Common Food Allergies
Dr Sarah Sasson
Immunology Registrar

Quiz:
- Which of the following are likely due to a food allergy?
  - A 25F Australian of Chinese descent becomes hot with over facial erythema after drinking 2 units of alcohol. Patient states this has happened numerous times before.
  - A 4F feels acutely generalized urticaria, wheeze, stridor and facial swelling after ingestion of peanut butter at a birthday party. Her mother states she is surprised as he had tried peanuts before.
  - C 4M suffer from abdominal pain and profuse diarrhoea after eating ice-cream. States a similar reaction occurs to milk and cheese.
  - D 1F is brought in by her mother. The child is pale and lethargic and her growth charts show deceleration. The mother states the child often has diarrhoea with blood in the stool, appears to suffer abdominal pain. She was commenced on solid foods at 6 months. On examination you note florid eczema over the child’s cheeks and limbs.
  - E 60F presents in ED with fever, abdominal pain, nausea, vomiting and diarrhoea after eating cold leftover chicken. Patient states bought BBQ chicken fresh 3 days prior.

Case: Patient A
- 40F nurse experienced onset of eye swelling, chest tightness and urticaria 10 min after eating a prawn and avocado sushi roll.
- Attempted to self manage with oral antihistamines before presenting to ED where her symptoms resolved with IM adrenaline.
- Otherwise well; Nil regular meds
- Nil history of atopy/allergic disease
- How would you manage this patient in the acute setting?
- What investigations would you order?

Food Allergy: Definition
- Adverse Immune reactions to food proteins
- An adverse health effect arising from a specific immune response that occurs reproducibly on exposure to a given food.
- Onset is usually within 2h of ingestion

<table>
<thead>
<tr>
<th>Mediator</th>
<th>Clinical Features</th>
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<tbody>
<tr>
<td>IgE</td>
<td>Skin, GIT, Respiratory Tract; Onset &lt;2h</td>
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<tr>
<td>Non IgE</td>
<td>Enterocolitis, proctocolitis, enteropathy syndromes</td>
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<tr>
<td>Mixed</td>
<td>Eosinophilic oesophagitis,</td>
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Food Allergy: Epidemiology
- 3.9% of children in the USA have a food allergy; 18% increase in prevalence between 1997-2007
- Children with food allergy have a 4x increase in asthma and 2.4x increase in atopic dermatitis and 3.6x increase in respiratory allergies
- Food allergy in adults can represent persistent allergy from childhood or de novo sensitization

Food Allergy: Risk Factors for fatal anaphylaxis
- Asthma
- Concurrent infection
- Amount of food ingested/eaten on an empty stomach
- Failure to use epinephrine
- History of severe reactions
- Known food allergies
- Denial of symptoms
- EIOM
- Use of beta blockers/ ACEI, TCA
- Adolescence/Young Age
- 40-100% of death from food-induced anaphylaxis involve ingestion of food catered or prepared away from the home.
Food Allergy: Major Food allergens

- Cow’s milk
- Eggs
- Peanut
- Soy
- Tree nuts
- Fish
- Shellfish
- Wheat

Food allergy seldom occurs to just one food
In general proteins with more than 62% homology to human proteins are unlikely to be allergenic
Common food allergens vary between geographical regions

Food Allergy: Pathogenesis

- Major food allergens are glycoproteins that are water soluble and stable to the effects of heat, proteases and acids
- These proteins are taken up by intestinal epithelial cells and presented to primed T-cells leading to the generation of Th2 cells

Food Allergy: Pathogenesis

- May be IgE mediated (e.g. anaphylaxis), not IgE (cell) mediated (e.g. delayed onset or a combination of both)
- Food allergies are thought to be due to a loss of oral tolerance or failure to induce tolerance
- Increased intestinal permeability may also play a role
- Food allergy may occur secondary to sensitization via a non-oral route (e.g. topical creams containing peanut or pollen-food syndrome)
- Higher concordance of peanut allergy among monozygotic twins (64%) as opposed to dizygotic twins (7%) suggest genetic factors

