Food Allergy: Tolerance and Desensitization

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Food Allergy: Tolerance and Desensitization

• **Tolerance**
  – Long term loss of allergic reactivity after discontinuation of therapy

• **Desensitization**
  – State in which the threshold dose of food that triggers an allergic reaction is raised during therapy

Future therapies for food allergies

Allergen-specific

- Extensively heated milk or egg diet
- Subcutaneous cross-immunotherapy with pollen
- Oral IT
- Milk OIT combined with anti-IgE
- Sublingual IT
- Epicutaneous IT

Native food allergens

Pre-clinical studies

- Heat-killed E.coli expressing modified Ara h 1, 2, 3 rectal vaccine
- Peptide IT
- Plasmid DNA IT
- ISS-ODN IT
- Human Fc-Fc fusion protein
- Mannoside-conjugated food allergen IT

Modified food allergens

Allergen non-specific

- Chinese herbs FAHF-2
- Anti-IgE
- Probiotics and prebiotics
- Anti-IL-5
- Trichurus suis ova

Clinical trials

Potential for entering clinical practice

Outline

• Definitions
• Milk
  – OIT, OIT/SLIT, baked milk, CHOP data
• Egg
  – OIT, baked egg
• Peanut
  – OIT, SLIT, anti-IgE/OIT
• Epicutaneous
  – Milk
  – Peanut
• Future

“Trick or treat, and here’s a list of my known food allergies.”
Oral tolerance

• Development of tolerance is the difference between those with and those without food allergy

• Defined in 1940s by Chase as: “state of active inhibition of immune responses to an antigen by means of prior exposure to that antigen through the oral route”

Chehade, JACI 2005;115:3-12
Food allergy: milk

- 13% of food allergy fatalities are due to milk
- Most common accidental exposure in schools

Summary of OIT Literature: Milk

Oral immunotherapy for milk allergy (Review)

• 5 RCTs published in 16 records b/t 2008-2012.
• 196 patients involved – all children (2 to 17 years)
  – All protocols differed, and all but 1 had a build-up phase in an institution followed by periodic up-dosing.

• Conclusions:
  – Milk OIT is effective at desensitizing. Tolerance development is unknown.
  – Adverse effects were common – almost all were mild.
    • For every 11 patients treated, 1 required epinephrine.
  – Overall quality of evidence is low.
  – Guidelines would be required prior to incorporation into practice.

Summary of OIT Literature: Milk

Safety and predictors of adverse events during oral immunotherapy for milk allergy: severity of reaction at oral challenge, specific IgE and prick test

- 81 children underwent milk OIT
- 25% persistent, frequent and unpredictable reactions
  - More likely with CM-sIgE ≥ 50 ku/L, CM-SPT ≥ 9 mm and more severe reactions at entry DBPCFC
  - Not included in Cochrane Review (2013)

Summary of OIT Literature: Milk

Safety and predictors of adverse events during oral immunotherapy for milk allergy: severity of reaction at oral challenge, specific IgE and prick test

