Food allergy

Brocovschii Victoria
Conf univ

Definition

Food allergy is an abnormal reaction of the immune system to ingestion, contact or inhalation of a certain food

Are not related to the immune system:

- Toxic reaction to food – any bacterial infection
- Food intolerance – intolerance to lactose, gluten, reactions to food additives

Non-immune mediated hypersensitivity to food (food intolerance)

- Is not related to the immune system by definition
- People who are food-intolerant can sometimes consume that food and are not symptomatic or the symptoms are very moderate
- Non-immune mediated hypersensitivity to food and food allergy are difficult to differentiate using only clinical manifestations
- For example, a person who is lactose intolerant has a shortage of lactose, the digestive enzyme that breaks down the sugar in milk and dairy products. That person could experience stomach pain or bloating several hours after drinking milk

Prevalence of food allergy

- Precise prevalence is unknown, but estimates are:
- About 1/3 of the general population with food allergy and only 1-2% are documented
- About 5% of children and 3-4% of adults
- Prevalence depends on: genetic factors, age, dietary habits, geography and diagnostic procedures

Food allergens

- Sensitization may occur through the gastrointestinal tract
- Water-soluble glycoproteins
- Molecular weights ranging from 10 to 70 kD
- Stable to heat, acid and proteases

Food allergens

- **Milk** - beta-lactoglobulin (not affected by high temperature)
- **Eggs –** ovalbumin and ovomucoid from the white part (not affected by high temperature)
- **Peanuts and nuts** - contain arahin and conarhin
- **Fish and seafood**– parvalbumin
- **Food additivs, colorants, preservativs**
- **Other:** exotic fruits, seeds (sesame, sunflower, poppy) and spices, food oils.

Risk factors for the development of food allergy

- A family history of atopy
  - ✓ 20 - 40% one parent with allergy
  - ✓ 60 -80% both parents with allergy
  - ✓ 5 - 15% no family history of atopy
- Atopy to other allergens (dust, polen)
- Persons with asthma
- A wide use of food additives

Pathogenesis of food hypersensitivity: gut barrier

- The immune system associated with this barrier is capable of discriminating among harmless foreign proteins or commensal organisms and dangerous pathogens

- Food allergy is an abnormal response of the mucosal immune system to antigens delivered through the oral route

- The immature state of the mucosal barrier and immune system might play a role in the increased prevalence of gastrointestinal infections and food allergy in the first few years of life

Pathogenesis of food hypersensitivity: gut barrier

- About 2 % of ingested food antigens are absorbed and transported throughout the body in an immunologically intact form, even through the immature gut

