



UMC Utrecht

Food allergy in Europe

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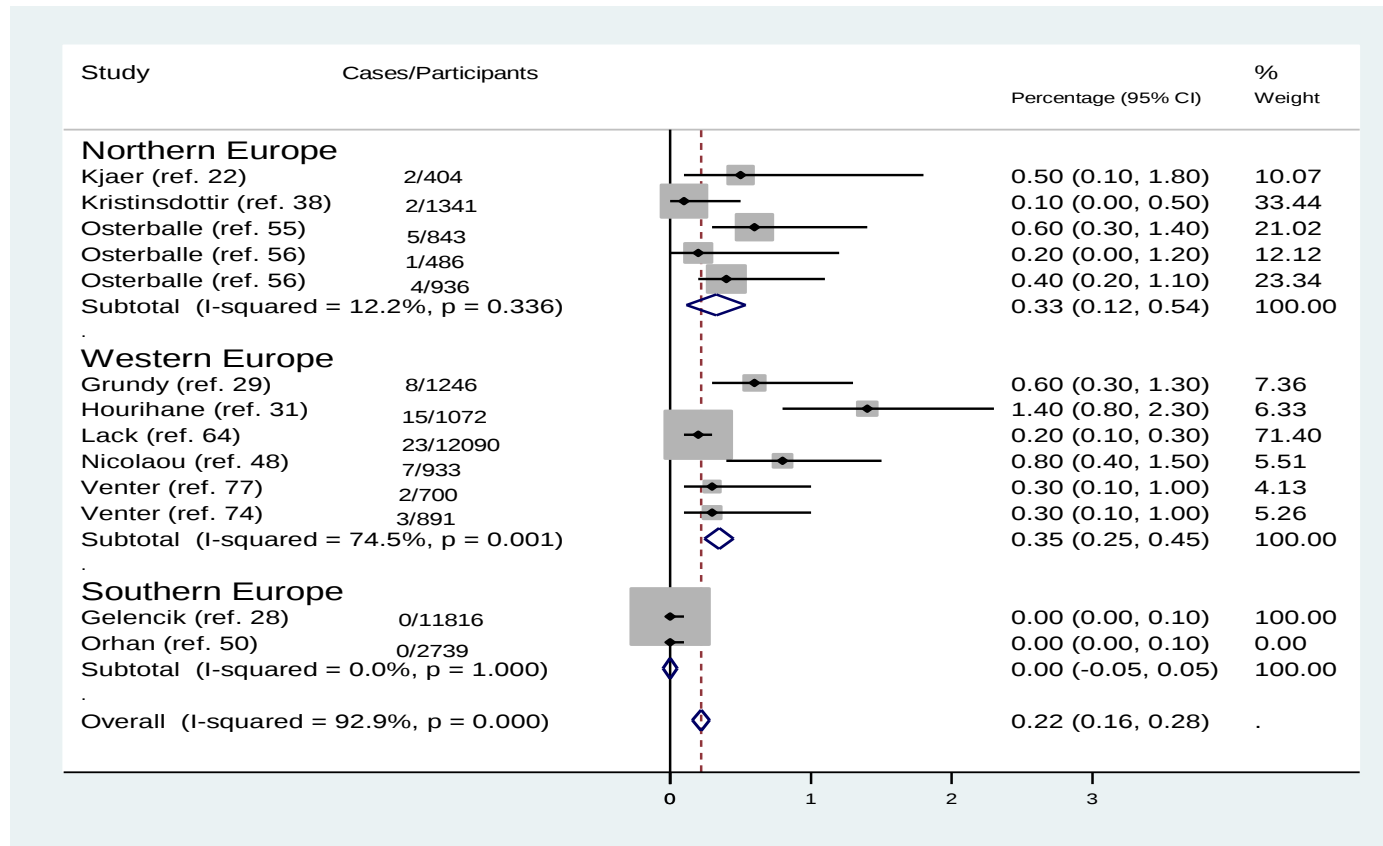


Overview of the presentation

- Prevalence of peanut and soy allergy in Europe
- Sensitisation patterns in Europe
- Ranking of sensitisation to specific food allergens
- Crossreactivities
- Specific allergens and severity
- Thresholds for different foods
- News about soy
- Conclusions



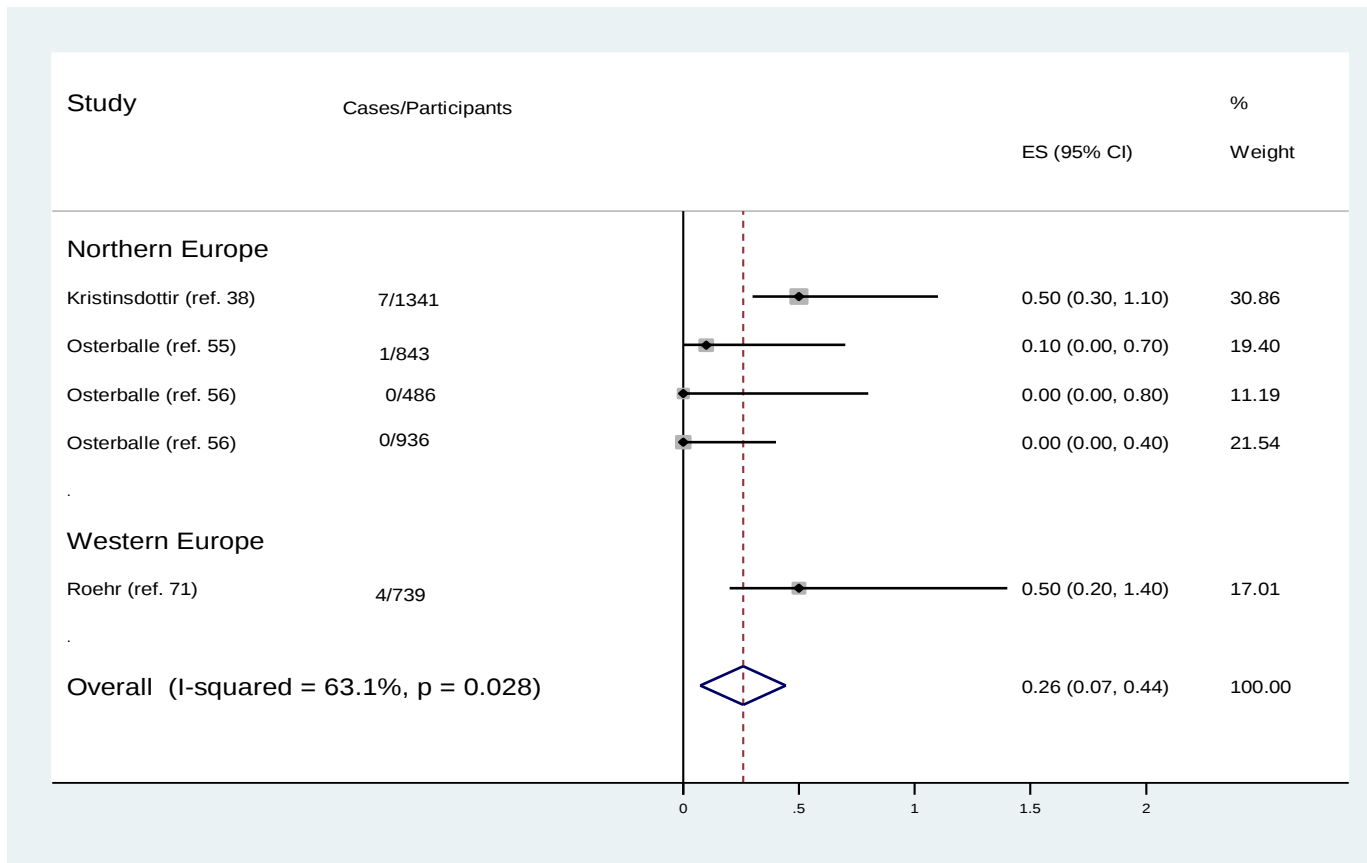
Point prevalence of FC positive peanut allergy



Region-stratified pooled prevalence of peanut allergy (PA) in studies published in Europe between January 2000 and September 2012. Markers represent percentages and 95%CI and boxes represent the size of the study (Nwaru et al, 2015)



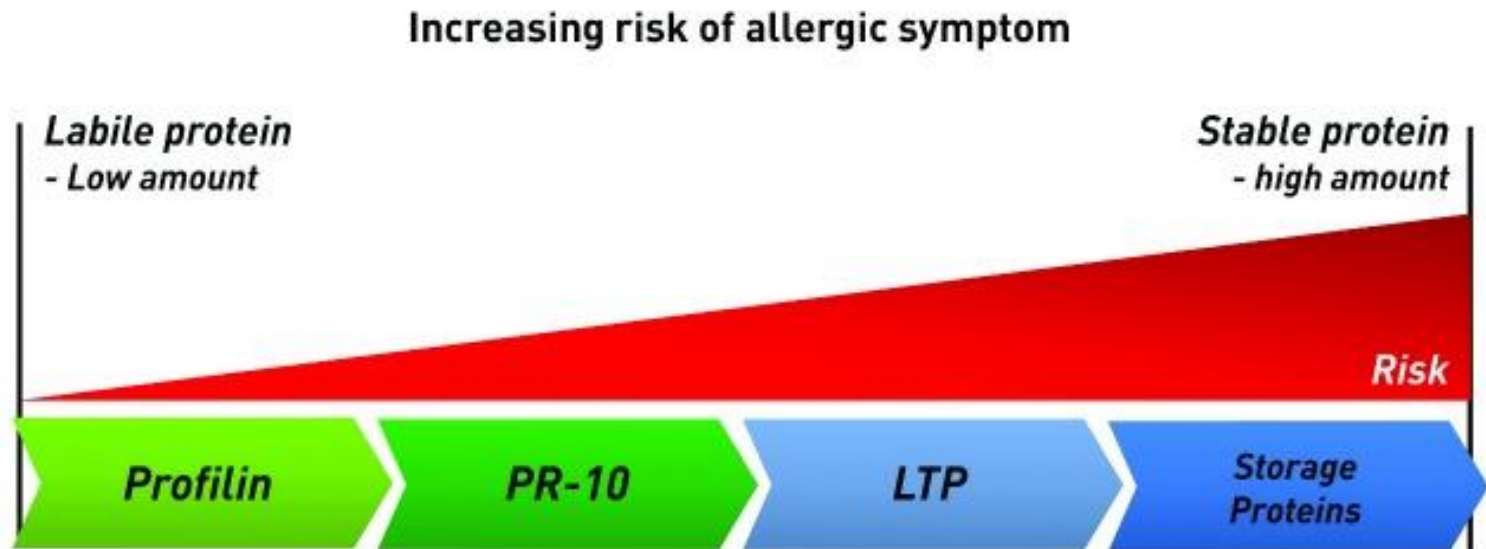
Point prevalence of FC positive soy allergy



