Diagnosing Allergy in Children

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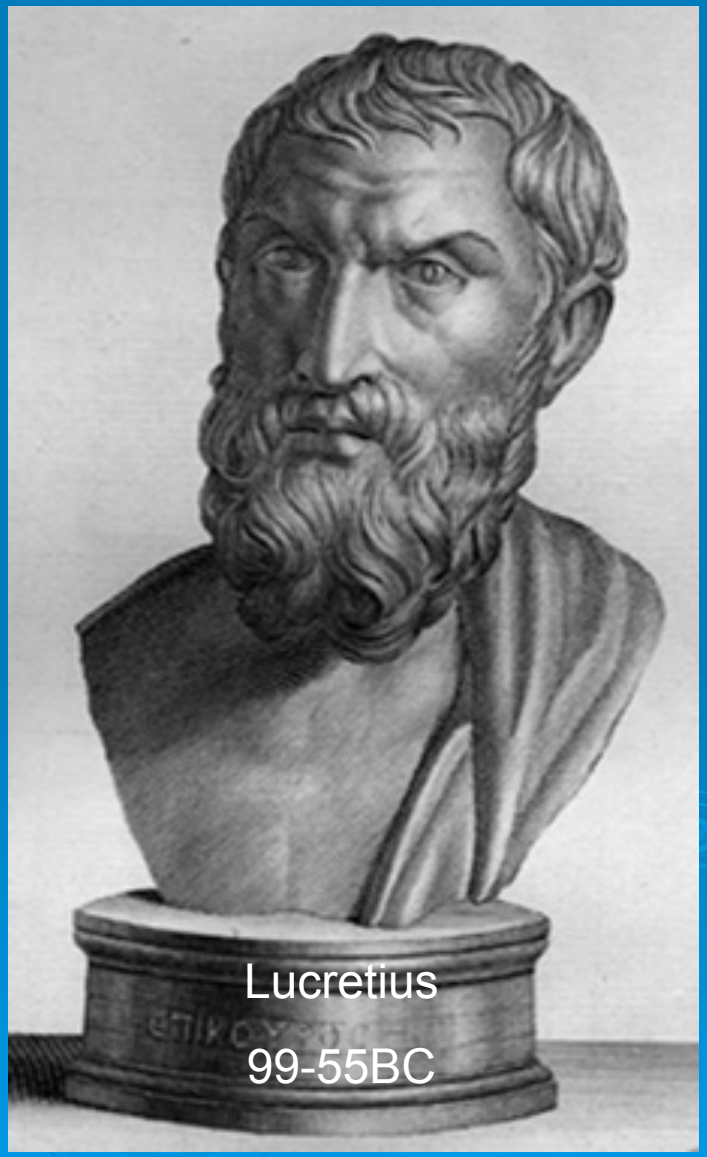
“What is food for some, may be fierce poisons for others."



Lucretius

99-55BC

Aims

- To give you a guide on an allergy oriented history
- To enable you to use allergy tests to aid in the diagnosis of children with possible immediate IgE-mediated food allergy