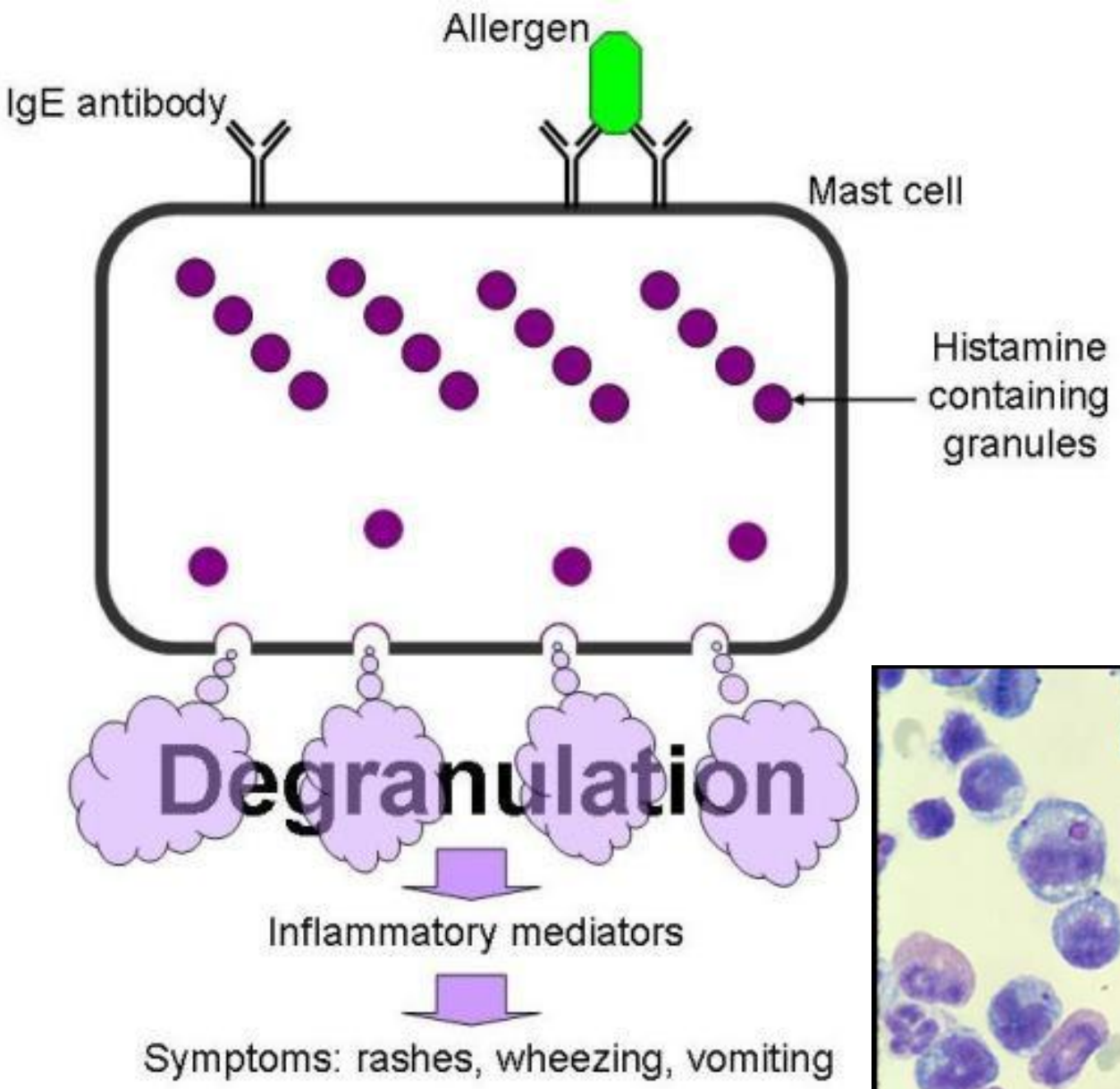
- The underlying immunologic mechanisms involved in oral tolerance induction have not been fully elucidated