Region-stratified pooled prevalence of soy allergy (SA) in studies published in Europe between January 2000 and September 2012. Markers represent percentages and 95%CI and boxes represent the size of the study (Nwaru et al 2015)



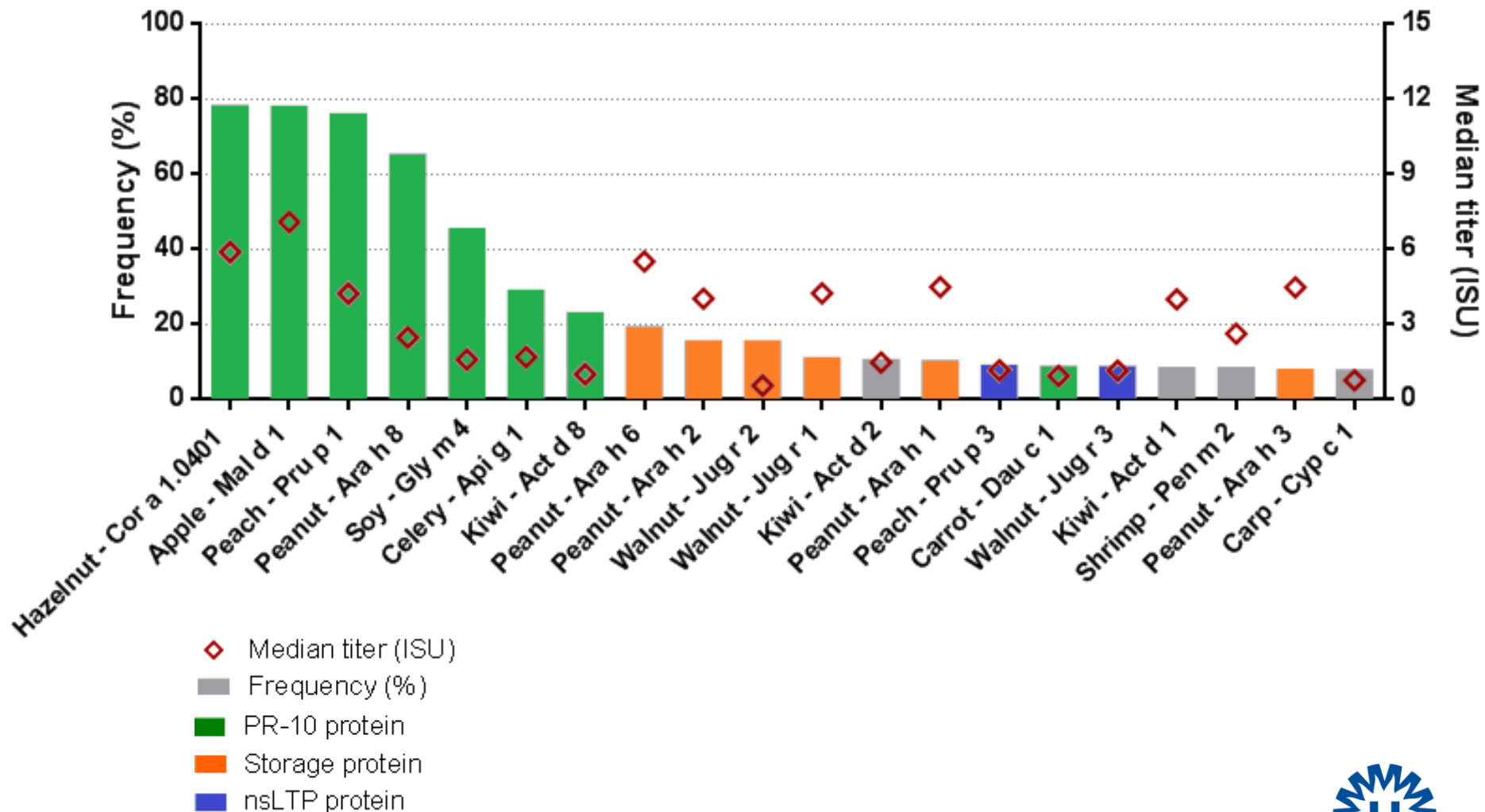
Plant food protein families and risk of allergy



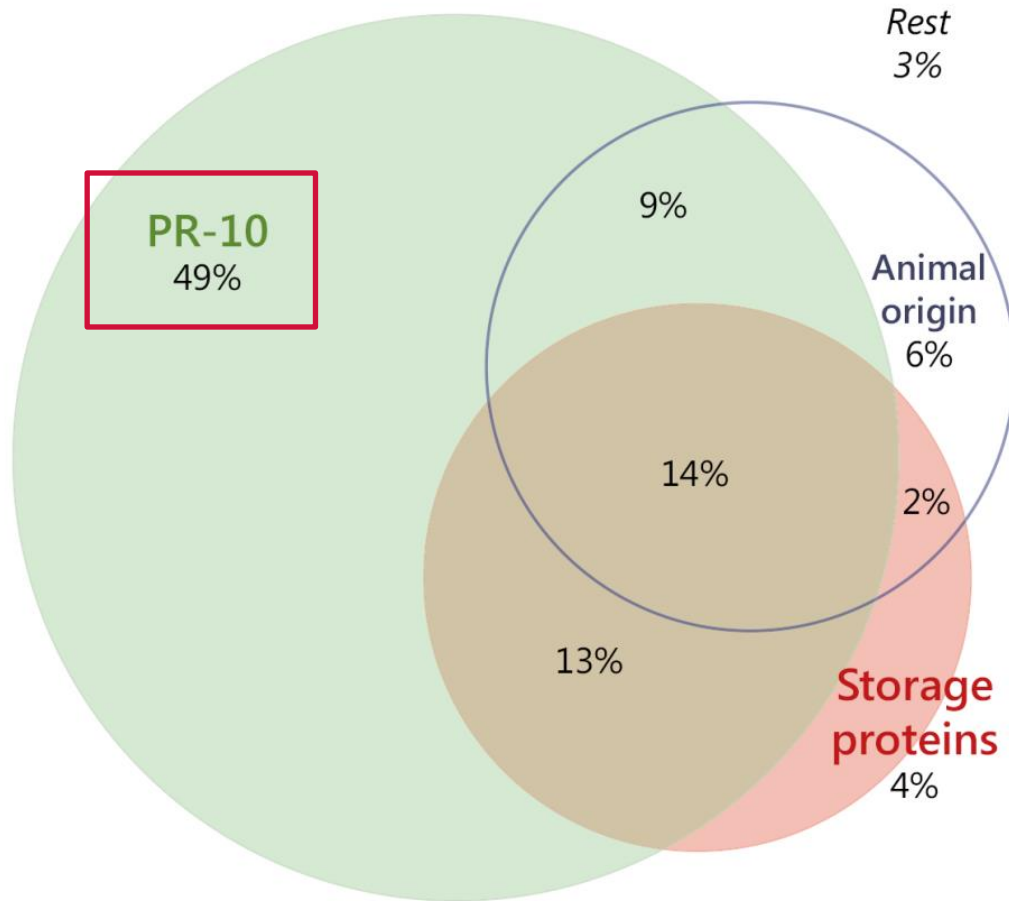
Source: ThermoFisher Scientific



Storage protein titers relatively high in NL



Co-sensitisation PR-10 / other food allergens in adults



Animal origin: cow's milk, hen's egg, fish, shellfish

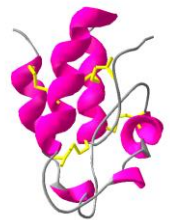
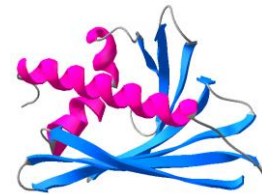


Apple allergy in Europe

Impact of different allergens

Austria, Netherlands, Italy, Spain (n=400)

- Apple = *Malus domestica*
- 4 major allergens
 - Mal d 1 (PR10) → mild symptoms – Northern Europe
 - Mal d 2
 - Mal d 3 (LTP) → (50%) severe symptoms – Southern Europe
 - Mal d 4