Recent suggestion/agreement

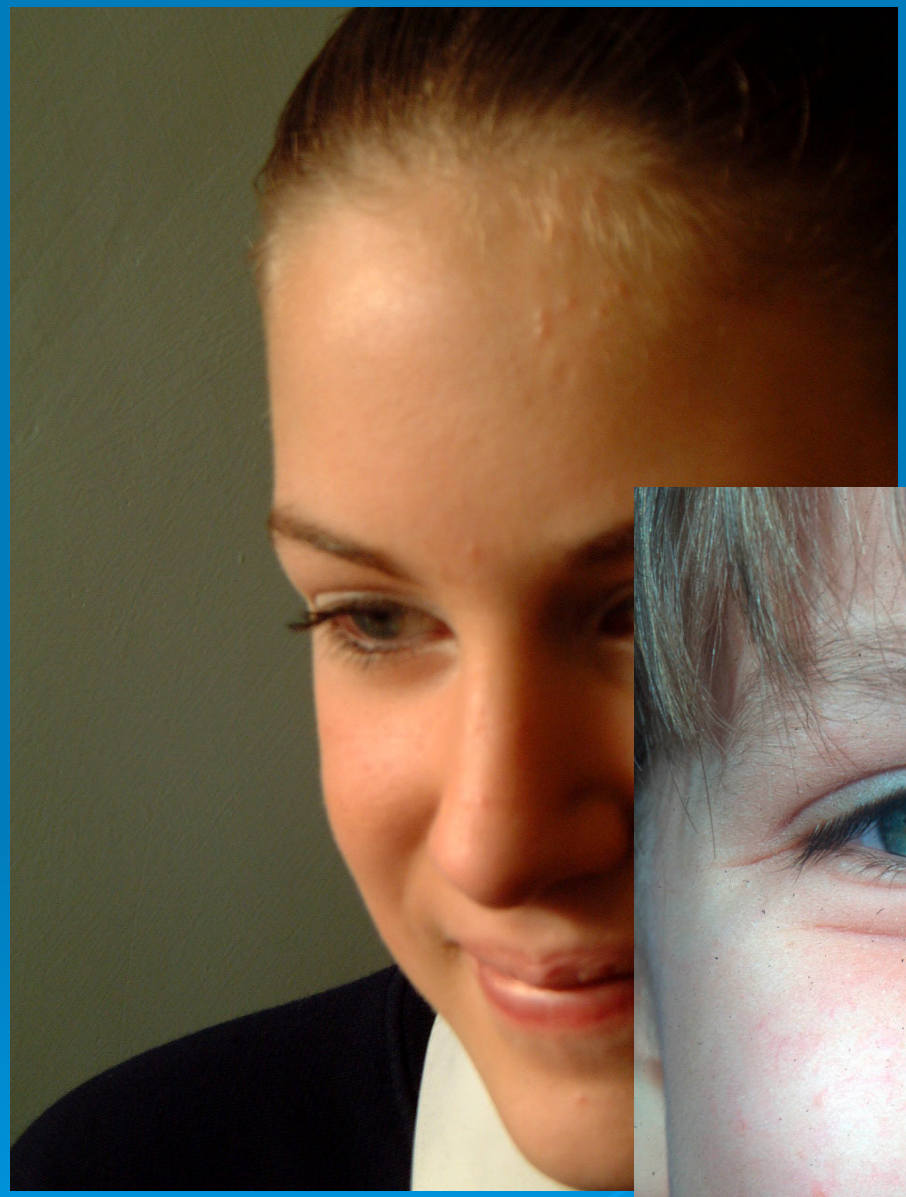
- 85% of allergies should be managed in primary care
- Recommendation for GPwSI in each practice

Topics covered

- Definitions
- Immunology
- Clinical history
- Food challenges
- Interpreting tests
  - Skin testing
  - Specific IgE
- Diagnosis
- Non-IgE mediated reactions
- (Case histories)
- Summary

Atopy

- A genetic predisposition to producing IgE antibodies to common environmental antigens
- Associated with common conditions:
  - Asthma, eczema, rhinitis, conjunctivitis, urticaria, anaphylaxis,



Allergy

- Immunologically mediated reaction to a specific antigen
- **Type I**
  - Antigen triggering IgE on mast cells
  - Immediate reactions
- **Type IV**
  - Antigen triggering lymphocytes
  - Delayed reactions