Summary of OIT Literature: Milk SLIT vs Milk SLIT+OIT

The safety and efficacy of sublingual and oral immunotherapy for milk allergy

• 3 groups of patients

Summary of OIT Literature: Milk SLIT vs Milk SLIT+OIT

The safety and efficacy of sublingual and oral immunotherapy for milk allergy

- Side effects
- Epinephrine for 2 SLIT doses and 4 OIT doses

### TABLE III. Symptoms with dosing

<table>
<thead>
<tr>
<th>Type of dose (no. of doses)</th>
<th>Total</th>
<th>Oral</th>
<th>GI</th>
<th>Skin</th>
<th>Upper</th>
<th>Lower</th>
<th>Multisystem</th>
<th>Medications used (% doses)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Antihistamine</td>
</tr>
<tr>
<td>SLIT escalation (2021)</td>
<td>30.28%</td>
<td>26.82%</td>
<td>2.97%</td>
<td>2.23%</td>
<td>0.59%</td>
<td>0.45%</td>
<td>0.10%</td>
<td>1.43%</td>
</tr>
<tr>
<td>SLIT maintenance (4205)</td>
<td>28.25%</td>
<td>27.99%</td>
<td>0.38%</td>
<td>0.10%</td>
<td>0.07%</td>
<td>0.02%</td>
<td>0.02%</td>
<td>0.52%</td>
</tr>
<tr>
<td>Initial OIT escalation (1842)</td>
<td>36.21%</td>
<td>29.64%</td>
<td>7.17%</td>
<td>1.79%</td>
<td>1.41%</td>
<td>2.17%</td>
<td>0.71%</td>
<td>11.13%</td>
</tr>
<tr>
<td>OIT escalation and maintenance (1230)</td>
<td>30.41%</td>
<td>24.07%</td>
<td>7.97%</td>
<td>0.73%</td>
<td>1.30%</td>
<td>2.28%</td>
<td>0.08%</td>
<td>3.50%</td>
</tr>
<tr>
<td>OITA escalation and maintenance (1396)</td>
<td>26.72%</td>
<td>21.99%</td>
<td>3.15%</td>
<td>1.72%</td>
<td>2.79%</td>
<td>1.00%</td>
<td>0.43%</td>
<td>11.03%</td>
</tr>
<tr>
<td>Post dose-adjustment maintenance (6029)</td>
<td>16.42%</td>
<td>12.71%</td>
<td>2.82%</td>
<td>1.68%</td>
<td>0.53%</td>
<td>1.01%</td>
<td>0.68%</td>
<td>4.01%</td>
</tr>
</tbody>
</table>

Epinephrine was used for 2 SLIT doses and 4 OIT doses.
GI, Gastrointestinal; Lower, lower respiratory tract; Upper, upper respiratory tract.

Summary of OIT Literature
Milk SLIT vs Milk SLIT+OIT

The safety and efficacy of sublingual and oral immunotherapy for milk allergy

- 6 of 15 patients who developed tolerance lost it within 6 weeks of stopping therapy (2 within a week)
- Lowest reaction threshold was 2 ½ ounces of milk

CHOP Milk Data

- 20 patients consented
  - 7 unable to participate
    • 1 outgrew milk, 1 concomitant soy allergy, 2 nervous, 1 would not complete placebo challenge, 2 unable to take daily antihistamines
  - 13 desensitization
    • 11 open diets with milk
    • 1 withdrew after reaching 8 ounces, disliked taste of milk and other options, nausea
    • 1 unable to get to 8 ounces, 2 episodes anaphylaxis; now drinks 1 ounce and fine with baked milk/cheese
Clinical Reactivity to Milk

• IgE values at the time of enrollment:
  – Total IgE (average) = 1283 kU/L
  – Range of milk-specific IgE = 1.71 to >100 kU/L
  – Casein-specific IgE (average) = 17.8 kU/L
  – Whey-specific IgE (average) = 16.3 kU/L

• Final dose given with milk challenge → reaction = 18.3 mL milk

• Final dose achieved with initial desensitization = 12.5 mL milk
  – Average starting dose for protocol = 9.4 mL
    • Range = 0.3 mL to 15 mL milk
Summary of OIT Literature: **Baked milk**

**Dietary baked milk accelerates the resolution of cow’s milk allergy in children**

- 88 children underwent challenges
- 65 tolerate baked milk
  - 39 (60%) tolerate unheated milk
  - 28 (28%) tolerate baked milk/baked cheese
  - 8 (12%) strict milk avoidance
- 23 reactive to baked milk
  - 2(9%) tolerate unheated milk
  - 3 (13%) tolerate baked milk/baked cheese
  - 18 (78%) strict milk avoidance

Summary of OIT Literature: Baked milk

Dietary baked milk accelerates the resolution of cow’s milk allergy in children

Summary of OIT Literature: Baked milk

Dietary baked milk accelerates the resolution of cow’s milk allergy in children

- 35% of patients who react to baked milk required epinephrine during challenge
- 75% of milk allergic patients tolerate baked milk
  - No epinephrine needed during unheated milk challenge
- Subjects who tolerated baked milk were 28 times more likely to become unheated milk tolerant
- Subjects who incorporated baked milk in diet were 16 times more likely to become unheated milk tolerant than comparison group

Summary of OIT Literature: Baked milk

Dietary baked milk accelerates the resolution of cow’s milk allergy in children

• Clinical implications: “Addition of dietary baked milk is safe, convenient, and well accepted by patients. Prescribing baked milk products to children with milk allergy represents an important shift in the treatment paradigm for milk allergy”.

• Recommend food challenge first!