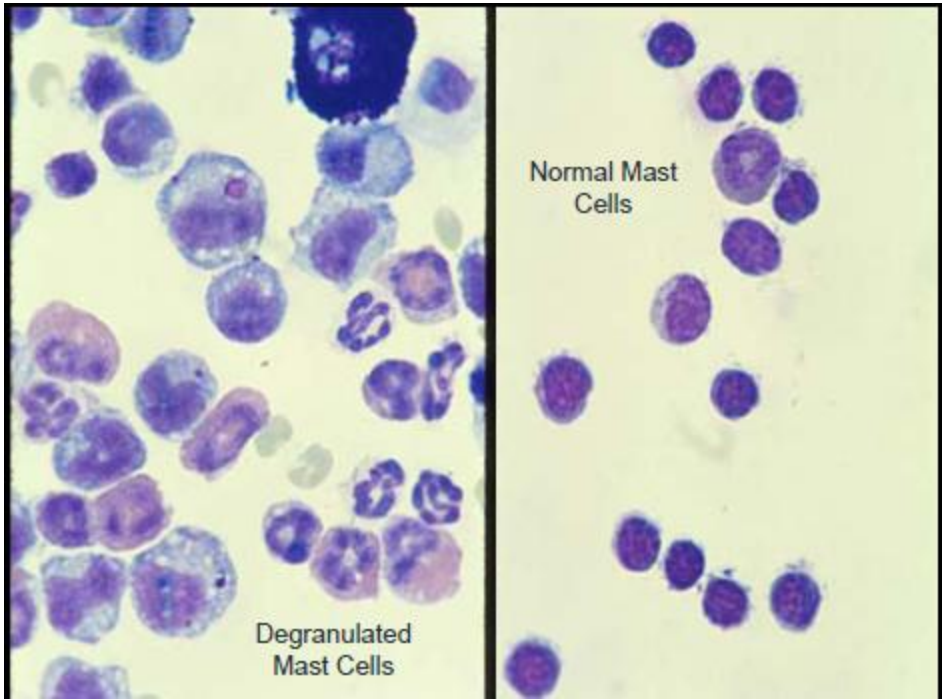
Oral tolerance

- The systemic immune system from the gastrointestinal tract is typically confronted with relatively small quantities of foreign antigen and mounts a brisk inflammatory response

- The mucosal immune system regularly encounters enormous quantities of antigen and must suppress immune reactivity to food and harmless foreign commensal organisms (ie, develop oral tolerance)

- Antigen-presenting cells, including intestinal epithelial cells and dendritic cells, and regulatory T cells play a central role in the development of oral tolerance.


Allergen
IgE antibody
Mast cell
Histamine containing granules
Degranulation
Inflammatory mediators
Symptoms: rashes, wheezing, vomiting


Normal Mast Cells
Degranulated Mast Cells

Cross-reaction

- IgE antibodies to one allergen may cross-react to other allergens.
- The clinical relevance of these antibodies varies due to the individual reactivity of the patient and due to the structural similarity of the allergens.
- Patiens with allergy to pollen or latex may present symptoms of allergy when eating fruits, vegetables or nuts.
- About 70% of food allergy are attribuate to pollen sensitization.

Fiziopatologie

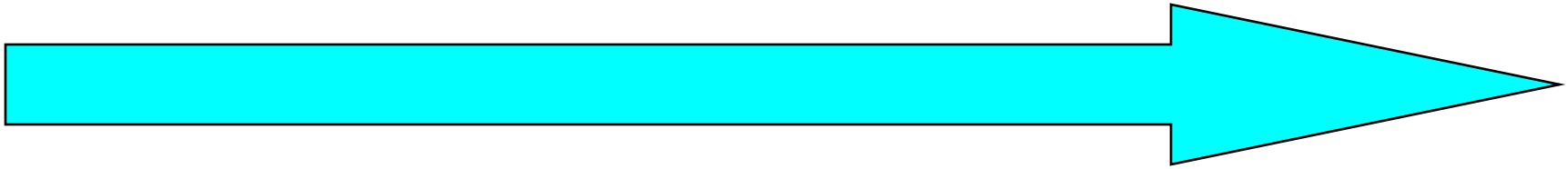
- Răspunsul imun la alergenii alimentari mediat celular, pot media reacţii alergice în afecţiuni cu simptome întârziate sau cronice

- De exemplu, sindromul de enterocolită la proteine alimentare, o alergie alimentară gastro-intestinală, pare a fi mediată de sinteza de TNF-alfa de către limfocitele T