Mechanisms Type I

Activation by Antigen

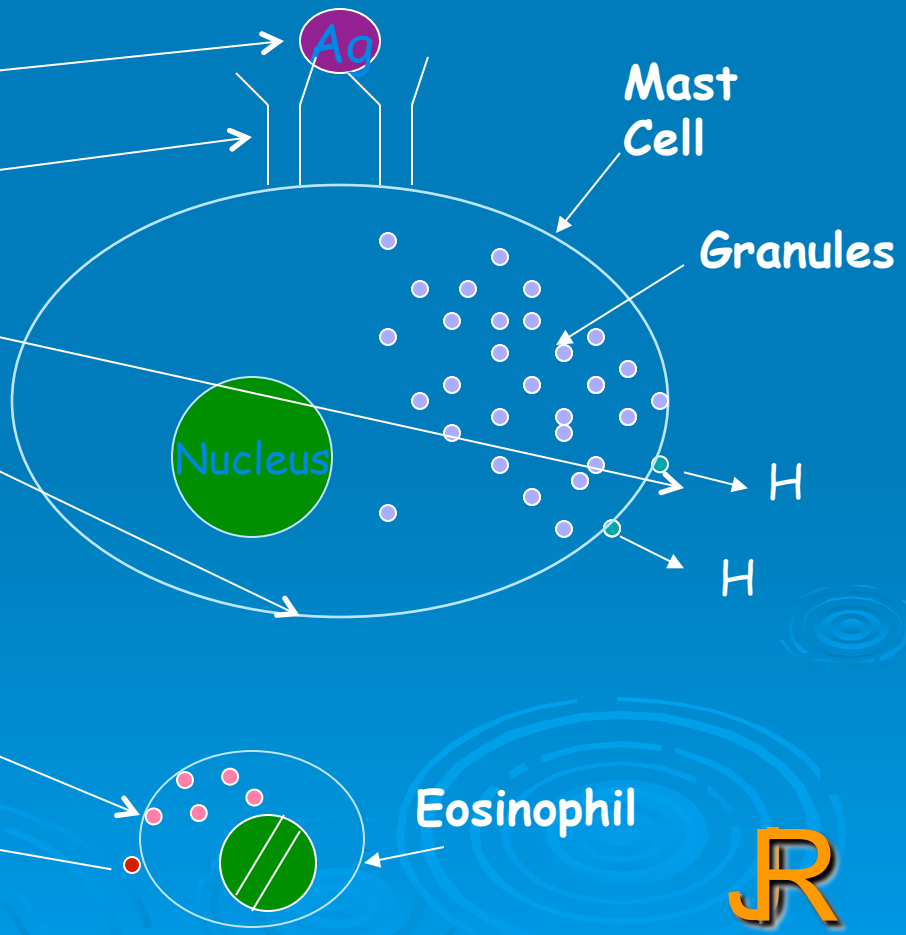
IgE Antibodies on Mast cells

