Difficult Cases: Oral Food Challenges

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Jaffe Food Allergy Institute
Disclosures

• Edwin Kim – consultant, Triangle E Technologies
• Jennifer S. Kim – consultant, Sanofi
Case 1

- 5 y/o female presents with mother
- Recently moved, wishes to transfer care
- Would like testing to follow up egg allergy and assess for other food allergies
Case 1 – Egg allergy history

- Presented at 9 months with fussiness, difficult to treat eczema
- Skin testing at 1 year: 9 mm wheal to standardized egg white extract (Greer labs, Lenoir, NC)
- Eczema improved with egg avoidance
- Has inconsistently avoided milk and has not introduced nuts because of recurrent eczema flares
- Tolerates soy, wheat, fish
- Began kindergarten last month and ate part of a classmate’s muffin; no symptoms or treatment
- No other known egg ingestion
Case 1

- **PMH:**
  - Eczema, now mild & well controlled

- **Meds:**
  - Topical aclometasone 0.05% ointment
  - Cetirizine 5 mg daily PRN itch
  - Epinephrine 0.15 mg IM PRN

- **Allergies:** egg, NKDA

- **Diet:** amount of milk is restricted but drinks up to 4 oz cow’s milk at a time
Case 1

• Family history:
  – Mother: allergic rhinitis
  – Father: allergic rhinitis, asthma

• Social/environmental history:
  – only child, began kindergarten 1 month ago, no prior day care, no pets, carpet in bedroom

• Exam:
  – dry skin with eczematous patches in antecubital and popliteal fossae
  – otherwise normal
Case 1 – Skin prick testing

- Egg: 7 mm wheal
- Milk: 0
- Peanut: 0
Question 1

• Based on the history and skin testing, what is your next step re: egg allergy?
  – A) recommend continued strict avoidance of all egg products
  – B) order ImmunoCAP IgE to egg white
  – C) order ImmunoCAP IgE to egg white and ovomucoid
  – D) schedule a food challenge
Outcomes of 100 consecutive open, baked-egg oral food challenges in the allergy office

Case 1 – Egg proteins

- Ovalbumin (Gal d 2): most abundant, but heat-labile
- Ovomucoid (Gal d 1): dominant allergen – heat and proteinase stable
  - Urisu, JACI 1997 – used ovomucoid depleted EW to show OVM as the dominant allergen
  - Jarvinen, Allergy 2007 – persistent egg allergy associated with higher IgE to ovomucoid

J Allergy Clin Immunol 2012; 100:171-6
Allergy, 2007; 62:758-65
Utility of ovomucoid-specific IgE concentrations in predicting symptomatic egg allergy

Hitoshi Ando, MD, PhD, Robert Movérare, PhD, Yasuto Kondo, MD, PhD, Ikuya Tsuge, MD, PhD, Akira Tanaka, MSc, Magnus P. Borres, MD, PhD, and Atsuo Urisu, MD, PhD

Toyokawa, Toyoake, Tokyo, and Nagoya, Japan, and Uppsala and Göteborg, Sweden

Raw egg reactive

Heated egg reactive

2.82 kU/L

4.4 kU/L

J Allergy Clin Immunol 2008; 122:583-8
Significance of ovomucoid- and ovalbumin-specific IgE/IgG₄ ratios in egg allergy

Jean Christoph Caubet, MD, Ramon Bencharitiwong, PhD, Erin Moshier, PhD, James H. Godbold, PhD, Hugh A. Sampson, MD, and Anna Nowak-Węgrzyn, MD  New York, NY

![ROC curve graph]

- Statistical model: AUC 87.4%
- Specific IgE to OVA: AUC 79.9%
- Specific IgE to egg white: AUC 75.9%
- Specific IgE to OVM: AUC 66.7%

J Allergy Clin Immunol 2012; 129:739-47
Immunologic changes in children with egg allergy ingesting extensively heated egg

Heather Lemon-Mulé, MD, Hugh A. Sampson, MD, Scott H. Sicherer, MD, Wayne G. Shreffler, MD, PhD, Sally Noone, RN, and Anna Nowak-Wegrzyn, MD  New York, NY