Predicting food challenge outcomes for baked milk

- No child with a milk SPT wheal < 7 mm failed their baked milk challenge
- No child with casein SPT >15 mm, casein sIgE >10.3 kU/L, or milk sIgE > 20.6 kU/L passed the challenge

Summary of OIT Literature: Eggs

- Affects 1.8 to 2% of children < 5 years
- 70% to 80% tolerate baked eggs
- 80% outgrow

Leonard SA, et al. JACI 2012;130:473-480
Summary of OIT Literature: Eggs

- 55 children between 5 and 11 years of age
  - 15 placebo
  - 40 active group
  - Initial dose-escalation, build-up, maintenance
  - Food challenge at 10 months and 22 months

Burks AW, NEJM 2012;367:233-243
Summary of OIT Literature: Eggs

Oral Immunotherapy for Treatment of Egg Allergy in Children

• 15 placebo
  – 2/15 withdrew from study (1 transport, 1 reaction)
  – 13/15 underwent OFC (5 gm) at 10 months
    • 0 passed

• 13 terminated placebo OIT
  – 12 ineligible for OFC at 22 months (> 2 kU/L)
  – 1 underwent OFC (10 gm) at 22 months
    • 0 passed

Burks AW, NEJM 2012;367:233-243
Summary of OIT Literature: Eggs

Oral Immunotherapy for Treatment of Egg Allergy in Children

• 40 assigned to Egg OIT (active)—2 gram maintenance
  – 5 withdrew: 4 allergic reaction, 1 anxiety
• 35 underwent OFC (5 gm) at 10 months
  – 22 passed (1 withdrew)
• 34 underwent OFC (10 gm) at 22 months
  – 30 passed and stopped OIT

Burks AW, NEJM 2012;367:233-243
Summary of OIT Literature: Eggs

**Oral Immunotherapy for Treatment of Egg Allergy in Children**

- 29 underwent OFC (10 gm + open) at 24 months (no OIT for 2 months)
  - 11 passed
  - 18 did not pass
    - 5 tolerated 7.5 gm
    - 3 tolerated 3.5 gm
    - 5 tolerated 1.5 gm
    - 4 tolerated 0.5 gm
    - 1 tolerated 0.1 gm

Burks AW, NEJM 2012;367:233-243
Summary of OIT Literature: Eggs

Oral Immunotherapy for Treatment of Egg Allergy in Children

Table 2. Success Rates on Oral Food Challenge.

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Participants Tested</th>
<th>Response Rate</th>
<th></th>
<th></th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Placebo (N=15)</td>
<td>Oral Immunotherapy (N=40)</td>
<td>Placebo (N=15)</td>
<td>Oral Immunotherapy (N=40)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>number</td>
<td>number (percent)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desensitization, 5 g at 10 mo</td>
<td>13</td>
<td>35</td>
<td>0</td>
<td>22 (55)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Desensitization, 10 g at 22 mo</td>
<td>1†</td>
<td>34</td>
<td>0</td>
<td>30 (75)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Sustained unresponsiveness at 24 mo‡</td>
<td>0</td>
<td>29‡</td>
<td>0</td>
<td>11 (28)</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Burks AW, NEJM 2012;367:233-243
Summary of OIT Literature: Eggs

Oral Immunotherapy for Treatment of Egg Allergy in Children

• 11 “passed”, all stopped OIT but ingested eggs
  – 11 no reported sx at 30 months
  • 1 lost to follow up
  – 10 no reported sx at 36 months

Burks AW, NEJM 2012;367:233-243
Summary of OIT Literature: Baked Egg

Dietary baked egg accelerates resolution of egg allergy in children

• If tolerate baked egg, 12.2 times likely to develop tolerance to egg
• Once someone tolerated baked egg, they were just as likely to develop tolerance
• Higher baseline serum egg white IgE levels was associated with persistent baked and regular egg reactivity
• Subjects in the baked egg group tolerated regular egg at a median time of 50 months vs 78.7 months in the comparison group