Release of Histamine (at once)

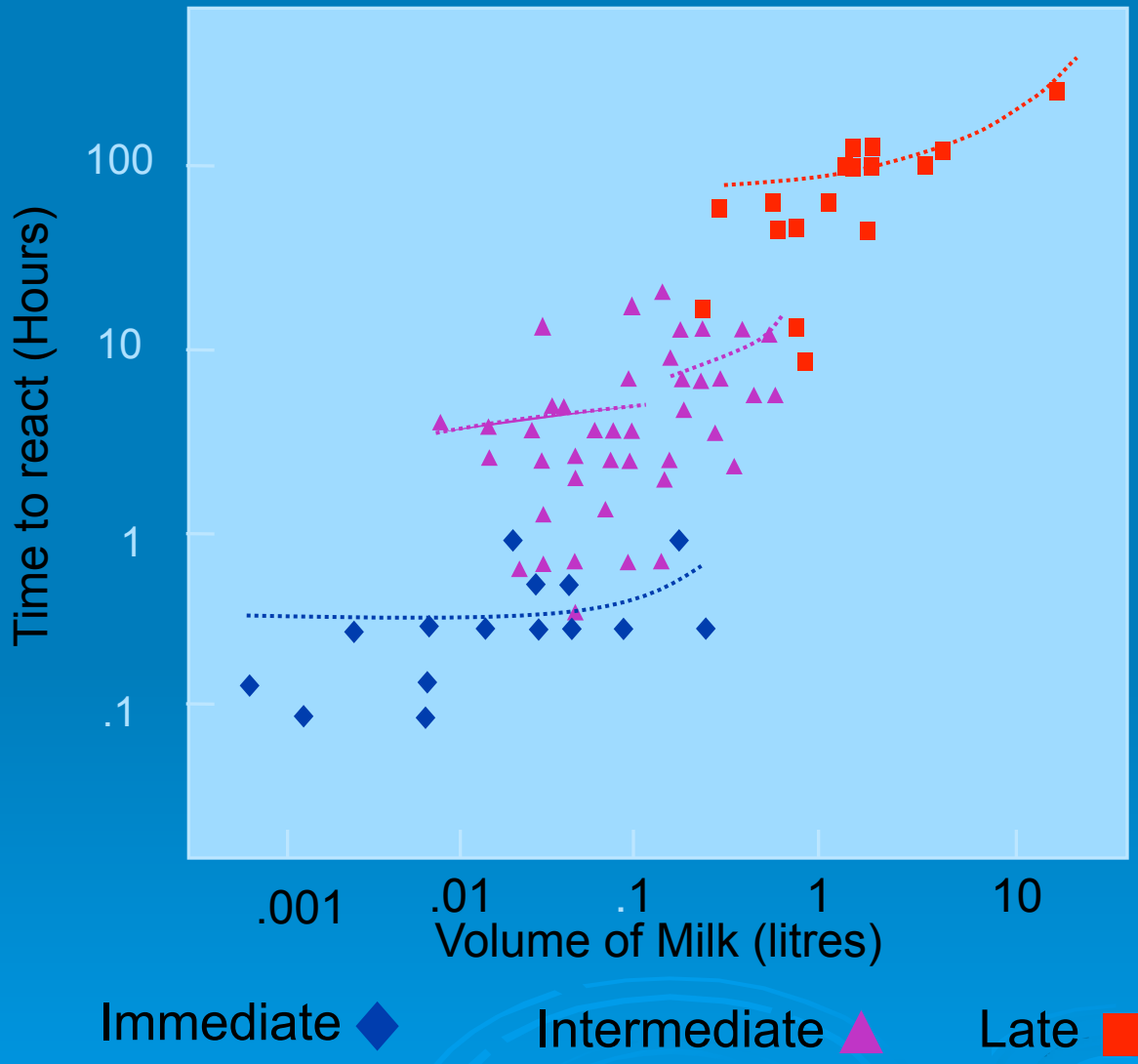
Release of other mediators (slower but more potent)