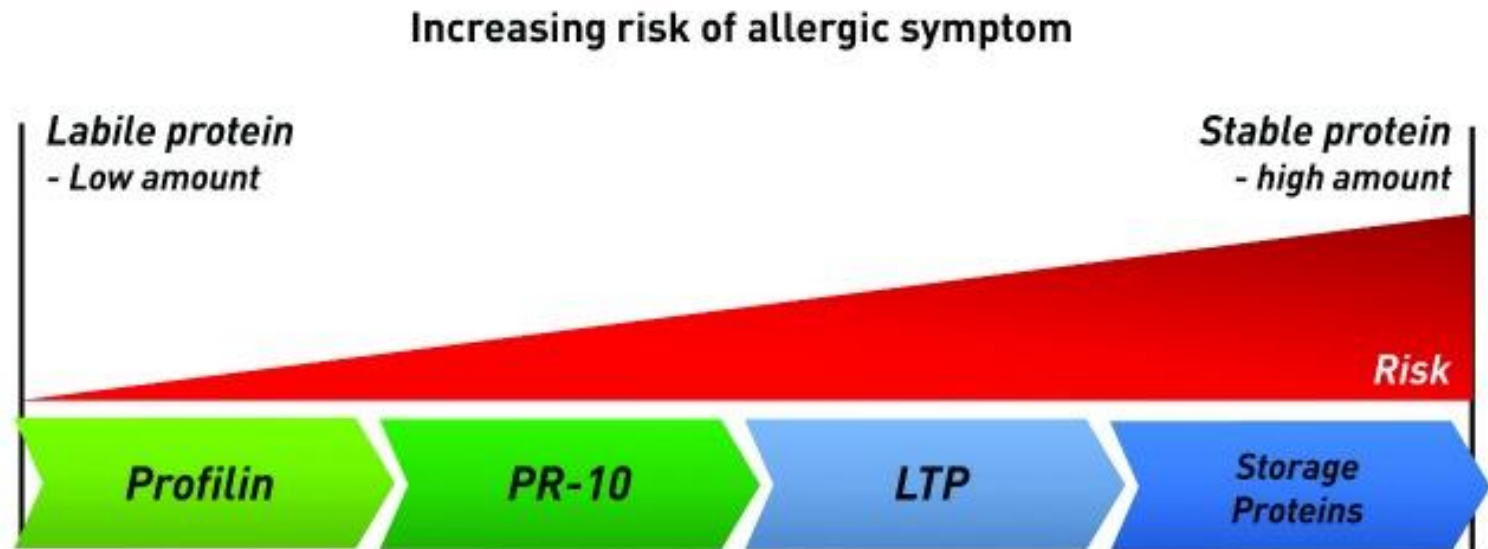


Kiwi allergy in Europe

Impact of CRD

- Severe symptoms: Iceland
- Mild symptoms: rest of Europe
- Recognition of allergens:
 - Act d 8 (PR10): Western/Central and Eastern Europe: mild symptoms
 - Act d 10 (LTP): Southern Europe: mild symptoms (in contrast to apple!)
 - Act d 1 (specific): Iceland: severe symptoms

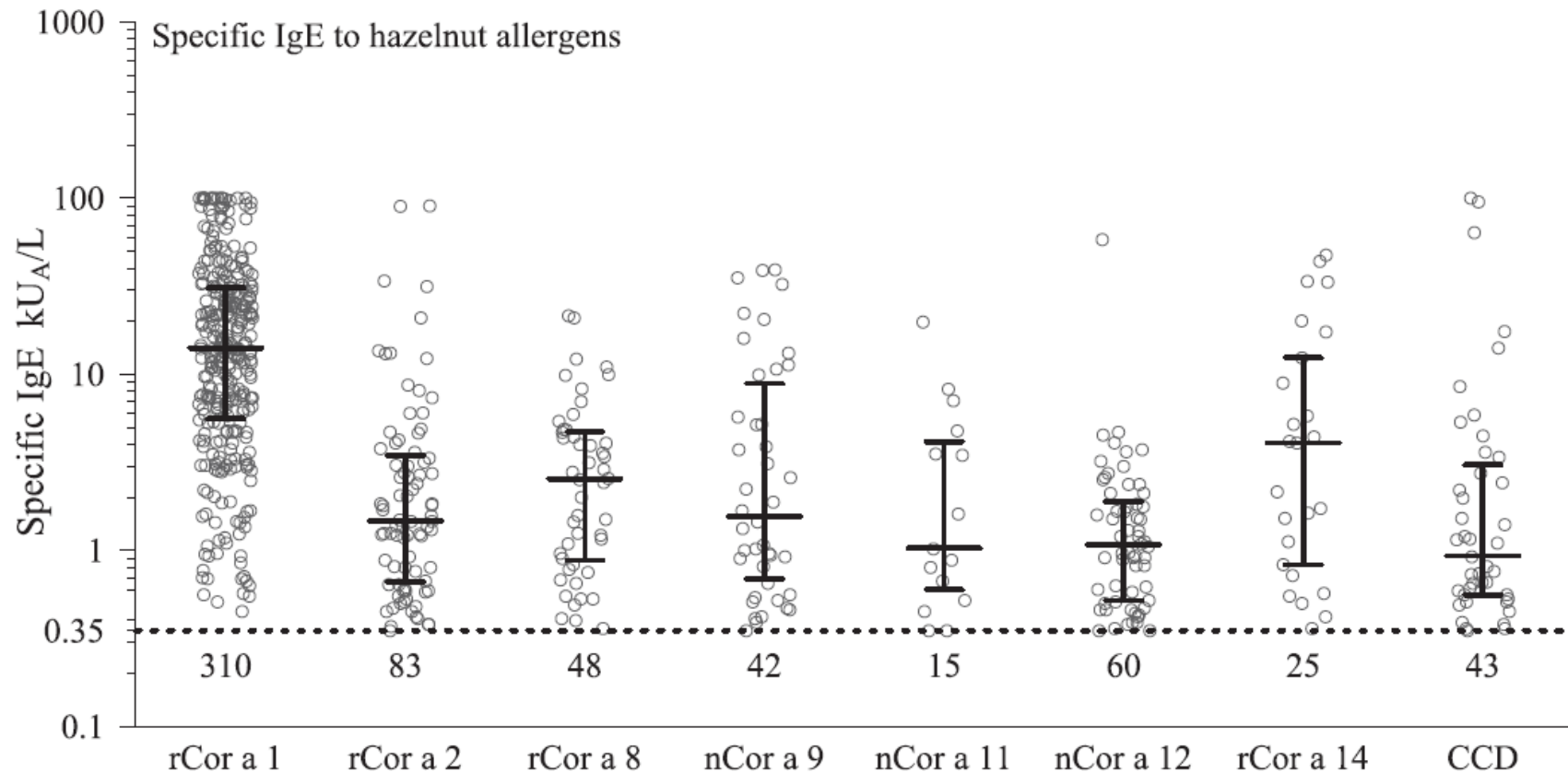
Plant food protein families and risk of allergy