Summary of OIT Literature: Baked Egg

Dietary baked egg accelerates resolution of egg allergy in children

**Summary of OIT Literature: Baked Eggs**

**Dietary baked egg accelerates resolution of egg allergy in children**

<table>
<thead>
<tr>
<th>Nature of Reaction</th>
<th>Applicable Testing</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reacted to regular egg, already tolerates heated egg</td>
<td></td>
<td>Continue inclusion of heated egg and reassess in 6-12 mo</td>
</tr>
<tr>
<td>Reacted to heated egg</td>
<td></td>
<td>Avoid all forms of egg and reassess in 6 to 12 mo</td>
</tr>
<tr>
<td>Reacted to regular egg</td>
<td>Egg white IgE &gt; 50 kUA/L(^{14})</td>
<td>Consider heated egg challenge under physician supervision</td>
</tr>
<tr>
<td></td>
<td>Egg white IgE &gt; 7 kUA/L(^{20}) or &gt; 2 kUA/L if &lt; 2 yr(^3)</td>
<td>Consider regular egg challenge under physician supervision</td>
</tr>
<tr>
<td>Never ingested, positive testing</td>
<td>Egg white IgE &lt; 7 kUA/L(^{20}) or &lt; 2 kUA/L if &lt; 2 yr(^3)</td>
<td></td>
</tr>
</tbody>
</table>

Peanut immunotherapy

• Leading cause of food fatalities in US
Summary of OIT Literature: Peanut

Allergen-specific oral immunotherapy for peanut allergy (Review)

• Found 16 studies and 15 excluded
• Conclusion: Effective, though with side-effects. Larger RCTs are needed.

Summary of OIT Literature: Peanut

A randomized controlled study of peanut oral immunotherapy: Clinical desensitization and modulation of the allergic response

• DBPC trial, 28 children enrolled, 12 month study

• 19 received therapy (3 withdrew) & 9 placebo
  – 16 reached maint. 4 gm; all tolerated 5 gm OFC
  – 9 placebo group able to tolerate 280 mg OFC

• Decrease in SPT wheal diameter, IL-5, IL-13 and increase in peanut-specific IgG\textsubscript{4}

Summary of OIT Literature: Peanut

A randomized controlled study of peanut oral immunotherapy: Clinical desensitization and modulation of the allergic response

- ↓ SPT size

Varshney, et al. JACI 2011;127:654-660
Summary of OIT Literature: Peanut

A randomized controlled study of peanut oral immunotherapy: Clinical desensitization and modulation of the allergic response

FIG 1. Cumulative amount of peanut protein ingested at OFC by peanut OIT and placebo subjects (*P < .001) after 12 months of therapy. Individual subjects are shown as diamonds (peanut OIT) or squares (placebo); lines designate median values.

Varshney, et al. JACI 2011;127:654-660
Summary of OIT Literature: Peanut

Clinical efficacy and immune regulation with peanut oral immunotherapy

• Initial day
  – began 0.1 mg peanut to 50 mg unless reaction earlier
    • 39 patients: 10 reached 50 mg; 15 reached 25 mg; 6 reached 12 mg; 5 reached 6 mg; 1 reached 3 mg and 2 reached 1.5 mg
• Build up phase
  – Following day began from 50 mg or dose tolerated
• Maintenance
  – Up to 300 mg peanut protein

Jones, JACI 2009;124:292-300
Summary of OIT Literature: Peanut

Clinical efficacy and immune regulation with peanut oral immunotherapy

• 39 total patients to start
  – 10 withdrew

• 29 had OFC to peanut:
  – 27/29 tolerated 3.9 gm peanut
  – 2/29 stopped at 2.1 gm peanut (parental anxiety; V/hives)

Jones, JACI 2009;124:292-300
## The Safety of Peanut Oral Immunotherapy in Peanut-Allergic Subjects in a Single-Center Trial