J Allergy Clin Immunol 2008; 122:977-83
Case 1 – ImmunoCAP IgE

- Egg white: 13.5 kUₐ/L
- Ovomucoid: 3.4 kUₐ/L
Question 2

• What are your recommendations based on ImmunoCAP testing?
  – A) recommend strict avoidance of all egg products & retest in 1 year
  – B) schedule a food challenge to baked egg
  – C) order IgG4 to ovomucoid
  – D) order IgE to ovalbumin
Nature of Reaction | Applicable Testing | Recommendation
--- | --- | ---
Reacted to regular egg, already tolerates heated egg |  | Continue inclusion of heated egg and reassess in 6-12 mo

Reacted to heated egg |  | Avoid all forms of egg and reassess in 6 to 12 mo

Reacted to regular egg | Egg white IgE > 50 kUA/L$^{14}$ | Consider heated egg challenge under physician supervision

Never ingested, positive testing | Egg white IgE > 7 kUA/L$^{20}$ or > 2 kUA/L if < 2 yr$^3$ | Consider regular egg challenge under physician supervision

Egg white IgE < 7 kUA/L$^{20}$ or < 2 kUA/L if < 2 yr$^3$ |  |  

Question 3

• What would be the best option for the baked egg challenge?
  – A) quiche
  – B) cake
  – C) pancake
  – D) muffin
Case 1 – Baked egg

• Jaffe Food Allergy Institute baked egg challenge recipe
  – Muffin containing 1/3 of a whole egg
  – Baked at 350°F for 30 minutes
  – Prepared by patient prior to visit

  J Allergy Clin Immunol 2012; 129:1682-4

• Other foods
  – Quiche has too much egg
  – Pancake has too little egg and not baked
  – Cake may not be fully baked in the center
Question 4

• Subsequent to a negative baked egg challenge, what recommendations would you give?
  – A) eat baked egg ad lib
  – B) eat baked egg weekly
  – C) eat baked egg daily
  – D) gradually advance diet to regular egg
Dietary baked egg accelerates resolution of egg allergy in children

Stephanie A. Leonard, MD, Hugh A. Sampson, MD, Scott H. Sicherer, MD, Sally Noone, RN, Erin L. Moshier, MS, James Godbold, PhD, and Anna Nowak-Wegrzyn, MD

New York, NY
Case 1 – Post challenge instructions

- Ingest baked egg daily
  - Store-bought baked products with egg listed as the 3rd ingredient or further down the list
  - Home baked products with 1 egg per 1 cup flour or 1-2 eggs per batch (yield 6 servings)
  - Ensure all products are baked throughout
Case 1 – Post challenge instructions

• Avoidance of the following egg-based foods:
  – Caesar salad dressing
  – Custard
  – French toast
  – Frosting
  – Hard boiled, scrambled or poached egg
  – Ice cream
  – Mayonnaise
  – Quiche
Questions?
Case 2

- 7 y/o male presents for allergy follow up
- Reports worsening rhinitis symptoms, most commonly in the spring with milder symptoms in fall
- Responds to daily cetirizine and intranasal fluticasone but mother wants to know what is causing his symptoms
Case 2

• Because an older sibling has peanut allergy, patient has never eaten peanut
• Testing at age 2 years
  • 8 mm skin test
  • ImmunoCAP IgE 7.3 kU\textsubscript{A}/L
• Strictly avoids all nuts and unaware of prior accidental ingestions
• His mother would like retesting to see if he is still allergic to peanut
Case 2

• PMH:
  – Allergic rhinitis, spring and fall
  – Asthma, mild persistent, adequately controlled

• Meds:
  – cetirizine 5 mg PO daily
  – budesonide INH BID
  – albuterol INH prn
  – epinephrine 0.15 mg IM prn
Case 2

• Family history:
  – Parents without allergy
  – 10 y/o sister with peanut allergy and asthma

• Social/environmental history:
  – Lives with parents and sister. In 2\textsuperscript{nd} grade.
    Home has 1 dog, no smokers, no carpet

• Exam:
  – Normal
Case 2 – Skin prick testing

• Environmental allergens:
  – Perennials: positive for cat
  – Pollens: positive for oak, birch, hickory, ragweed, cocklebur
  – Molds: negative

• Peanut: 6 mm wheal
Question 5

• What is your next step regarding his peanut allergy?
  – A) recommend strict avoidance of peanut
  – B) schedule a food challenge to peanut
  – C) order IgE to peanut
  – D) order IgE to peanut & peanut components
Case 2 – Peanut proteins