Source: ThermoFisher Scientific

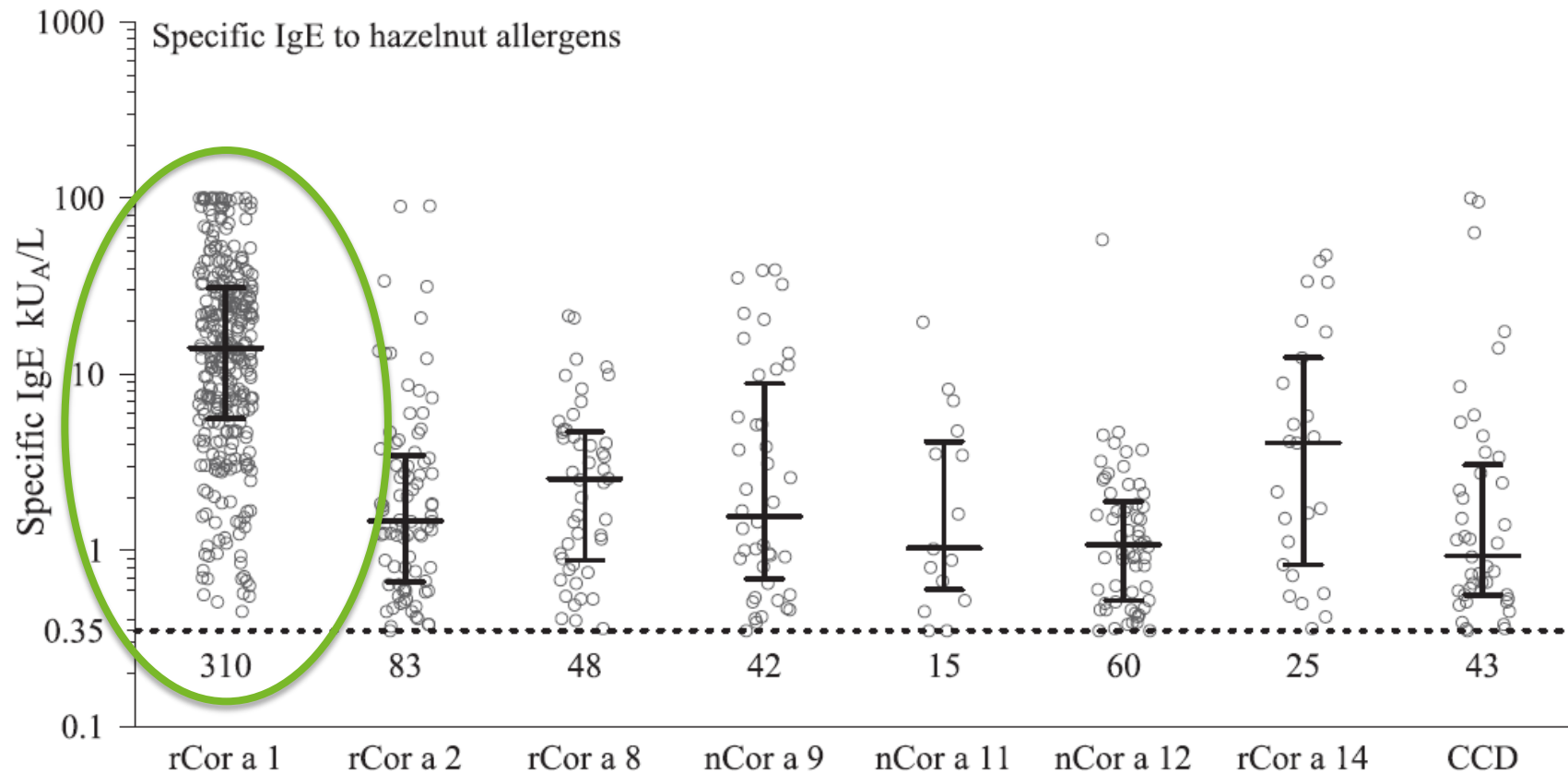


EuroPrevall data: sensitization to hazelnut



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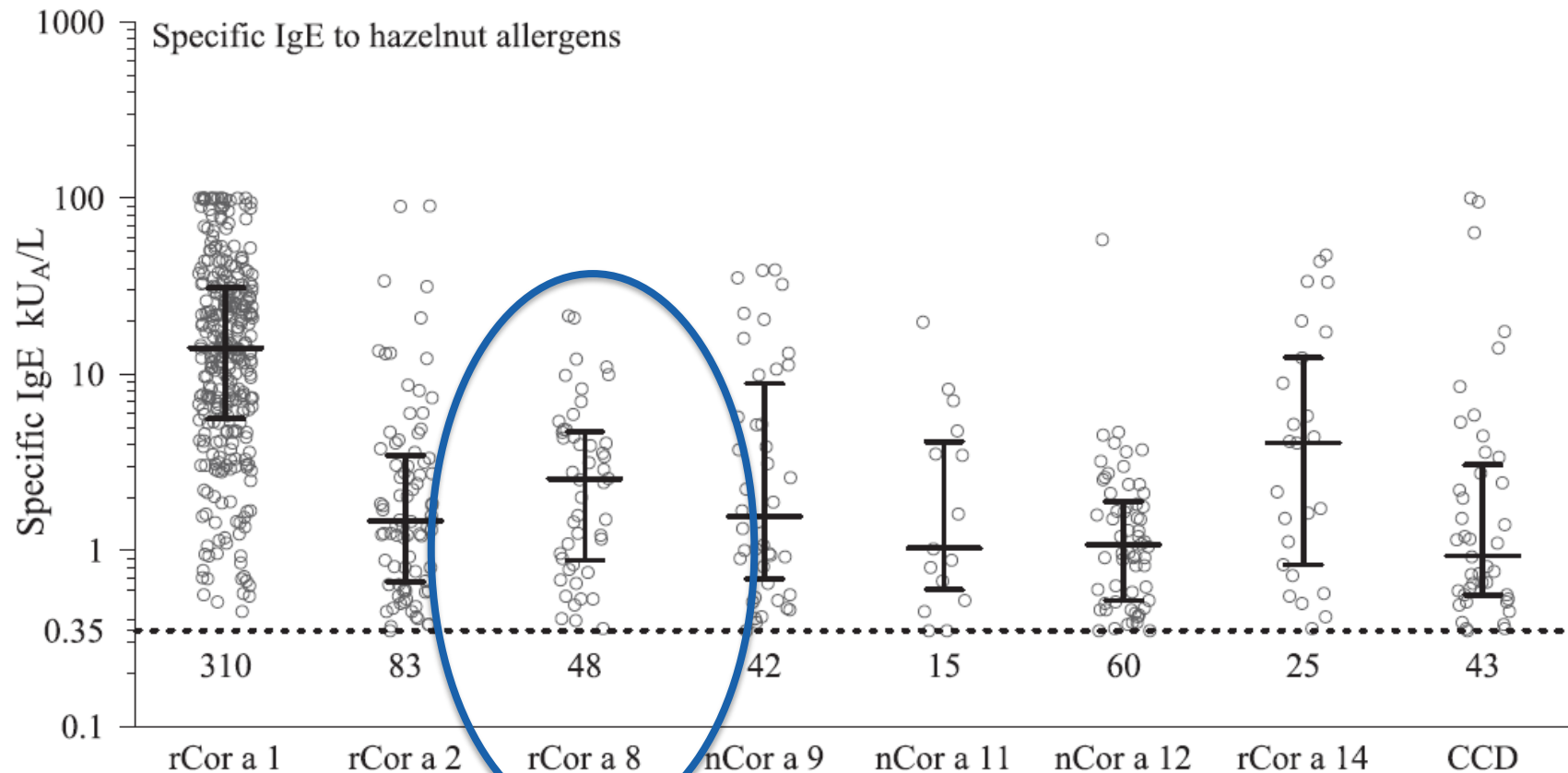
Cor a 1 most prevalent (74%)



Datema, J All Clin Immunol (2015)

EuroPrevall data: sensitization to hazelnut

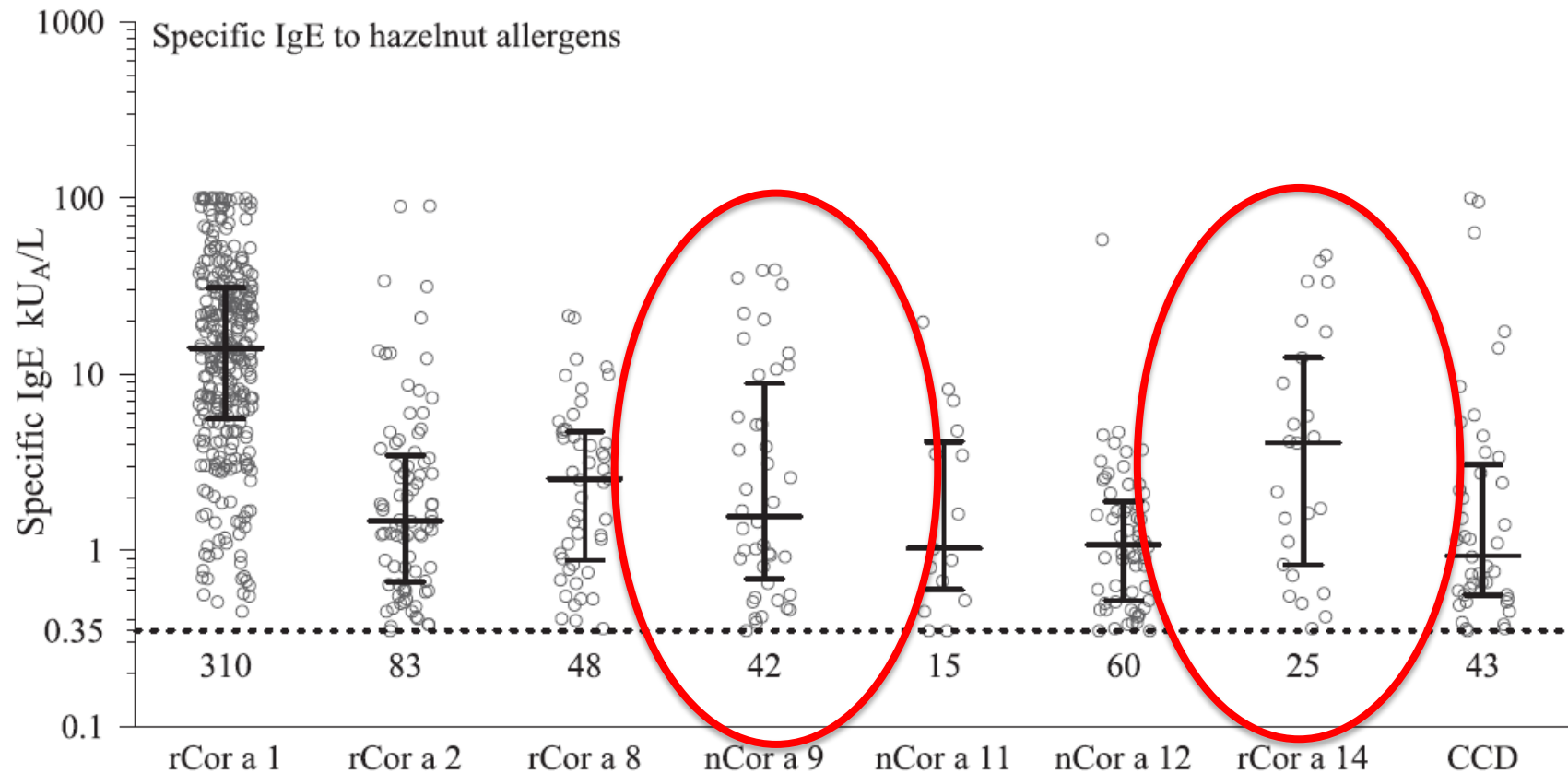
Cor a 8 mediterranean 83% Athens, 36% Madrid



Datema, J All Clin Immunol (2015)

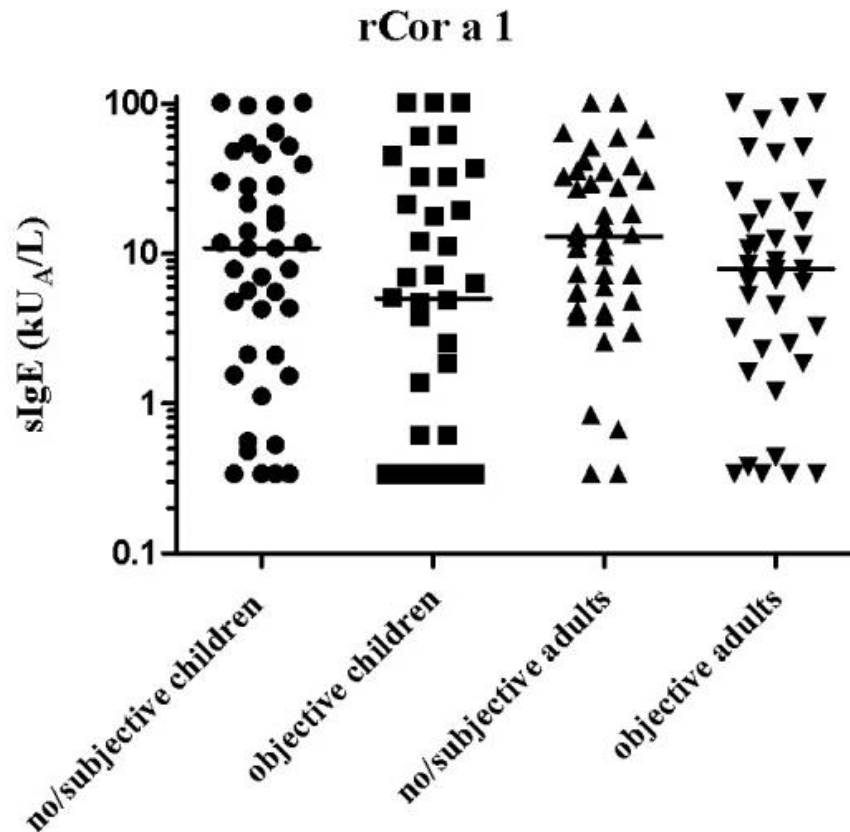
EuroPrevall data: sensitization to hazelnut

