

Food Allergy Diagnostics: Pearls for Pediatricians

Yale University ECHO Series
Session 1

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Learning Objectives

- Identify validated testing for food allergies, as well as commercially available testing that is not validated or evidence-based.
- Recognize the limitations of food allergy testing.
- Create an algorithm for how to initiate food allergy testing in a pediatric patient, and when to refer to an allergist.

What is a (conventional) food allergy?

IgE-mediated reaction to food allergen - usually **protein** - that results in hives, swelling, coughing, wheezing, vomiting, hypotension within **minutes to two hours after ingestion.**

Other types of non IgE-mediated food allergies

- Food protein induced allergic proctocolitis (FPIAP) (a.k.a. milk soy protein intolerance (MSPI))
- Food protein induced enterocolitis syndrome (FPIES)
- Eosinophilic esophagitis (EoE)
- Celiac disease

What does not fall under the category of food allergy?

- Lactose intolerance
- Reflux/GERD
- Irritable Bowel Syndrome
- Food sensitivity/intolerance

What are the diagnostic tests we use for food allergy?

- CLINICAL HISTORY
- Skin prick testing
- Food-specific serum IgE testing
- *Component resolved diagnostics*
- Oral food challenges

We don't use the following, as they are not validated for IgE-mediated food allergy:

- Patch testing
- ALCAT
- Food specific serum IgG testing
- Provocation-neutralization testing
- Hair analysis
- Electrodermal testing (VEGA)
- Applied kinesiology

Utility of Allergy Testing

Remember statistics from medical school? It's baaaack...

	Illness present	Illness absent
Test +	A (true positive)	B (false positive)
Test -	C (false negative)	D (true negative)

Sensitivity $A/(A+C)$

Specificity $D/(B+D)$

PPV $A/(A+B)$

NPV $D/(C+D)$

Allergy Testing Basics

Skin prick test or specific IgE test:

- Specificity around 50%
- Sensitivity around 95%

- Another way to say this is that allergy tests have poorer positive predictive value compared to negative predictive value.

*Larger skin tests/higher IgE levels correlate with increased likelihood of clinical allergy but not severity.

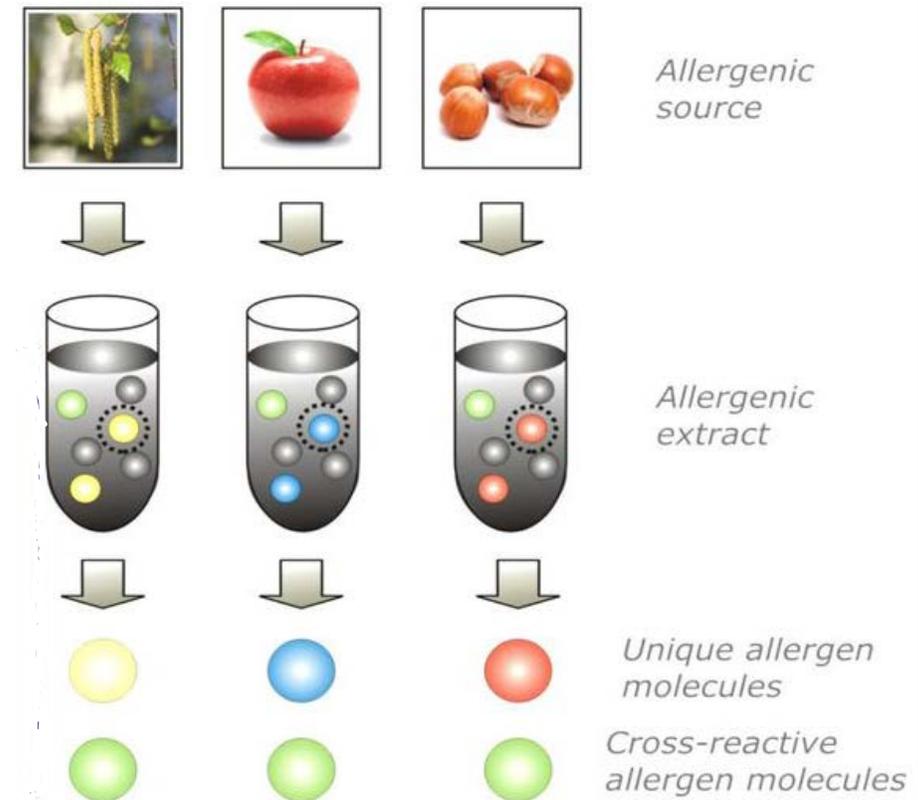
95% Predictive Decision Points for sIgE and SPT