- Ara h 1 – 3: seed storage proteins
- Ara h 6: Ara h 2 homologue
- Ara h 8: Bet v 1 (birch) homologue
- Ara h 9: lipid transfer protein
Quantification of specific IgE to whole peanut extract and peanut components in prediction of peanut allergy

0.35 kU$_A$/L

Clinical value of component-resolved diagnostics in peanut-allergic patients

E. Eller & C. Bindslev-Jensen

Allergy 2013; 68:190-4

Correlation with objective threshold

<table>
<thead>
<tr>
<th></th>
<th>Correlation with f13 (n = 205)</th>
<th>Correlation with Ara h1 (n = 158)</th>
<th>ROC curve analysis</th>
<th>If specificity = 1.00</th>
<th>Correlation with symptoms (n = 158)</th>
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<tbody>
<tr>
<td></td>
<td>$\rho (R_s)$</td>
<td>$P$</td>
<td>$\rho (R_s)$</td>
<td>$P$</td>
<td>Best cutoff</td>
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<tr>
<td>f13</td>
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<td>-</td>
<td>-0.32</td>
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<td>Ara h 1</td>
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<td>&lt;0.01</td>
<td>-0.28</td>
<td>&lt;0.01</td>
<td>-</td>
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<tr>
<td>Ara h 2</td>
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<td>&lt;0.01</td>
<td>-0.35</td>
<td>&lt;0.01</td>
<td>-</td>
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<tr>
<td>Ara h 3</td>
<td>0.82</td>
<td>&lt;0.01</td>
<td>-0.24</td>
<td>&lt;0.01</td>
<td>-</td>
</tr>
<tr>
<td>Ara h 8</td>
<td>0.20</td>
<td>&lt;0.01</td>
<td>0.08</td>
<td>0.32</td>
<td>-</td>
</tr>
<tr>
<td>Ara h 9</td>
<td>0.34</td>
<td>&lt;0.01</td>
<td>-0.04</td>
<td>0.60</td>
<td>-</td>
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</table>
Increasing the accuracy of peanut allergy diagnosis by using Ara h 2

Thanh D. Dang, BBiomedSc (Hons), Mimi Tang, MBBS, PhD, FRACP, FRCPA, FAAAAI, Sharon Choo, MBBS, FRACP, FRCPA, Paul V. Licciardi, PhD, Jennifer J. Koplin, PhD, Pamela E. Martin, BBiomedSc (Hons), Tina Tan, BSc, Lyle C. Gurrin, PhD, Anne-Louise Ponsonby, BMedSc, MBBS, PhD, FAFPHM, FRACP, Dean Tey, MBBS, FRACP, Marnie Robinson, MBBS, FRACP, Shyamali C. Dharmage, MBBS, MD, PhD, and Katrina J. Allen, BMedSc, MBBS, FRACP, PhD, for the HealthNuts study

Parkville, Australia
Case 2 – PN component IgE

- uKnow™ Peanut ImmunoCAP results (kU/L):
  - Peanut (f13): 15.5
  - Ara h1: 1.6
  - Ara h2: 0.18
  - Ara h3: <0.10
  - Ara h8: 28.5
  - Ara h9: <0.10
Question 6

• Based on component-resolved testing, what is your next recommendation?
  – A) schedule a food challenge to peanut
  – B) order birch tree pollen IgE
  – C) order IgG4 to peanut components
  – D) recommend strict avoidance of peanut
Clinical value of component-resolved diagnostics in peanut-allergic patients
E. Eller & C. Bindslev-Jensen

Allergy 2013; 68:190-4
Peanut component Ara h 8 sensitization and tolerance to peanut

Anna Asarnoj, MD, PhD, Caroline Nilsson, MD, PhD, Jonas Lidholm, PhD, Susanne Glaumann, MD, Eva Östblom, MD, PhD, Gunilla Hedlin, MD, PhD, Marianne van Hage, MD, PhD, Gunnar Lilja, MD, PhD, and Magnus Wickman, MD, PhD

Stockholm and Uppsala, Sweden

Recruited at Sachs’ Children’s Hospital (n=98)

Loss to follow-up/excluded (14):
[Declined/unreachable (12)
Disabled (2)
Previous systemic reaction to peanut (0)]

Avoiding peanuts: previous reaction/never eaten (53)

Consuming peanuts during last 12 months. Considered tolerant
Not challenged (35)

Avoiding peanuts: previous reaction/never eaten (9)

Recruited from the population-based BAMSE survey (n=62)

Avoiding peanuts/symptoms at exposure at age 8 (15)