- Celiachia este urmare a unui răspuns imun la glutenul din cereale *etc*

Food allergy: clinical manifestations

IgE **IgE/Non-IgE** **Non-IgE**



Urticaria/angioedema
Rhinitis /Asthma
Anaphylaxis

Atopic dermatitis

Protein-induced proctocolitis/enterocolitis

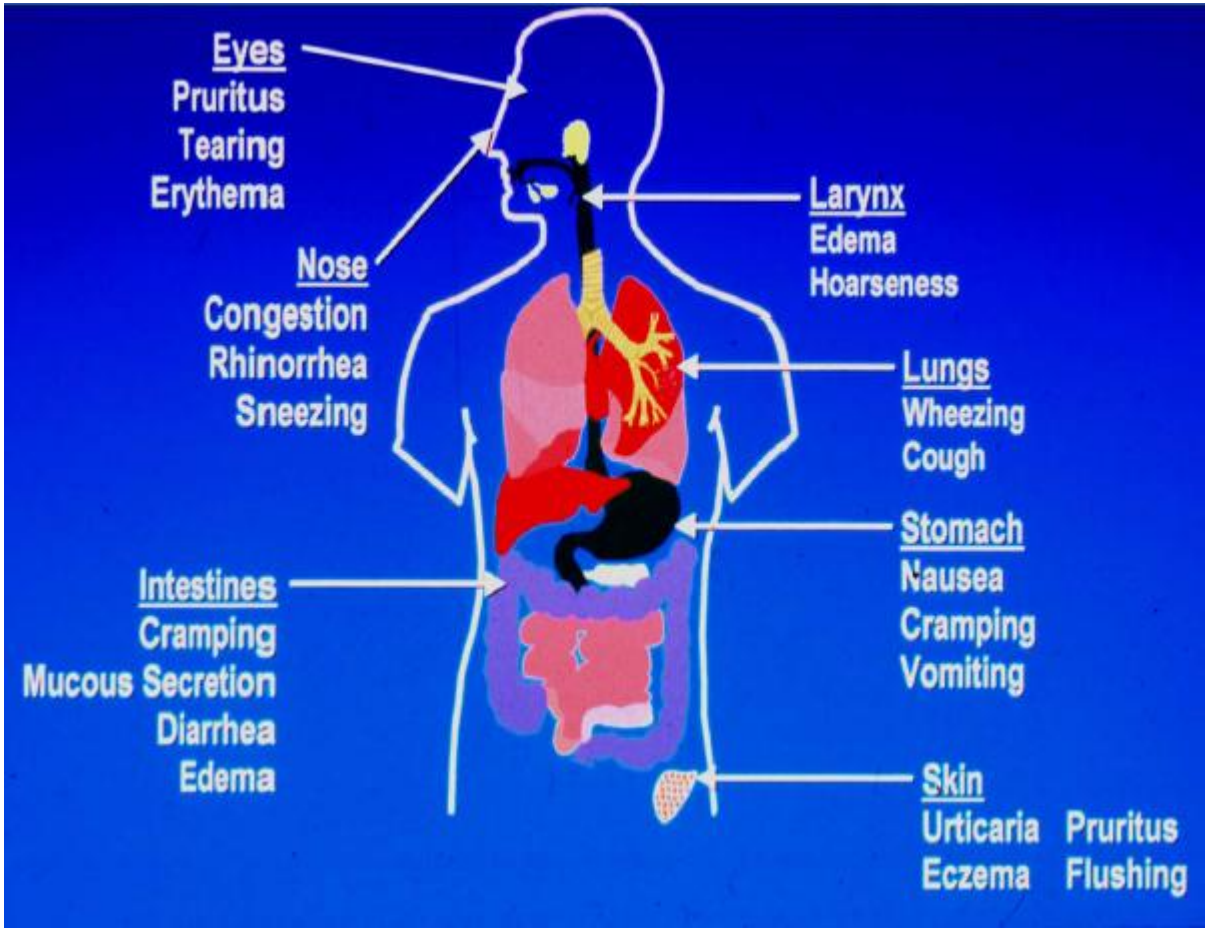
Oral allergic syndrome
Gastrointestinal symptoms (GIT)

Eosinophilic gastro-intestinal disorders

Celiac disease
Contact dermatitis
Herpetiform dermatitis
Heiner´s syndrome

Clinical manifestations of food allergy:

- cutaneous
- gastrointestinal
- respiratory
- systemic



Gastrointestinal manifestations

- Oral allergy syndrome
- Gastrointestinal anaphylaxis
- Allergic eosinophilic esophagitis
- Allergic eosinophilic gastroenteritis
- Proctocolitis to food proteins
- Enterocolitis to food proteins
- Enteropathy to food proteins, celiacia