<table>
<thead>
<tr>
<th>Patient letter</th>
<th>Age (years)</th>
<th>Gender</th>
<th>Peanut-specific IgE, kU/l</th>
<th>Skin prick wheal average diameter (mm)</th>
<th>Clinical history of peanut allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>26</td>
<td>M</td>
<td>20.9</td>
<td>17</td>
<td>Abdominal pain, vomiting, diarrhea, skin and lip pruritus</td>
</tr>
<tr>
<td>B</td>
<td>8</td>
<td>M</td>
<td>&gt;100</td>
<td>11</td>
<td>Angioedema, urticaria</td>
</tr>
<tr>
<td>C</td>
<td>7</td>
<td>M</td>
<td>&gt;100</td>
<td>9</td>
<td>Abdominal pain, choking</td>
</tr>
<tr>
<td>D</td>
<td>6</td>
<td>F</td>
<td>442</td>
<td>9</td>
<td>Facial angioedema</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
<td>M</td>
<td>435</td>
<td>30</td>
<td>Urticaria, periorbital swelling, vomiting</td>
</tr>
<tr>
<td>F</td>
<td>5</td>
<td>M</td>
<td>342</td>
<td>7</td>
<td>Angioedema, cough</td>
</tr>
<tr>
<td>G</td>
<td>11</td>
<td>F</td>
<td>&gt;100</td>
<td>25</td>
<td>Urticaria</td>
</tr>
<tr>
<td>H</td>
<td>10</td>
<td>F</td>
<td>12.6</td>
<td>8.5</td>
<td>Drooling, vomiting</td>
</tr>
<tr>
<td>I</td>
<td>6</td>
<td>F</td>
<td>249</td>
<td>19.5</td>
<td>Angioedema, coughing, wheezing</td>
</tr>
<tr>
<td>J</td>
<td>7</td>
<td>F</td>
<td>&gt;100</td>
<td>21.5</td>
<td>Abdominal pain, vomiting, flushing</td>
</tr>
<tr>
<td>K</td>
<td>7</td>
<td>M</td>
<td>153</td>
<td>11</td>
<td>Oral pruritus</td>
</tr>
<tr>
<td>L</td>
<td>7</td>
<td>M</td>
<td>54.9</td>
<td>25</td>
<td>Vomiting</td>
</tr>
<tr>
<td>M</td>
<td>11</td>
<td>M</td>
<td>&gt;100</td>
<td>2</td>
<td>Urticaria, oropharyngeal swelling, respiratory distress</td>
</tr>
<tr>
<td>N</td>
<td>45</td>
<td>M</td>
<td>20.6</td>
<td>10</td>
<td>Abdominal pain</td>
</tr>
<tr>
<td>O</td>
<td>11</td>
<td>M</td>
<td>81.9</td>
<td>9</td>
<td>Angioedema, urticaria</td>
</tr>
<tr>
<td>P</td>
<td>9</td>
<td>F</td>
<td>48.7</td>
<td>20</td>
<td>Perioral redness, abdominal pain</td>
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<tr>
<td>Q</td>
<td>6</td>
<td>F</td>
<td>59.4</td>
<td>8</td>
<td>Urticaria</td>
</tr>
<tr>
<td>R</td>
<td>7</td>
<td>F</td>
<td>32.7</td>
<td>14</td>
<td>Facial angioedema, skin pruritus</td>
</tr>
<tr>
<td>S</td>
<td>5</td>
<td>F</td>
<td>7.86</td>
<td>15.5</td>
<td>Urticaria</td>
</tr>
<tr>
<td>T</td>
<td>13</td>
<td>M</td>
<td>53.1</td>
<td>8.5</td>
<td>Vomiting, respiratory distress, urticaria</td>
</tr>
<tr>
<td>U</td>
<td>8</td>
<td>M</td>
<td>69.7</td>
<td>16.5</td>
<td>Facial angioedema, urticaria, throat pruritus</td>
</tr>
<tr>
<td>V</td>
<td>10</td>
<td>M</td>
<td>62.4</td>
<td>17</td>
<td>Facial angioedema, respiratory distress</td>
</tr>
<tr>
<td>W</td>
<td>5</td>
<td>F</td>
<td>16.6</td>
<td>17.5</td>
<td>Wheezing, respiratory distress</td>
</tr>
<tr>
<td>X</td>
<td>13</td>
<td>M</td>
<td>0.64</td>
<td>9</td>
<td>Allergic conjunctivitis</td>
</tr>
</tbody>
</table>

The Safety of Peanut Oral Immunotherapy in Peanut-Allergic Subjects in a Single-Center Trial

3 reactions required epinephrine
1 in CTRC
2 at home (following exercise, shower)

The Safety of Peanut Oral Immunotherapy in Peanut-Allergic Subjects in a Single-Center Trial

SLIT Immunotherapy for Peanut

Sublingual immunotherapy for peanut allergy: A randomized, double-blind, placebo-controlled multicenter trial

• 40 subjects, 12 to 37 years-old (median 15 y/o)
  – Received peanut SLIT for 44 weeks
  – 2 gm entry challenge, 5 gm desensitization challenge