Loss to follow-up, OAS at age 8 Not possible to reach (2)

No symptoms at age 8, not contacted (47)

Oral challenge (62)

OOFC

No symptoms (46)
Subjective OAS (12)
Objective OAS (2)*

DBPCFC

No symptoms (1)
Systemic reaction (1)**

J Allergy Clin Immunol 2012; 130:468-72
Evaluation of Ara h2 IgE thresholds in the diagnosis of peanut allergy in a clinical population

Corinne A. Keet, MD, MSa, Kristen Johnson, MDb, Jessica H. Savage, MDc, Robert G. Hamilton, PhD, D. ABMLI, and Robert A. Wood, MDa

- Retrospective component analysis of 60 patients with positive reaction history or sensitization
- Ara h 2 IgE > 0.1 kUA/L = 96% sensitivity, 54% specificity
- Ara h 8 IgE > 0.1 kUA/L → more likely negative challenge (p=0.01)
Question 7

• Where is the appropriate setting for challenge?
  – A) food allergy research unit
  – B) outpatient clinic
  – C) inpatient hospitalization
  – D) none, would not offer challenge
Case 2 – Ara h 8 sensitization

• Eller, Allergy 2013:
  – ~30% of challenge proven peanut-allergy sensitized to Ara h 8

• Asarnoj, JACI 2012:
  – 2 of 62 patients with isolated Ara h 8 sensitization had systemic reactions

• Keet, JACI In Practice 2013:
  – 3 of 26 positive challenges had IgE to Ara h 8

• No FDA approved test for Ara h 6
Evaluation of Ara h2 IgE thresholds in the diagnosis of peanut allergy in a clinical population
Corinne A. Keet, MD, MS\textsuperscript{a}, Kristen Johnson, MD\textsuperscript{b}, Jessica H. Savage, MD\textsuperscript{c}, Robert G. Hamilton, PhD, D. ABMLI\textsuperscript{d}, and Robert A. Wood, MD\textsuperscript{a}

TABLE II. Diagnostic characteristics of various thresholds for Ara h2—specific IgE

<table>
<thead>
<tr>
<th>Threshold</th>
<th>Sensitivity, % (95% CI)</th>
<th>Specificity, % (95% CI)</th>
<th>Positive predictive value, % (95% CI)</th>
<th>Negative predictive value, % (95% CI)</th>
<th>Percent misclassified</th>
</tr>
</thead>
<tbody>
<tr>
<td>ImmunoCap Ara h2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.23 kU\textsubscript{A}/L</td>
<td>92.3 (74.9-99.1)</td>
<td>60 (42.1-76.1)</td>
<td>63.2 (46-78.2)</td>
<td>91.3 (72-98.9)</td>
<td>26.2</td>
</tr>
<tr>
<td>0.35 kU\textsubscript{A}/L</td>
<td>88.5 (69.8-97.6)</td>
<td>71.4 (53.7-85.4)</td>
<td>69.7 (51.3-84.4)</td>
<td>89.3 (71.8-97.7)</td>
<td>21.3</td>
</tr>
<tr>
<td>2 kU\textsubscript{A}/L</td>
<td>23.1 (9.0-43.6)</td>
<td>94.3 (80.8-99.3)</td>
<td>75 (34.9-96.8)</td>
<td>62.3 (47.9-75.2)</td>
<td>36.1</td>
</tr>
<tr>
<td>ISAC Ara h2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.3 ISU</td>
<td>80.8 (60.6-93.4)</td>
<td>77.1 (59.9-89.6)</td>
<td>72.4 (52.8-87.3)</td>
<td>84.4 (67.2-94.7)</td>
<td>21.3</td>
</tr>
</tbody>
</table>
### Factors that make component testing MORE likely to be informative

- Mild reactions or no reaction history
- Remote clinical reaction with development of birch sensitization over time
- PN-IgE 0.35-15 kU\textsubscript{A}/L
- Birch sensitization
- Older persons

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### Factors that make component testing LESS likely to be informative

- A recent convincing clinical reaction
- A remote significant clinical reaction in a patient with PN-IgE $\geq 15$
- PN-IgE $> 25$ or $< 0.35$ kU\textsubscript{A}/L
- Lack of birch sensitization
- Younger children
Questions?
Case 3

• 11 y/o male referred for allergy evaluation
• Several years of asthma
  – Seasonal inhaled fluticasone
  – Albuterol 1 – 2 times per month
  – No exercise restriction
• Allergic rhinitis
  – Year-round but worse in spring and fall
Case 3