Cor a 9 and 14 <10% mainly children

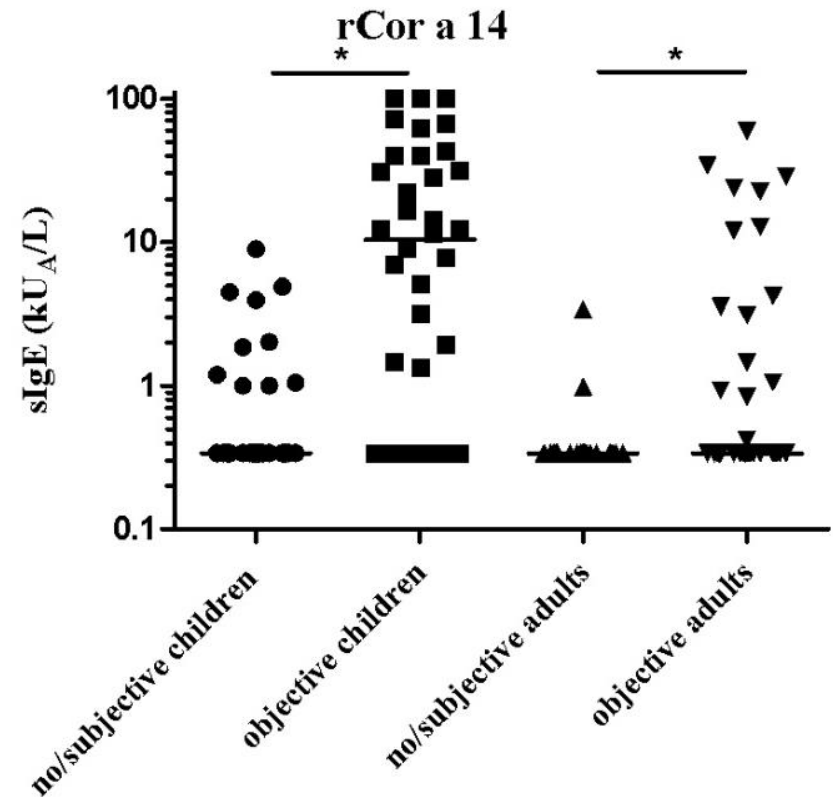
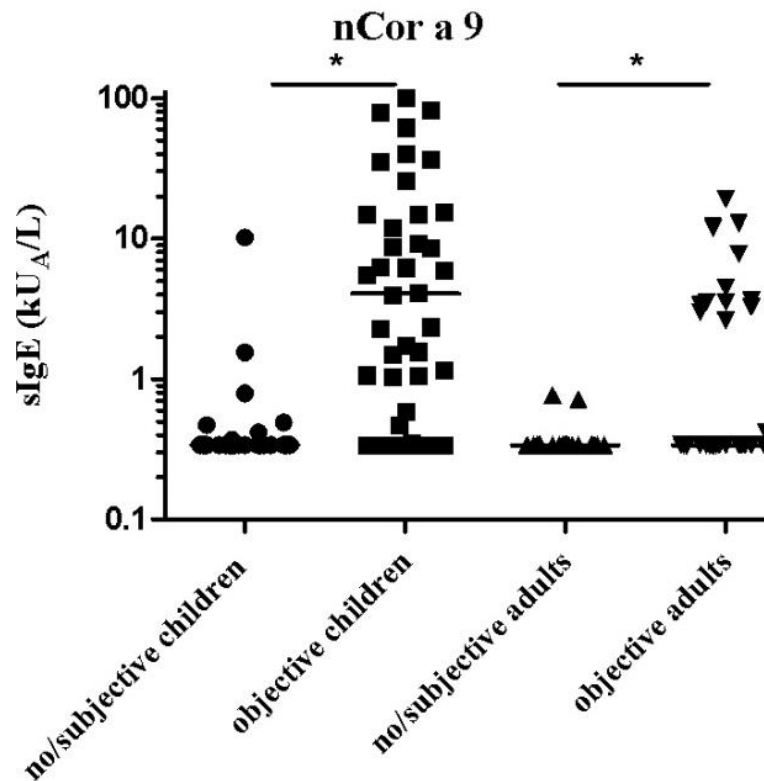


Cor a 1

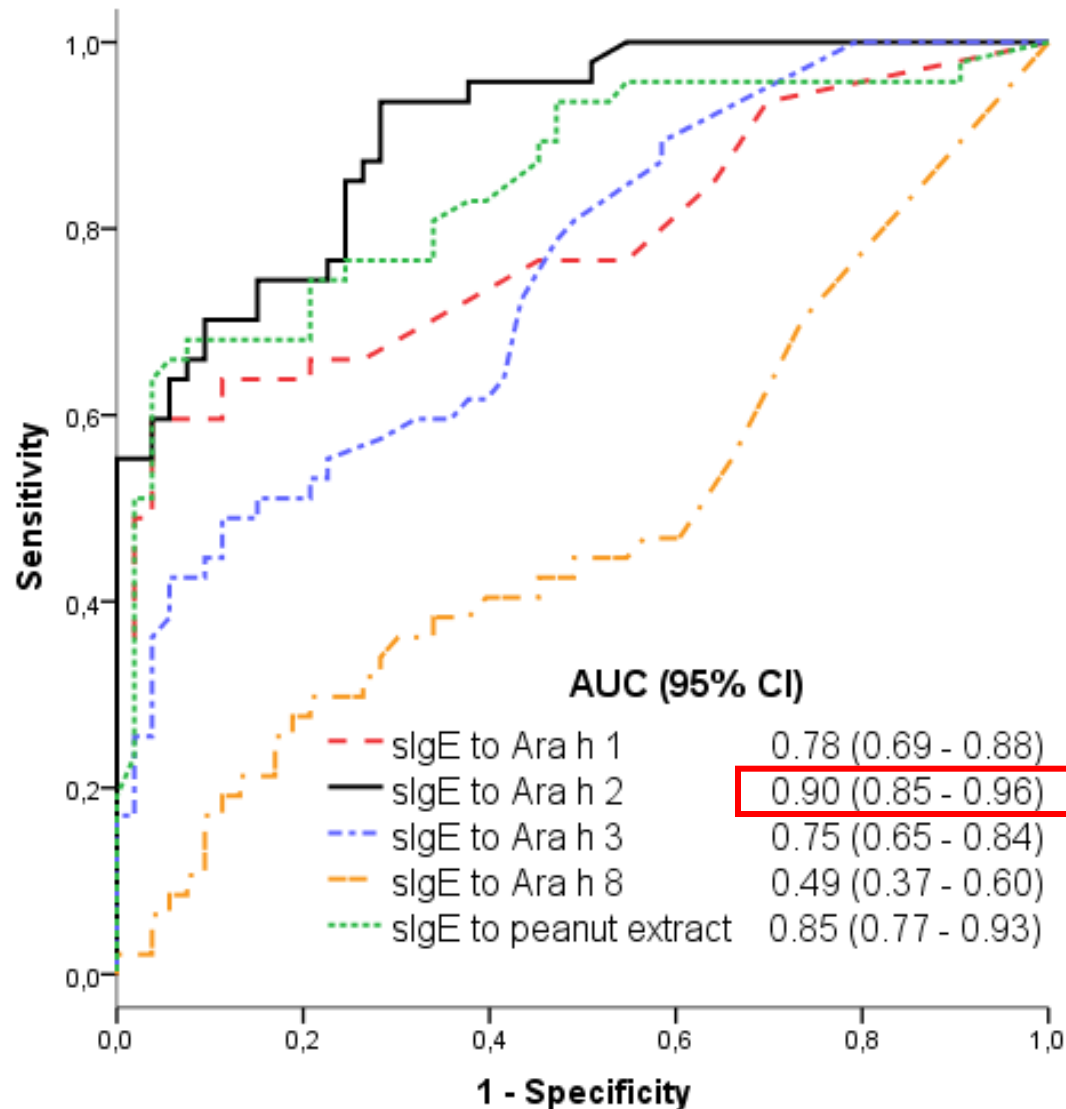
recognized by IgE among all the different



