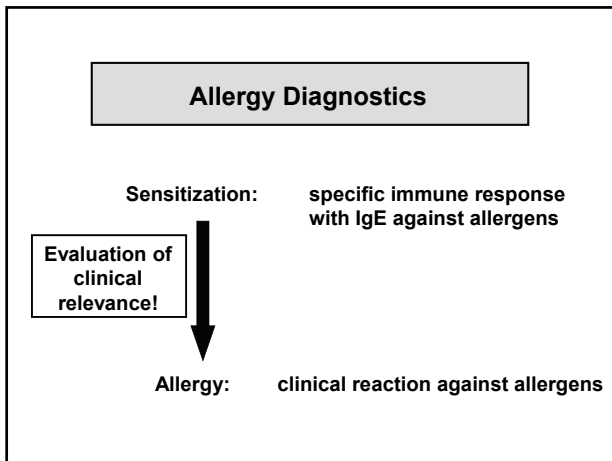
- #1** most common chronic condition in children: **ASTHMA**
- #6** most common chronic condition in adults: **ASTHMA**
- #1** trigger of acute asthma attacks in children: **COLDS AND FLU**
- 20 MILLION+** Americans have **ASTHMA**

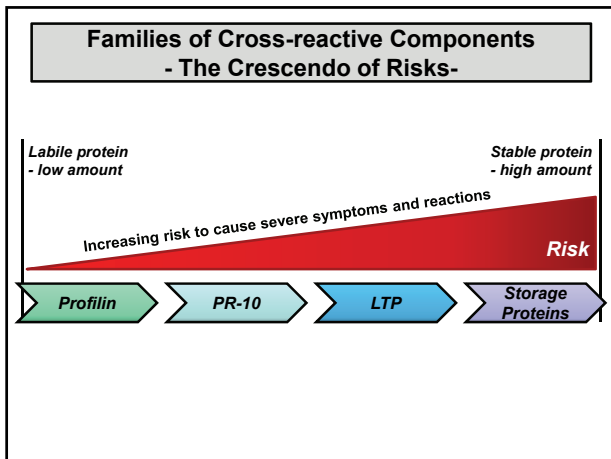
THE TALLY

- 3 MILLION WORK DAYS LOST** to asthma each year (average 13 days per person)
- 10 MILLION SCHOOL DAYS LOST** to asthma each year
- \$850 MILLION IN LOST WAGES** (1990 National Institutes of Health estimate)
- \$14.5 BILLION TOTAL YEARLY COST** of asthma (1999 Centers for Disease Control estimate)
- \$1 BILLION IN LOST WAGES** for those needing to miss work to care for sick children
- 10 MILLION PHYSICIAN VISITS, 1 MILLION EMERGENCY ROOM VISITS, 400,000 HOSPITALIZATIONS** due to asthma each year
- 2.3 MILLION DAYS SPENT IN THE HOSPITAL** each year (average length of hospital stay due to asthma: 5 days)

National Asthma Campaign (NAC) 2013 - www.nationalasthmacampaign.org







Proteine Family - Profilines

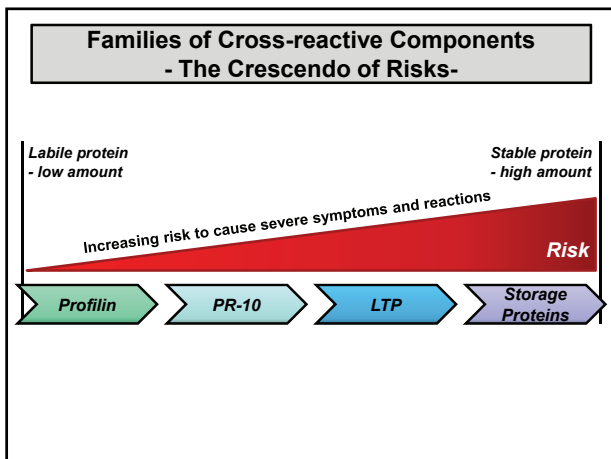
Birch (Bet v 2)

Latex (Hev b 8)