- Strict peanut and tree nut avoidance because of mother’s hazelnut allergy
- Allergy evaluation 4 years ago
  - Positive tests to peanut and several tree nuts
- Passed peanut challenge 1 year later and peanut introduced into diet
- Continued tree nut avoidance although has eaten foods with “may contain” labels
- Interested in introducing tree nuts into diet
Case 3

• PMH:
  – Asthma, seasonally mild persistent
  – Allergic rhinitis, spring and summer

• Meds:
  – loratadine 10 mg PO daily
  – montelukast 10mg PO daily
  – fluticasone 44 mcg 2 puffs INH daily
  – albuterol 2 puffs INH PRN
  – epinephrine 0.3 mg IM PRN
Case 3

• Family history:
  – Parents and sister with allergic rhinitis
  – Mother with anaphylaxis to hazelnut

• Social/environmental history:
  – In 5th grade. Home with carpet and no pets. Plays soccer and baseball.

• Exam:
Case 3 – Skin prick testing

• Environmental allergens:
  – Perennials: positive for cat
  – Pollens: positive for ash, oak, birch, hickory, bermuda, bahia, timothy
  – Molds: negative
Case 3 – Skin prick testing

• Food skin prick testing
  – Almond: 3 mm wheal
  – Brazil nut: 0
  – Cashew: 0
  – Hazelnut: 6 mm wheal
  – Pecan: 0
  – Pistachio: 0
  – Walnut: 0
Case 3 – ImmunoCAP IgE

- ImmunoCAP IgE testing (kU\textsubscript{A}/L)
  - Almond: 10.37
  - Brazil nut: <0.35
  - Cashew: <0.35
  - Hazelnut: >100
  - Pecan: <0.35
  - Pistachio: <0.35
  - Walnut: <0.35
Question 8

• What would be your recommendation regarding hazelnut based on skin testing and ImmunoCAP?
  – A) Continue strict avoidance of hazelnut
  – B) Add IgE to birch tree pollen
  – C) Order IgE to hazelnut components
  – D) Schedule a food challenge to hazelnut
Hazelnut allergy: from pollen-associated mild allergy to severe anaphylactic reactions
Annebeth E. Flinterman\textsuperscript{a}, Jaap H. Akkerdaas\textsuperscript{b}, André C. Knulst\textsuperscript{a}, Ronald van Ree\textsuperscript{b} and Suzanne G. Pasmans\textsuperscript{a}

<table>
<thead>
<tr>
<th>Hazelnut allergen</th>
<th>Allergen</th>
<th>Homologues\textsuperscript{a}</th>
<th>Molecular weight (kDa)</th>
<th>Clinical relevance</th>
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</thead>
<tbody>
<tr>
<td>Cor a 1</td>
<td>Bet v 1</td>
<td>Bet v 1</td>
<td>17</td>
<td>OAS, none</td>
</tr>
<tr>
<td>Cor a 2</td>
<td>Profilin</td>
<td>Bet v 2, grass pollen</td>
<td>14</td>
<td>OAS? none</td>
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<tr>
<td>Cor a 8</td>
<td>Lipid Transfer Protein</td>
<td>Jug r 3</td>
<td>8–10</td>
<td>More severe symptoms</td>
</tr>
<tr>
<td>Cor a 9</td>
<td>11S globulin</td>
<td>Ara h 3, Ana o 2, Jug r 4, Ber e 2</td>
<td>40</td>
<td>More severe symptoms</td>
</tr>
<tr>
<td>Cor a 11</td>
<td>7S vicilin</td>
<td>Ara h 1, Jug r 2, Ana o 1</td>
<td>48</td>
<td>More severe symptoms?</td>
</tr>
<tr>
<td>2 S albumins</td>
<td>2S albumins</td>
<td>Ara h 2, Ara h 6, Jug r 1, Ber e 1</td>
<td>12</td>
<td>More severe symptoms?</td>
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<tr>
<td>Oleosin</td>
<td>Oleosin</td>
<td>Peanut</td>
<td>15–18</td>
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</tbody>
</table>

\textsuperscript{a} Ana o, cashew; Ara h, peanut; Ber e, Brazil nut; Bet v, birch; Jug r, walnut.
TABLE I. Sensitization to hazelnut, birch pollen, nBet v 1, nCor a 1, rCor a 1, nCor a 2, nCor a 8, and rPru p 3 in children who were challenged with hazelnut