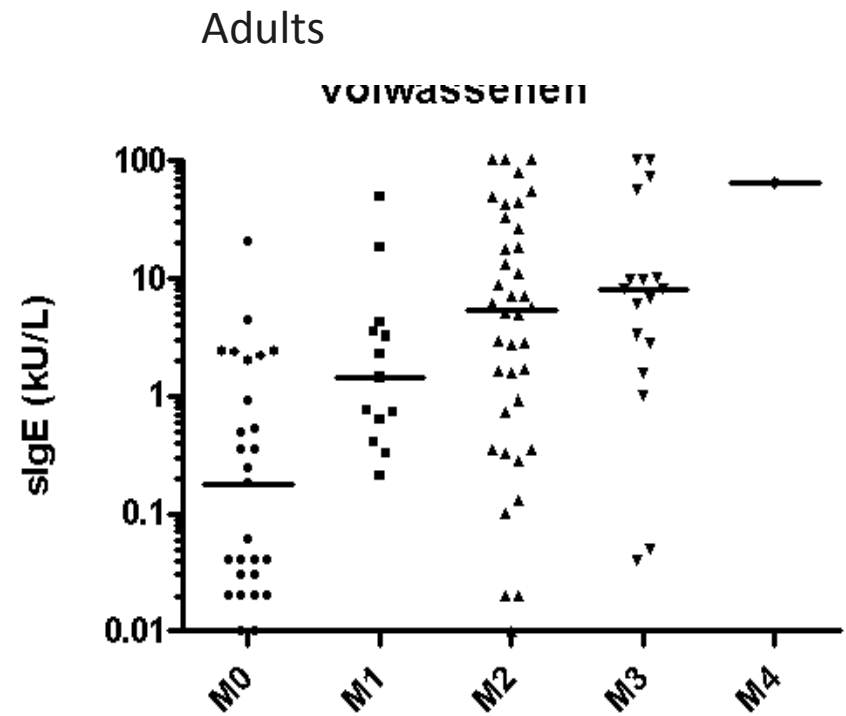
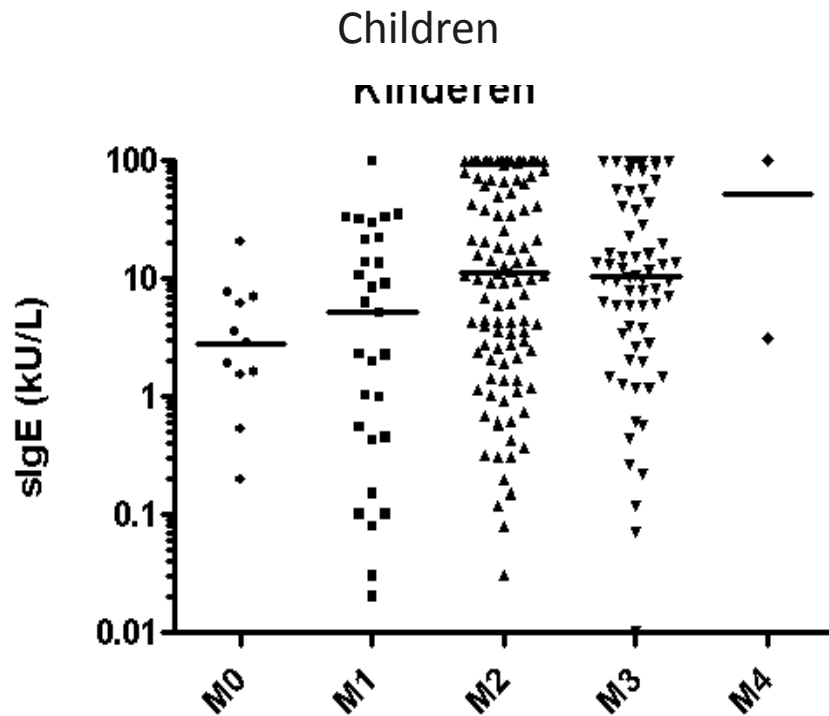
IgE to nCor a 9 and Cor a 14 predictive for a hazelnut allergy with objective symptoms



ROC curves peanut components in children (WKZ)



Ara h 2 significantly correlated with severity at population level



- Weak correlation children:
- Moderate correlation adults:

$\rho = 0.17$, $P=0.01$

$\rho = 0.52$, $P<0.001$

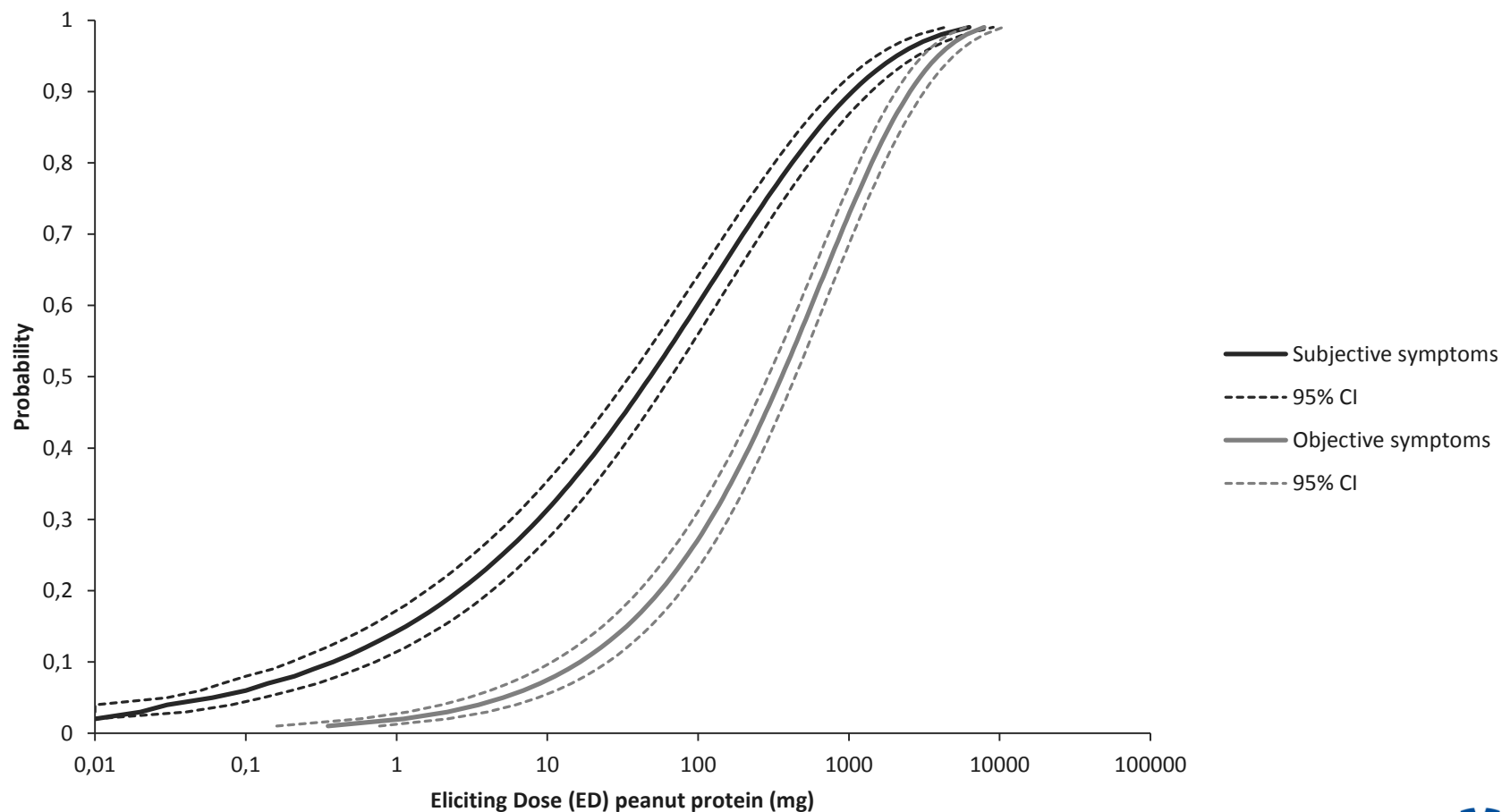


Crossreactivity

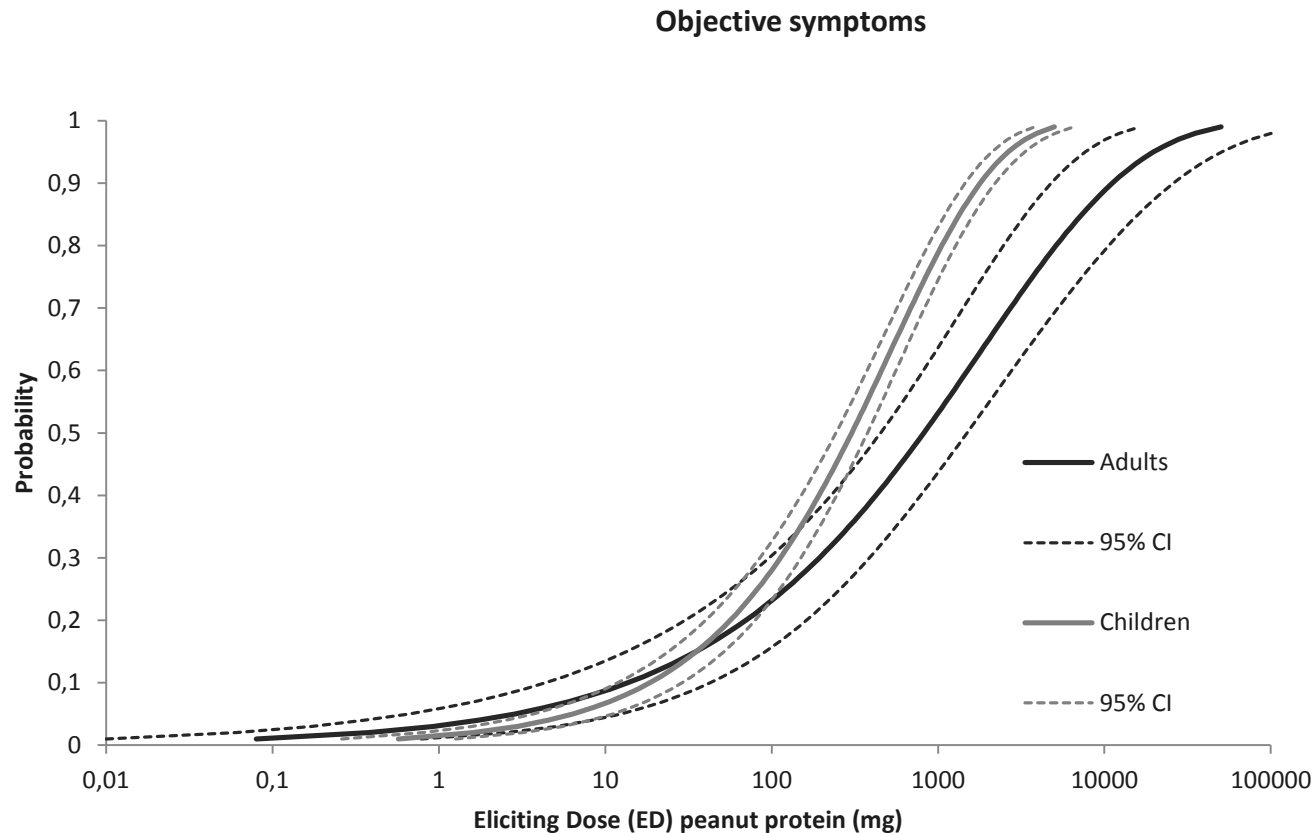
If Allergic to:	Risk of Reaction to at Least One:	Risk:
A legume* peanut 	Other legumes peas  lentils  beans 	5% 
A tree nut walnut 	Other tree nuts brazil  cashew  hazelnut 	37% 
A fish* salmon 	Other fish swordfish  sole 	50% 
A shellfish shrimp 	Other shellfish crab  lobster 	75% 
A grain* wheat 	Other grains barley  rye 	20% 
Cow's milk* 	Beef hamburger 	10% 
Cow's milk* 	Goat's milk goat 	92% 
Cow's milk* 	Mare's milk horse 	4% 