• Responder: tolerated 5 gram challenge or 10-fold increase in threshold dose

SLIT Immunotherapy for Peanut

Sublingual immunotherapy for peanut allergy: A randomized, double-blind, placebo-controlled multicenter trial

- 14/20 (70%) responders vs 3/20 (15%) in placebo group

Role of Anti-IgE in Desensitization Studies
Role of Anti-IgE with OIT for Milk

Rapid oral desensitization in combination with omalizumab therapy in patients with cow’s milk allergy

• Pilot I study

• Goal: children to get to 2000 mg in 7 to 11 weeks

• Received 9 initial weeks of Anti-IgE therapy

• “Rush” to get to 1000 mg dose on day 1

• 10 of 11 subjects completed (1 withdrew—abd sx)
  – 9 of 10 able to reach 1000 mg and had weekly increases
  – 1 of 10 reacted at 1000 mg dose, required Epinephrine

Role of Anti-IgE with OIT for Milk

Rapid oral desensitization in combination with omalizumab therapy in patients with cow’s milk allergy

- Weekly increases (dose adjustments in CTRC) to 2000 mg; 1 patient got to 1200 mg
- Anti-IgE therapy was stopped at week 16
- DBPCFC at week 24
  - 9/9 who achieved goal, tolerated 8000 mg milk
- Overall side effects similar to other IT

Role of Anti-IgE with OIT for Milk


<table>
<thead>
<tr>
<th>TABLE II. Overall safety data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk doses per child, mean (range)</td>
<td>209 (36-334)</td>
</tr>
<tr>
<td>Total doses</td>
<td>2301</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symptom/treatment</th>
<th>No. (%) of total doses</th>
<th>No. of reactions per child, mean (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total reactions</td>
<td>41 (1.8)</td>
<td>3.7 (1-7)</td>
</tr>
<tr>
<td>Grade 1 (mild) symptoms</td>
<td>29 (1.3)</td>
<td>2.6 (1-5)</td>
</tr>
<tr>
<td>On rush desensitization day</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>During weekly dose escalation phase</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>During maintenance dosing</td>
<td>5</td>
<td></td>
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<tr>
<td>Grade 2 (moderate) symptoms</td>
<td>8 (0.3)</td>
<td>0.7 (0-2)</td>
</tr>
<tr>
<td>On rush desensitization day</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>During weekly dose escalation phase</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>During maintenance dosing</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Grade 3 (severe) symptoms</td>
<td>4 (0.1)</td>
<td>0.3 (0-1)</td>
</tr>
<tr>
<td>On rush desensitization day</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>During weekly dose escalation phase</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>During maintenance dosing</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Epicutaneous Immunotherapy

- Adhesive crown
- Dry layer of allergenic proteins
- Polarized polymer
- Water accumulation and condensation
- Natural Water loss – Hydration of skin
- Solubilization and epicutaneous delivery of the proteins
- Interaction with Epidermal Immune Cells

Epidermis

Dermis

SKIN

Slide courtesy of DBV Technologies
EPIT for Milk Allergy

EPIT for Peanut Allergy

• **ARACHILD STUDY:** Multicenter DBPC 18 month trial
  – 54 randomized children aged 5 to 17 years
  – 18.5% of patients in the treated group consumed at least 10-fold more peanut at the 6-month oral food challenge vs 0% in the placebo group (p=0.05)

• **VIPES STUDY:** multicenter and multinational DBPC 12 month trial
  – 220 patients (children, adolescents, and adults)
Current & future studies at CHOP

• **Baked Milk and Egg OIT**

• **Peanut**
  – Epicutaneous (atopy patch study)
  – Anti-IgE and OIT for peanut

• **Tree nuts OIT (walnut)**

  **Studies are performed with great team**
  Jonathan Spergel MD, PhD
  Rushani Saltzman MD
  Megan Ott CRNP
  Karhy Pinzone RN
  Courtney Rooney RN
  Many colleagues who refer patients, patients/families, donors
Conclusion

• Is immunotherapy ready for clinical practice?
• There are many questions that remain...

**Peanut Oral Immunotherapy: Is It Ready for Clinical Practice?**

Hugh A. Sampson, MD  New York, NY

“I finally feel normal. I can eat the same foods as my friends at parties.”  DT, 9 yrs

Pictures courtesy of Dr. Rushani Saltzman