Profiline

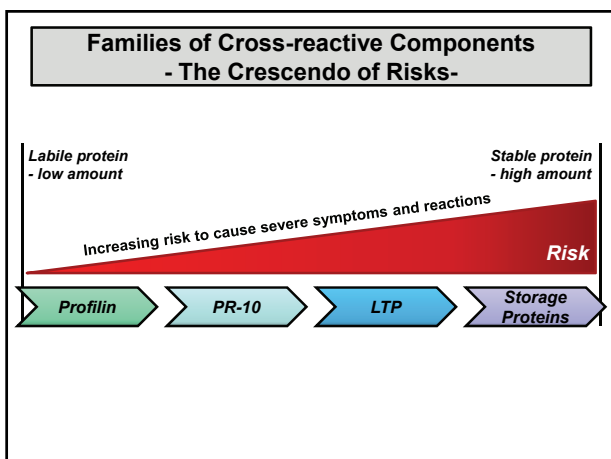
- common
- frequent sensitization but no clinical symptoms

Hauser et al, Allergy Asthma Clin Immunol 2010;6:1-14



Proteine Family: Pathogenesis related proteins (PR-10)

Examples	Characteristics
birch (Bet v 1) peanut (Ara h 8) soy (Gly m 4) hazelnut (Cor a 1) apple (Mal d 1) kiwi (Act d 8) peach (Pru p 1) carrot (Dau c 1) celery (Api g 1)	<ul style="list-style-type: none"> • heat sensitive • tolerated in cooked state • Oral Allergy Syndrome (OAS) • Fruit-Vegetable-Syndrome in Northern Europe



Proteine Family: Lipid Transfer Proteins

Corn

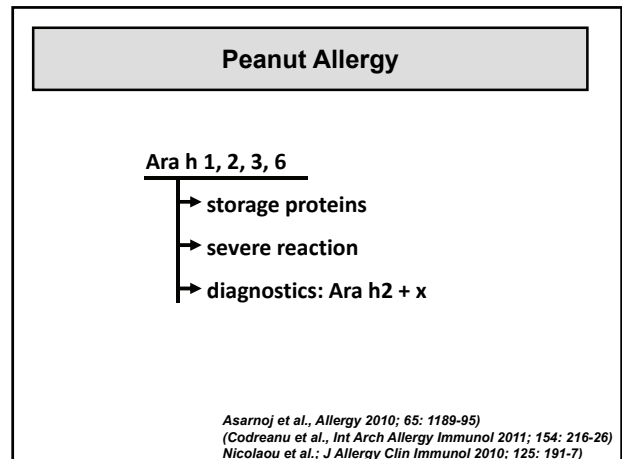
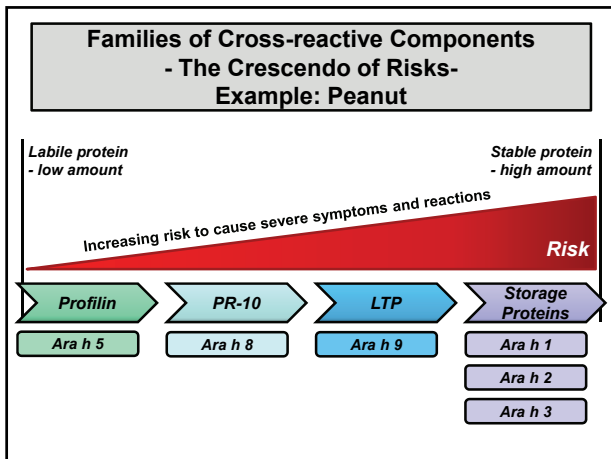
Bean

Rice

Wheat

- important cross-reactivities
- plants and pollen
- associated with severe symptoms
- common with nut allergy
- common in Southern Europe

Hauser et al, Allergy Asthma Clin Immunol 2010;6:1-14



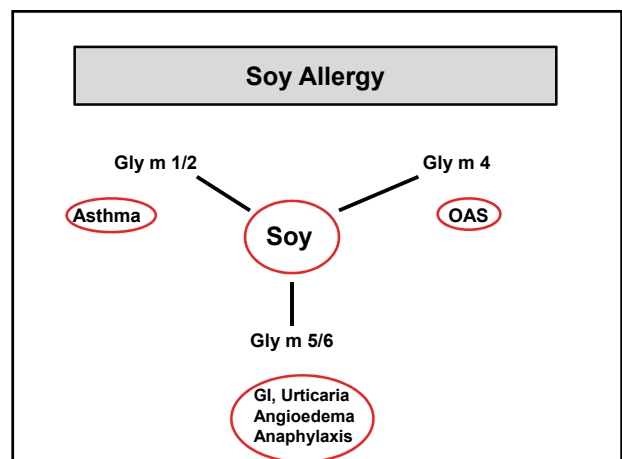
Proteine Family: Storage Protein

Examples	Characteristics
peanut (Ara h 1, 2, 3, 6, 7) soy (Gly m 5, 6) hazelnut (Cor a 9) wheat (Tri a 19 Gliadin)	<ul style="list-style-type: none"> stable heat resistant also cooked reactive frequently severe reactions