<table>
<thead>
<tr>
<th>Patient no.</th>
<th>Sex</th>
<th>Allergy*</th>
<th>Age (y)</th>
<th>Hazelnut</th>
<th>Birch pollen</th>
<th>Bet v 1</th>
<th>Cor a 1</th>
<th>rCor a 1</th>
<th>Cor a 2</th>
<th>Cor a 8</th>
<th>Pru p 3</th>
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<tr>
<td>1</td>
<td>M</td>
<td>None</td>
<td>8</td>
<td>8.5</td>
<td>&gt;100</td>
<td>86.8</td>
<td>10.7</td>
<td>20.0</td>
<td>Negative</td>
<td>Negative</td>
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<tr>
<td>2</td>
<td>F</td>
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<td>9</td>
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<td>76.0</td>
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<td>87.5</td>
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P < .001  P = .567  P = .567  P = .030  P = .567  P = .022  P < .001  P = .331
Caution: The Phadia hazelnut ImmunoCAP (f17) has been supplemented with recombinant Cor a 1 and now detects Bet v 1-specific IgE, which leads to elevated values for persons with birch pollen allergy.

Case 3

- ImmunoCAP® hazelnut component package (kU_A/L):
  - Cor a 1: 94.4
  - Cor a 8: <0.10
  - Filbert: 4.12
  - Hazelnut (f17): 80.8

- Out-of-pocket expense $150 (www.pirllab.com)
Question 9

• Based on hazelnut component testing, what is your next recommendation?
  – A) continued strict avoidance of all tree nuts
  – B) food challenge to 2 TBSP hazelnut spread
  – C) food challenge to 1 oz of hazelnuts
  – D) introduce hazelnut at home
**TABLE V. Examples of portion sizes* for an open food challenge with common food allergens**

<table>
<thead>
<tr>
<th>Food</th>
<th>Portion size</th>
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<tbody>
<tr>
<td>Milk/dairy</td>
<td>6-8 oz milk or infant formula†</td>
</tr>
<tr>
<td></td>
<td>½-1 cup yogurt</td>
</tr>
<tr>
<td></td>
<td>½-1 cup cottage cheese</td>
</tr>
<tr>
<td></td>
<td>½-1 oz hard cheese</td>
</tr>
<tr>
<td>Soy/legumes</td>
<td>½-1 cup soy beverage</td>
</tr>
<tr>
<td></td>
<td>½-1 cup tofu</td>
</tr>
<tr>
<td></td>
<td>½-1 cup cooked beans (kidney, pinto, chickpeas, lentils)</td>
</tr>
<tr>
<td>Egg</td>
<td>1 slice of French toast‡ (1 egg per 1 slice of bread)</td>
</tr>
<tr>
<td></td>
<td>1 hard boiled or scrambled egg</td>
</tr>
<tr>
<td>Grains (rice, corn, wheat, rye, barley, oat)</td>
<td>½-1 cup pasta‡/rice</td>
</tr>
<tr>
<td></td>
<td>½-1 oz cereal</td>
</tr>
<tr>
<td></td>
<td>½-1 slice bread</td>
</tr>
<tr>
<td></td>
<td>½-1 muffin or roll bread‡</td>
</tr>
<tr>
<td>Meats</td>
<td>2-3 oz cooked lean meat/poultry</td>
</tr>
<tr>
<td>Fish</td>
<td>2-3 oz cooked fish</td>
</tr>
<tr>
<td>Shellfish</td>
<td>2-3 oz shellfish</td>
</tr>
<tr>
<td>Peanut</td>
<td>30 g peanut butter = 2 tablespoons peanut butter</td>
</tr>
<tr>
<td>Tree nuts</td>
<td>30-40 g crushed tree nuts = 25-30 pieces</td>
</tr>
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</table>

* Portion sizes are approximate and may vary depending on preparation and especially the age of the child
† Omit if formula only or if infant formula is not colonized
‡ Omit if already fixed in the diet

Summary – Component resolved testing

• A powerful new diagnostic tool
• Combined with existing testing, may improve overall accuracy
• Most likely helpful in a subset of patients
  – Remote or no history of ingestion reaction
  – “Gray area” serum specific IgE
  – Concomitant sensitization to cross-reactive aeroallergens
• Will not replace oral food challenge
Questions?