Food Allergy: Diagnosis

- Neither medical history nor laboratory investigations alone is diagnostic of food allergy
- Double-blind placebo controlled food challenge is gold standard (resource intensive). Potential allergen is gradually fed in increasing doses under supervision
- Skin prick testing- if positive increases the likelihood of a food allergy (may not correlate to clinical reactivity)
Food Allergy: Diagnosis
- IgE levels - if elevated increases the likelihood of a food allergy (may not correlate to clinical reactivity)
- Cut-off thresholds for both SPT and IgE levels have aided the diagnosis of IgE mediated food allergy and reduced the use of DBPCFC
- No evidence for patch testing
- There are no tests for non-IgE mediated food allergies; Food elimination/reintroduction trials may be useful

Food Allergy: Sampson et al J All Clin Imm 2001
- Authors had previously established 95% cut off intervals for food-specific IgE to egg, milk, peanut and fish in a retrospective cohort
- In this study they aimed to determine the usefulness of these cut-offs in a prospective manner
- Food-specific IgE were measured in 100 children referred with suspected food allergy
- Diagnosis of food allergy was determined either by food challenge OR history
- The previously published cut-offs for IgE successfully identified >95% of clinically diagnosed food allergies

Food Allergy: Treatment
- There is no treatment for prevention of IgE/Non IgE mediated food allergy
- Mainstay of treatment is strict avoidance of causal food in both IgE/Non IgE and mixed allergy syndromes including education on reading ingredient lists
- In Australia food packaging must display ingredients which are common allergens
- Mild allergic reactions may be managed with antihistamines
- Epinephrine autoinjector for patients at risk of anaphylaxis
- Annual physicians review to discuss accidental ingestion, education, nutritional status
- Allergies to milk and egg are usually outgrown in the first years of life while those to peanut and shellfish are not

Food Allergy: Inpatient Management
- For anaphylaxis observation period of 4-6h is reasonable
- Systemic steroids are commonly used to prevent biphasic or protracted reactions however there is little evidence for this
Food Allergy: Advice during pregnancy and lactation

- ASCIA do not recommend restriction of maternal diet even for high-risk infants
- Recommendation for exclusive breast feeding without maternal restrictions for first 4-6 months with introduction of solid foods including potential allergens at this time
- Early introduction of foods may be protective of food allergy eg low rate of peanut allergy in Israel where Bamba peanut snack is commonly eaten

Patient A: Initial management

- 40F nurse experienced onset of eye swelling, chest tightness and urticaria 10 min after eating a prawn and avocado sushi roll
- Attempted to self manage with oral antihistamines before presenting to ED where her symptoms resolved with IM adrenaline
- Observed in ED for 4h before being dc on 3/7 prednisone 50mg, 10mg loritidine and 150mg ranitidine with prescription for an EpiPen
- IgE, tryptase, C3, C4 CH100, ANA ordered for follow-up in Immunology Clinic

Patient A: Follow-up

- Prior to attending clinic JG again ate prawn and avocado sushi (from a different outlet) with no sequelae
- Nil further adverse food reactions
- IgE 11, Tryptase 14 P, C3, C4 CH100 all normal, ANA Neg
- RAST Seafood mix also Neg
- How would you advise and manage this patient?

Food Allergy: Summary

- Food allergies are adverse reactions to food proteins that are immune mediated
- May be IgE, Non-IgE or mixed
- A small number of major food allergens are responsible for the bulk of reactions
- Commonly these allergies present in childhood but may develop or persist into adulthood
- Food allergy is on the rise
- Diagnosis is largely based on history/exam combined with laboratory investigations. DBPCFC is the gold standard
- Initial management may involve IM adrenaline, steroids and antihistamine
- The mainstay of long-term treatment is avoidance of triggers, patient education and regular review