- ### Storage Proteins
- Major allergens of leguminous plants (peanut, soy) and seeds of dicotyledonous plants (buckwheat, sesame, mustard)
 - Major portion of total protein content
 - Reaction already to minute amounts
 - High stability
 - Resistant to enzymatic degradation and heat
 - Most important group: 2S-Albumines

Important Storage Proteins

	2S-Albumine	7S-Globuline	11S-Globuline
Peanut (Arachis hypogaea)	Ara h 2 Ara h 6	Ara h 1	Ara h 3 Ara h 4
Soy (Glycine max)		Gly m 5	Gly m 6
Hazelnut (Corylus avellana)	Cor a 14	Cor a 11	Cor a 9
Walnut (Juglans regia)	Jug r 1	Jug r 2	Jug r 4
Brazil nut (Bertolletia excelsa)	Ber e 1		
Buckwheat (Fagopyrum esculentum)	Fag e 2		
Sesame (Sesamum indicum)	Ses i 1		



Proteine Family: Tropomyosine

<p>Home dust mite (Der p 10) Anisakis (Ani s 3) Shrimp (Pen a 1)</p>	<p>Actin-binding proteins in muscle cells</p> <p>Cross-reactivity between</p> <ul style="list-style-type: none"> • crustaceae • home dust mites • cockroaches • nematodes
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Insect Venom Allergy

Bee

Api m 1 (Phospholipase A 2)
Api m 2 (Hyaluronidase)

Wasp

Ves v 1 (Phospholipase A 1)
Ves v 2 (Hyaluronidase)
Minor-Allergen (10 – 15 %)
Ves v 5 (Antigen 5)

↓

Api m 1 + Api m 2

Native venom

Ves v 1 + Ves v 5 = 97 % aller Allergiker

Native venom

↓

Cross reactivity?

↓

Carbohydrate determinants (CCD)

Sturm et al., J Allergy Clin Immunol 2011; 128: 247-8
Seismann et al., Clin Mol Allergy 2010; 8: 7
Jin et al., J Allergy Clin Immunol 2010; 125:194-90
Mittermann et al.; J Allergy Clin Immunol 2010; 125: 1300-7
Hofmann et al.; J Allergy Clin Immunol 2011; 127: 265-7

Pet Allergens

Lipocaline	Can g 1,2 (dog)
	Fel d 4 (cat)
	Equ c 1 (horse)
	Mus m 1 (mouse)
Secretoglobine	Fel d 1 (cat)
Kallikreine	Can g 5 (dog)

Canonica et al. *World Allergy Organization Journal* 2013, 6:17
<http://www.waojournal.org/content/6/1/17>

WAO journal
WORLD ALLERGY ORGANIZATION

CONSENSUS DOCUMENT Open Access

A WAO - ARIA - GA²LEN consensus document on molecular-based allergy diagnostics

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Principals of the IgE Microassays

Harwanegg et al, Methods Mol Biol, 2007

Preclinical molecular spreading of grass pollen allergens

Hatzler et al; JACI 2012

2014 Hitliste der Komponenten-basierten Allergie-Diagnostik	
Allergen	Hoch-Risiko
Erdnuss	Ara h 2 (plus Ara h x)
Haselnuss	Cor a 9, Cor a 14
Soja	Gly m 5, Gly m 6 (Gly m 4)
Ei	Gal d 1
Milch	Bos d 8, Bos d 5
Weizen	Tri a 19, Tri a 14
Steinfrucht (Apfel, Pfirsich)	Pru p 3, Mal d 3
Biene	Api m 1, Api m 2
Wespe	Ves v 1, Ves v 5

Leitlinien und Positionspapiere	
	www.dgaki.de http://dgaki.de/leitlinien
	http://www.awmf.org/ http://www.awmf.org/leitlinien.html