Attraction of inflammatory cells

Release of further inflammatory mediators



Onset of food allergic reactions in CMA



Non IgE Mediated

Eczema/GI symptoms

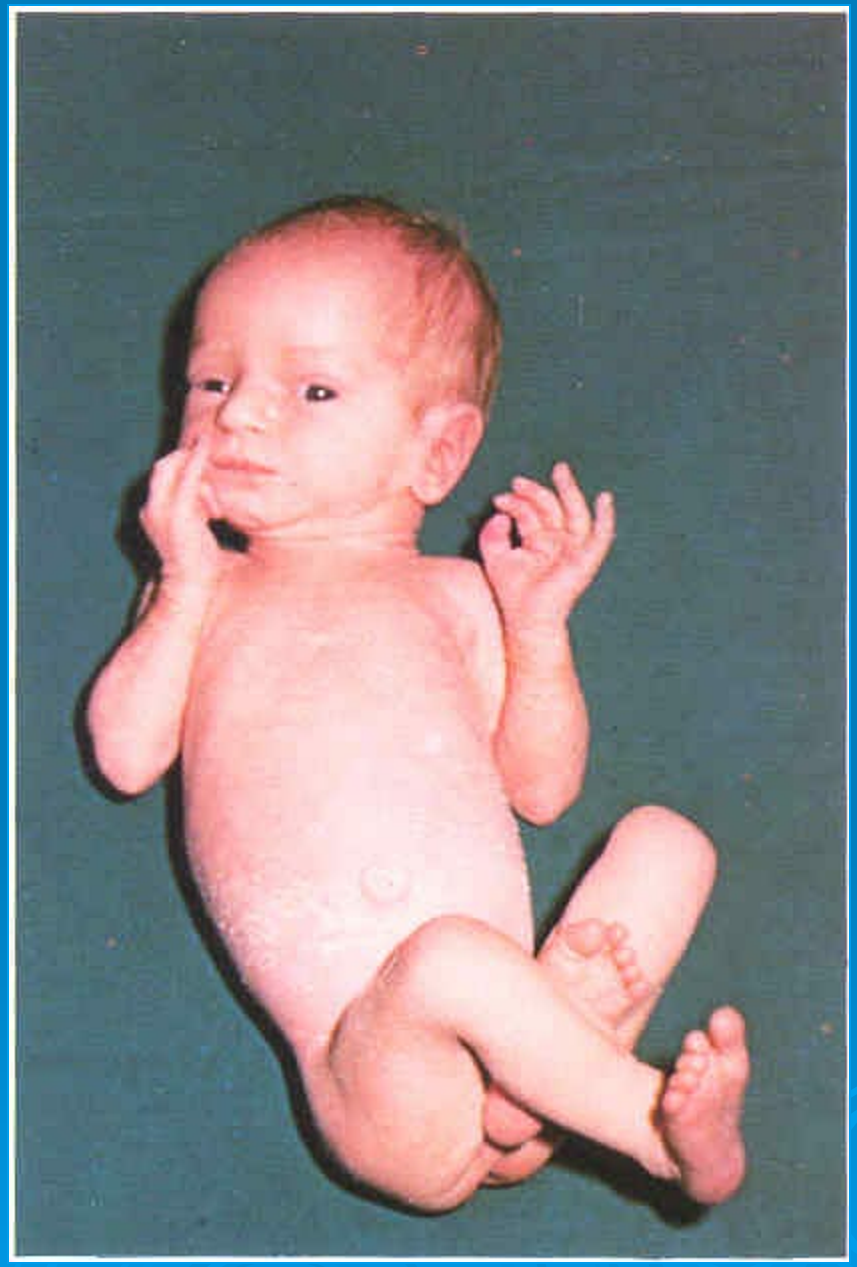
GI/resp symptoms

Urticaria, anaphylaxis

IgE Mediated

Hill DJ et al., Ann Med 1999; :272-281


THOMAS



Food Allergy Oriented History

- Typical symptoms
- Typical foods
- Typical time scales
- Consistent

Clinical history

- Is taking a history enough?
- Some authors use ‘unequivocal’ clinical history as a gold standard (Clark 2003)
  - Acute onset of symptoms (urticaria, angioedema, pruritus, asthma, abdo pain/ vomiting/ faintness/ collapse)
  - Occurring immediately/ soon after ingestion of food
- Plus
  - on more than one occasion
  - on every exposure
  - recently

Clinical history (cont)

- But other authors have shown that clinical history is not always conclusive (Sampson 1999)
  - Food challenge only positive in 50% of children with positive history
- Why?
  - Outgrowing allergy
  - Incorrect identification of food
  - Non-allergic cause of reaction

Clinical history (cont)

- I do not believe clinical history alone is usually enough.
- But it will give you an idea how likely food allergy is.

Clinical history (cont)

- History will fall into 1 of 3 categories
- Good history of allergy
- Possible history eg
  - Older child, dislikes food (esp nuts), never eats
  - Good history of allergic reaction, food unclear
  - Clear history of food exposure, reaction unclear
- No history suggestive of allergy

Clinical history (cont)

- Good history of ‘immediate’ allergy
  - Quick onset
  - Reproducible
  - Typical symptoms
  - Typical foods

Clinical history

- Non IgE type more difficult
  - Symptoms 12-24 hours after challenge
  - More vague association with challenge
    - Eczema
    - GI
      - GOR
      - Abdo pain
      - Diarrhoea
      - Constipation
      - FTT

Food Allergy; International

USA & UK
- Milk
- Egg
- Peanut
- Tree Nuts
- Seafood

France
- Egg
- Peanuts
- Milk
- Mustard

Italy
- Milk
- Egg
- Seafood

Israel
- Milk
- Egg
- Sesame

Australia
- Milk
- Egg
- Peanuts
- Sesame

Singapore
- Birds Nest
- Seafood
- Egg
- Milk

Sampson HA 2005 WAO

Clinical history (cont)

- Then move onto allergy tests

Allergy tests

- The reason for testing depends on history:
- Good history
  - Provides baseline
  - Acts as confirmation of history
- Possible History
  - Aids diagnosis
- No history of allergy
  - Only reason is to prove to the family that there is no allergy. No other reason to test

Allergy tests

- Which test to do?