Oral allergy syndrome (pollen–food related)

- A type of a cross-reaction
- IgE- mediated
- Affects about 40% of adults with pollen allergy
- Acute onset – oral pruritis, angioedema of mouth, tongue and throat after ingestion of fresh vegetables and fruits.
- Represents cross-reactivity between distant remnants of tree or weed pollen still found in certain fruits and vegetables and needs an initial respiratory sensitization to pollen which contains some proteins homogeneous with proteins from fruits and vegetablesa
- Positive history for seasonal allergic rhinitis

Cutaneous symptoms

- Urticaria/angioedema acut/cronic

- Atopic dermatitis

- Contact dermatitis (daily exposure to fresh fish, fresh meat, eggs or using latex gloves (medical staff)

- Dermatitis Herpetiformis

Respiratory symptoms

- Allergic rhinoconjunctivitis

- Bronhospasm after ingestion of small amounts of dood allergens

- Heiner syndrome (idiopathic pulmonary hemosiderosis) – a rare form of hemosiderosis due to cow's milk hypersensitivity .

➢ Clinical manifestations – recurrent pneumonias, pulmonary infiltrats, hemosiderosis, anemia, weight loss.

Diagnosis: history / examination

- History: symptoms, timing, reproducibility
  - Acute reactions vs chronic disease
- Diet details / symptom diary
  - Specific causal food/s
  - "Hidden" ingredient/s
- Physical examination: Evaluate disease severity
- Identify general approach
  - Allergy vs intolerance
  - IgE-mediated vs non-IgE mediated

Diagnosing food hypersensitivity disorders: IgE-mediated

- Identification and relationship with the food: Medical history
- To identify specific IgE: Skin tests/serum specific IgE
- To demonstrate that IgE sensitization is responsible for the clinical reaction: Controlled challenge tests
- Diagnosis is based on the medical history, supported by identification of specific IgE antibodies to the incriminated food allergen and confirmed by challenge

Adapted from Adverse Reactions to Foods Committee. Spanish Society of Allergy and Clinical Immunology Alergol Inmunol Clin 1999; 14: 50-62.

Diagnosing IgE-mediated food hypersensitivity disorders

Medical history: Symptoms

- Symptoms described by patient
- Length of time between ingestion and development of symptoms
- Severity of symptoms
- Frequency of symptoms
- Time from last episode

Diagnosing IgE-mediated food hypersensitivity disorders

Prick:	Reproducible, sensitive, not irritant
Prick-prick:	Use raw or cooked food. Highly recommended for fruits and vegetables (commercially prepared extracts are generally inadequate because of the lability of the allergens, so the fresh food must be used for skin testing)

Diagnosing IgE-mediated food hypersensitivity disorders

Skin tests

Intradermal: Not indicated

Atopy Patch test (APT): Atopic dermatitis, delayed reactions

Fresh food or dry food recommended

Non-standardized

Difficult to interpret

Specific IgE to food (CAP / Radioallergosorbent tests)

Sensitivity similar to skin prick tests

Good correlation with other procedures

Efficiency: Depends on the allergen

Indicated if SPT are contraindicated (eg, skin disease, medications)

Useful if discrepancy exists between history and SPT

The use of quantitative measurements has shown to be predictive, for some allergens, of symptomatic IgE-mediated food allergy

Food allergy: treatment

- Correct diagnosis
- Treatment of reactions
- Avoidance
- Role of dietician
- Tolerance assessment
- Prevention
- Immunotherapeutic strategies

Treatment emergency medicines

- Epinephrine: drug of choice for reactions
  - Self-administered epinephrine readily available
  - Train patients: Indications / technique

- Antihistamines: Secondary therapy

- Emergency plan in writing
  - Schools, spouses, caregivers, mature siblings / friends

- Emergency identification bracelet