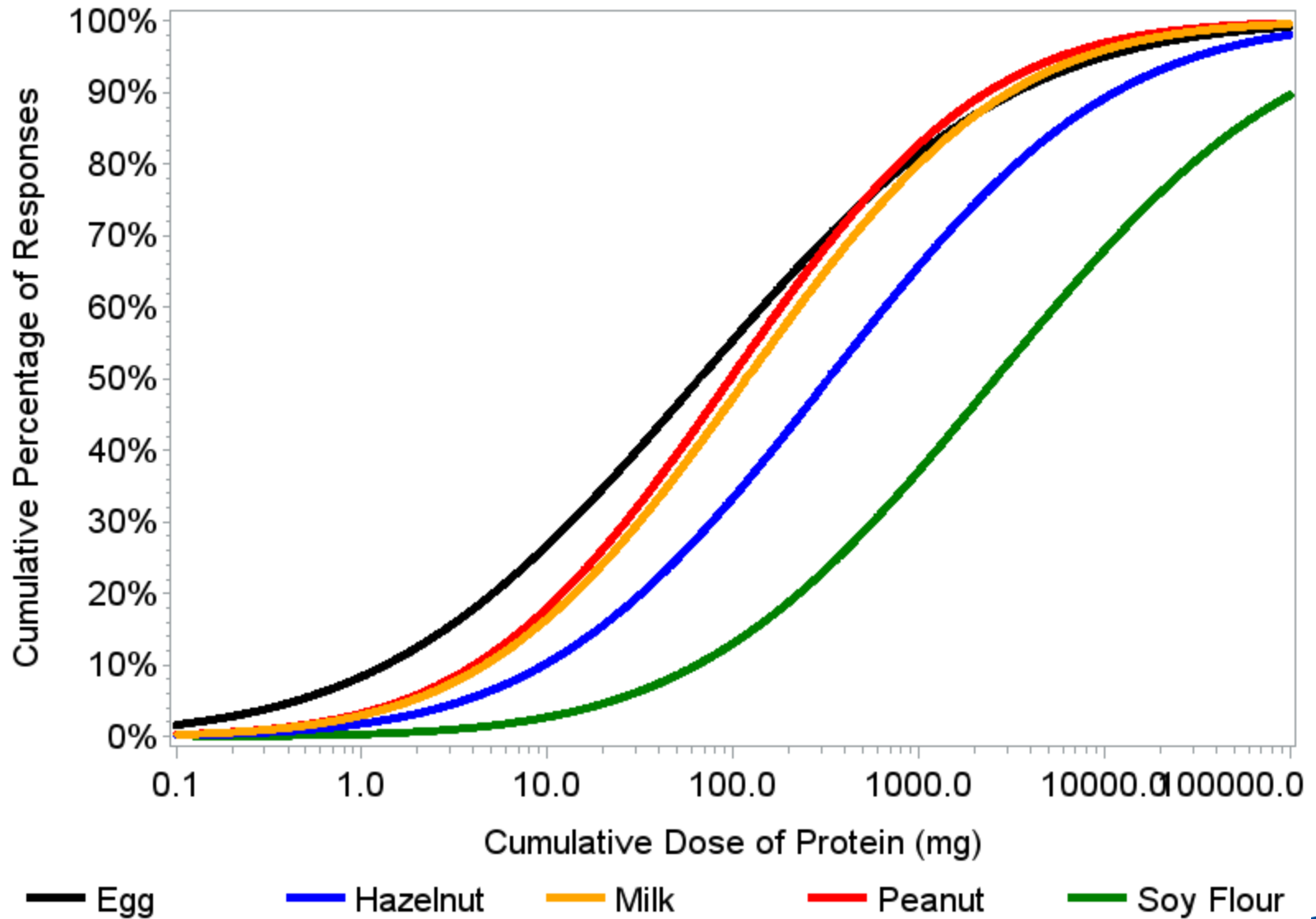
Differences between subjective vs objective symptoms