Food challenge

- Gold standard test for food allergy
- Child given graded doses of food
- Final dose is a portion of the food

- Challenge stopped if there is a reaction
- If tolerates top dose — not allergic
- If reacts — allergic
- If unable to eat all doses — inconclusive

Positive challenge

Food challenge

- Method
  - Performed in hospital
  - Last several hours
  - Facilities for resuscitation available
  - Child closely monitored throughout
  - Blinded or open
- Problems with food challenge
  - Labour and resource intensive
  - Risk of reaction
- Therefore NOT first line test!

Allergy tests

- Instead, perform:

- Specific IgE OR
- Skin prick tests

Skin prick testing

Allergy testing pros/ cons

	Skin prick test	Specific IgE
Advantages	Satisfying Results available in clinic	Easy to order, just write out blood form
Disadvantages	Need trained staff available Risk (v slight) of systemic reaction Have to hold arm still Can't do if recent antihistamines or if bad eczema	Expensive Painful Takes several weeks for results Involves a blood test

JR

Sampson et al 1997 (cont)

- Results (SIgE)

Food	95% PPV (kU/L)	Likelihood ratios
Egg	6	7.2
Milk	32	25
Peanut	15	9.1
Fish	20	40

Skin prick testing

- Variety of methods available
- All studies agree that there is no relation between weal size and severity of allergic reaction
- Size of weal relates to the likelihood of being clinically allergic

IgE testing

- Does a positive test imply allergy?
  - No, but makes it more likely
  - Can be sensitised but not allergic
- Does a negative test exclude allergy?
  - No, but makes it less likely

Skin prick tests or RAST

- Consider test as giving 3 possible results
- low
  - skin prick test 0-2mm /RAST < 0.7
- medium
  - skin test 3-7mm/RAST 0.7-7
- high
  - skin test ≥ 8mm/RAST > 7

Diagnosis

- How should we use history and test results to help in the diagnosis of food allergy?

Diagnosis

- History and allergy tests together lead to 3 possible conclusions

  Definitely not food allergy

  Doubt about food allergy–
  need food challenge

  Definite food allergy

Diagnosis

Clinical history

Allergy test	No suggestion of allergy	Possible allergy	Good history of allergy
Low	Not allergy	Not allergy or Food challenge	Food challenge
Medium	Not allergy	Food challenge	Allergy
High	Food challenge	Allergy	Allergy

Case histories 1

- 9 year old girl
- Ate peanut butter at age 2 and developed hives within minutes
- Avoided since. Accidentally exposed on 3 or 4 occasions, each time with hives. Last reaction 2 months ago

Specific IgE <0.35	food challenge
Specific IgE 3.1	Allergy
Specific IgE 32	Allergy

Case histories 2

- Her 9 year old friend
- Ate peanut butter at age 2 and developed hives within minutes
- Avoided since. Accidentally exposed on 3 or 4 occasions, each time with hives. Last reaction 5 years ago

Specific IgE <0.35	Food challenge
Specific IgE 3.1	Food challenge/ Allergy
Specific IgE 32	Allergy

Case histories 3

- 5 year old girl
- Eczema as infant. When drank cows milk in infancy, developed urticaria within minutes. No exposures since age 3.
- Currently on soya.
- Skin tests:

1mm	Food challenge
4mm	Food challenge
10mm	Allergy

Case histories 4

- 7 year old boy
- Never eaten peanuts
- Skin tests:

0mm	Not allergy
5mm	Food challenge
8mm	? Allergy*

Non-IgE mediated allergy

- History difficult (reactions can be delayed)
- Symptoms include worsening of eczema/ GI abnormalities (pain/ vomiting/ diarrhoea/ bloating)
- Particularly occurs with cows milk
- No confirmatory tests
- Only way to confirm is with a supervised trial exclusion diet followed by reintroduction

Food Intolerance

- Many other mechanisms
  - Chemical
  - Pharmacological
  - Direct irritant
  - Psychological

Management

- Avoidance
  - Dietitian
- Anti-histamine
  - 2nd generation
- Adrenaline
  - Prior anaphylaxis
  - Asthma
  - Tiny dose reaction
    - with training

Questions

Summary

- Topics covered
  - Immunology
  - Clinical history
  - Food challenges
  - Interpreting tests
  - Specific IgE
  - Non IgE mediated allergy
  - (Case examples)

Thank You!

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