Food	95% PPV for sIgE (ku/L)	95% PPV for SPT wheal diameter (mm)
Milk	15 (5*)	8
Egg	7 (2*)	7
Peanut	14 (5*)	8
Tree Nuts	15 (5*)	8?
Fish	20	7?
Soy	30	N/A
Wheat	26	N/A

* Age adjusted <2 y/o

What is Component Resolved Diagnostics?

These blood tests detect specific IgE against individual allergen molecules or components using purified native or recombinant allergens (whereas traditional allergy blood tests look at IgE against whole proteins).



Advanced Testing: Component Resolved Diagnostics

Food	Significant Component
Peanut	Arah 1, Arah 2, Arah 3, Arah 6
Soy	Glym 5, Glym6
Wheat	Omega-5-gliadin
Milk	Bos d 8 (casein)
Egg	Gal d 1 (ovomucoid)
Hazelnut	Cora 8, 9, 14
Additional Tree Nuts: Brazil Nut, Cashew, Walnut	Ber e1, Ana o3, Jugr1 and Jugr3

What is the Role of the Pediatrician?

Often you are the first point of entry – important to get a detailed history to determine the pre-test probability of food allergy before doing any testing or referring!

If there are only a few questions you ask, I suggest the following:

- 1) Has patient had food before or since reaction?
- 2) What were the symptoms of reaction?
- 3) How soon after ingestion did the patient have the reaction?
- 4) Are parents worried/afraid to give food again?

What is the Role of the Pediatrician?

- 1) Has patient had food before or since reaction? **If they are eating food again without issue, no need for testing or evaluation.**
- 2) What were the symptoms of reaction? **If the symptoms are not clear cut to you, don't jump to testing and perhaps refer for evaluation instead.**
- 3) How soon after ingestion did the patient have the reaction? **If reaction was not within minutes to hours after ingestion, not likely an IgE-mediated food allergy.**
- 4) Are parents worried/afraid to give food again? **If family is strictly avoiding food regardless of whether reaction is convincing, refer to allergist for (at minimum) an educational appointment.**

What is the Role of the Pediatrician?

If you plan on starting the allergy evaluation, please always remember the following:

**NEVER ORDER FOOD
ALLERGY PANELS.
JUST DON'T DO IT.**

What Do We Do with Allergy Tests?

We triangulate information to better counsel our families on management of individual foods:

- 1) Avoid food
- 2) Oral food challenge
- 3) Home introduction

*Additional interventions may include low dose challenge/OIT, but these are not standard of care at this point.

Oral Food Challenges

Diagnostic gold standard for food allergy, but not always done:

- History is clear cut (either for or against allergy)
- Patient anxiety or lack of interest
- Lack of office space/resources
- Lack of physician experience/confidence

*You must be prepared to readily treat anaphylaxis in the setting of oral food challenge.

Take Home Points

- Pediatricians should ask detailed questions about food reaction when deciding whether to refer to an allergist: symptoms, timing, and subsequent exposures.
- Skin and blood allergy testing is valid only for IgE-mediated reactions.
- Allergy testing has major limitations and has better negative predictive value than positive predictive value.
- Food allergy panels should never be run.

Q&A