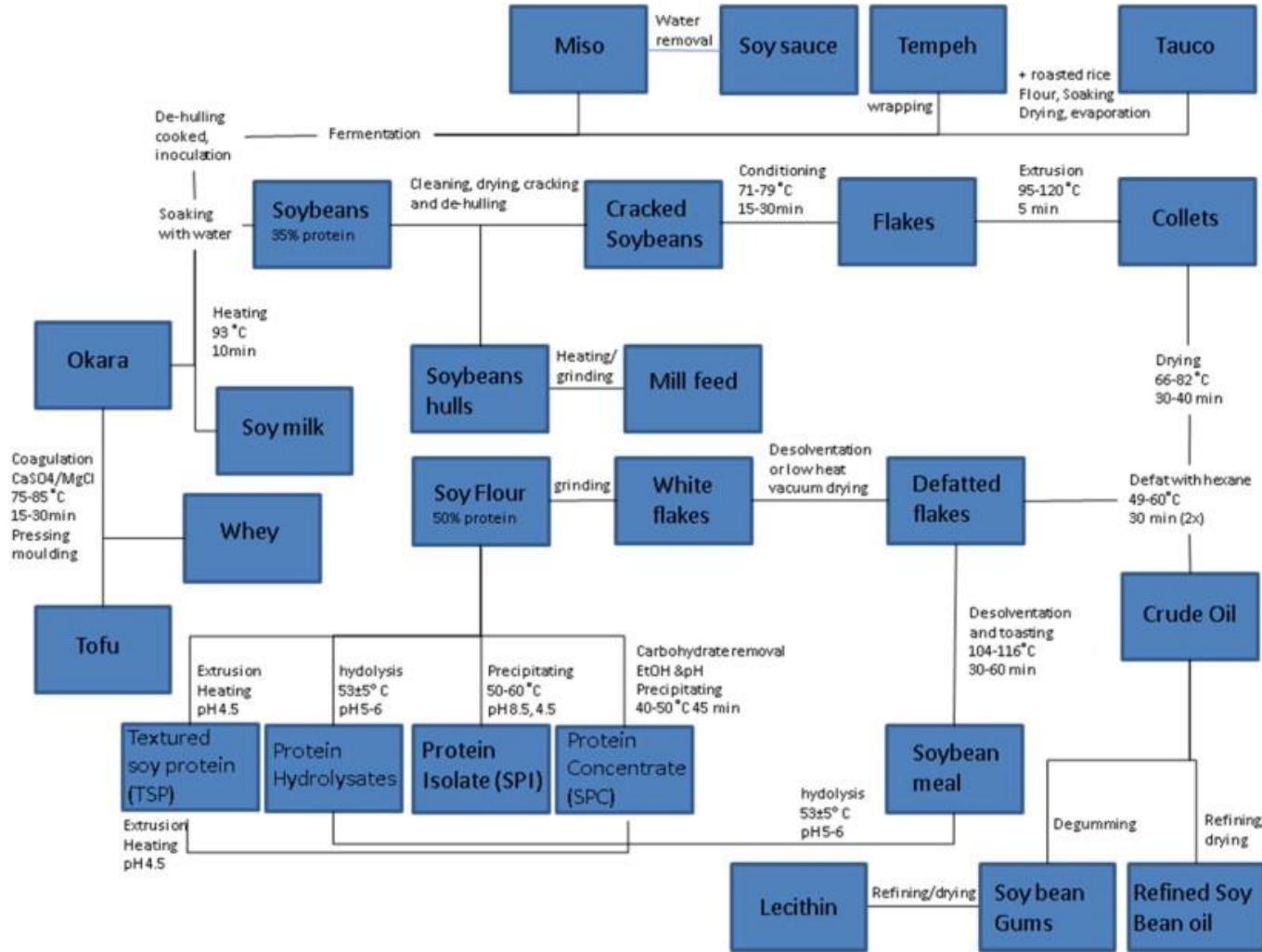


Small differences between children vs adults

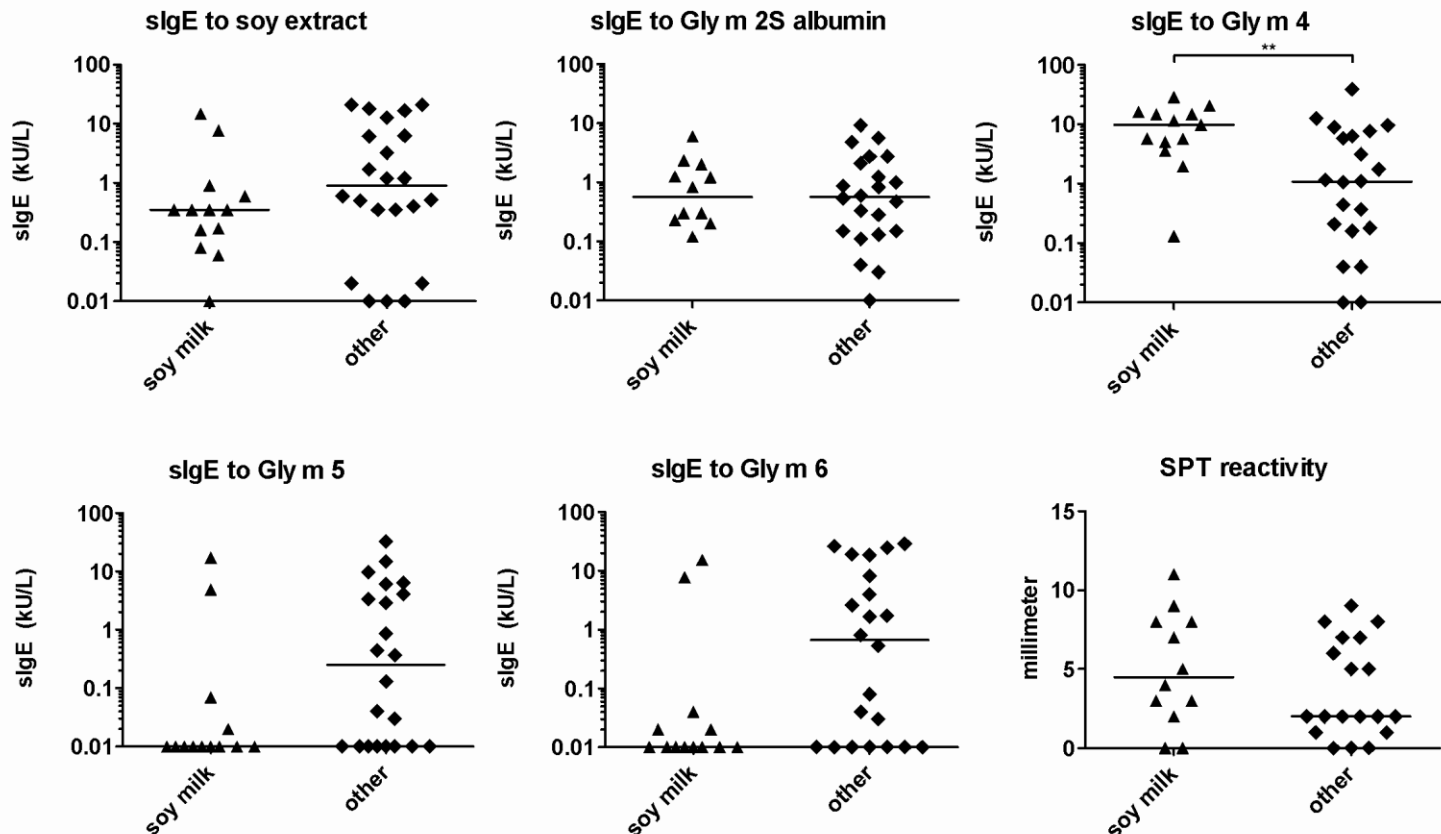


VITAL 2.0 Data





Soy milk vs soy flour allergy



Other: patients with allergic symptoms to other soy products than soy milk as well, ** P -value < 0.001



Diagnostic performance of soy allergens

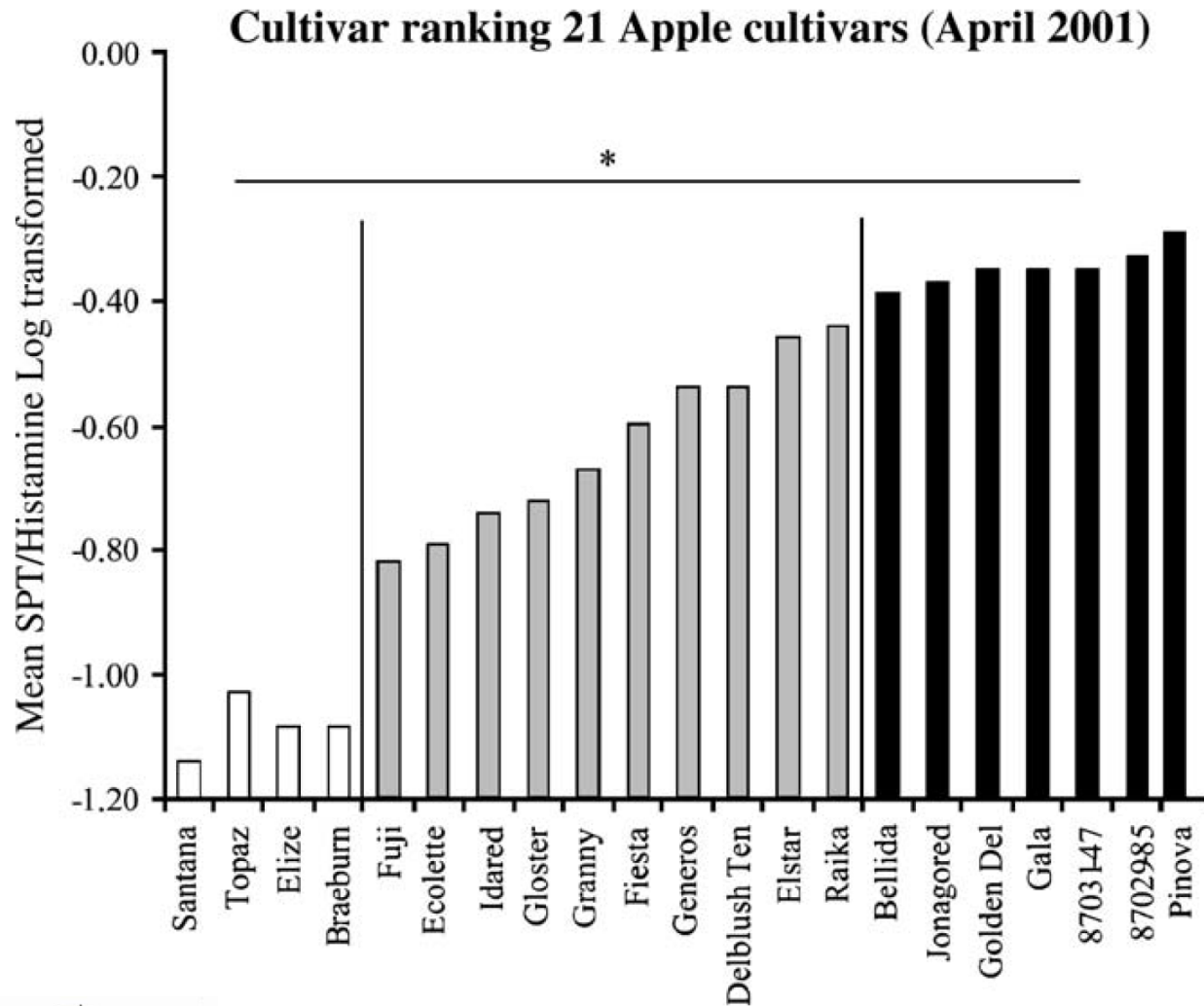
AUC of all diagnostic tests in the challenged population (n=30)

Diagnostic test	AUC (95% CI)	
Gly m 2S albumin	0.79	(0.62 – 0.96)
Gly m 4	0.54	(0.32 – 0.77)
Gly m 5	0.74	(0.54 – 0.94)
Gly m 6	0.77	(0.58 – 0.96)
Soy extract	0.77	(0.57 – 0.97)
SPT (n = 40)	0.76	(0.57 – 0.96)

CI, confidence interval



Allergenicity related to apple cultivar



Novel foods: lessons from mealworm

13 out of 15 shrimp allergic patients react to mealworm

Patient	Sex (Male/ Female)	Age (years)	Shrimp history Muller	0.01 g (2,16 mg)	0.1 g (21,6 mg)	1 g (216 mg)	7.5 g (1,62 g)	10 g (2,16 g)	30 g (6,48 g)	60 g (12,96 g)	Mealworm challenge Muller
19	F	46	2							OA, S, GI	2
21	F	23	3					OA,S,R	OA,S,GI	OA, S, GI,R	3
22	M	69	1				OA	OA		OA, S	0
23	M	45	4						S, GI		2
24	F	27	4			OA			OA	OA, S	1
25	M	19	4					S	GI		2
28	F	60	0				S			S	1
31	M	30	3							GI	2
32	M	27	1								Neg
33	F	47	4			S	S, R	S, GI,R			3
34	F	52	4								Neg
36	M	26	4							S, GI	2
37	M	34	2					OA	OA	OA	0
38	F	23	3				OA, S	OA	OA	OA, S	1
40	M	46	3		OA	OA		OA	OA,GI		2

OA Oral allergy, local S Skin/mucosa GI Gastrointestinal R Respiratory C Cardiovascular Dose not given

Conclusions

- Sensitisation is related to the risk of allergy and severity only on population level
- Age/geographical differences in the relevant allergens
- Crossreactivities are important (inhalant-food, food-food)
- Soy has moderate allergenic potential as compared to other plant foods (influenced by processing)
- New protein sources need careful allergenic risk assessment
- SPT and BAT can be important tools in the evaluation of potential allergenicity

