Common Allergic Diseases

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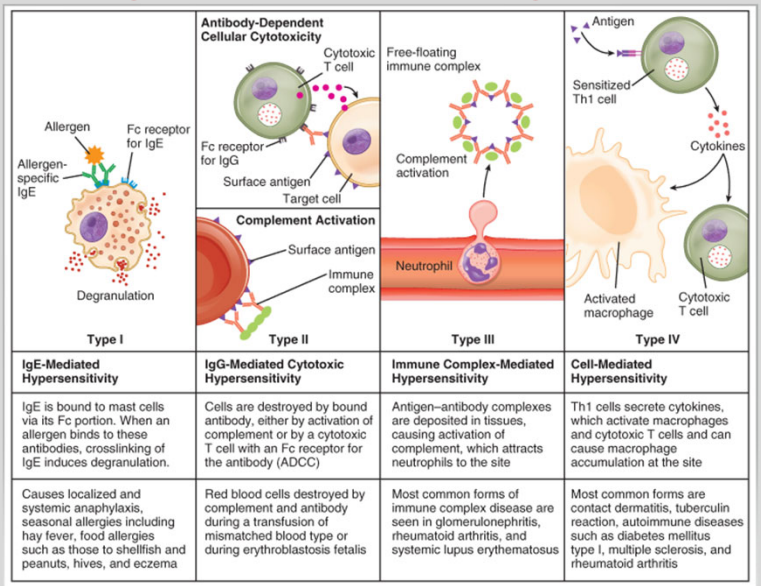
Objectives

- Review mechanisms of Allergy
- Discuss the approach to evaluation and treatment of rhinitis
- Examine food allergy vs food intolerance

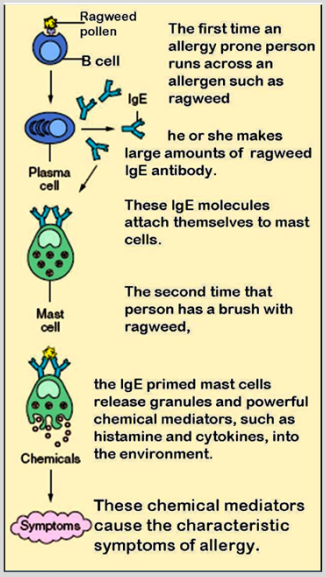
Immune Hypersensitivity



IgE-Mediated Hypersensitivity	IgG-Mediated Cytotoxic Hypersensitivity	Immune Complex-Mediated Hypersensitivity	Cell-Mediated Hypersensitivity
IgE is bound to mast cells via its Fc portion. When an allergen binds to these antibodies, crosslinking of IgE induces degranulation.	Cells are destroyed by bound antibody, either by activation of complement or by a cytotoxic T cell with an Fc receptor for the antibody (ADCC)	Antigen–antibody complexes are deposited in tissues, causing activation of complement, which attracts neutrophils to the site	Th1 cells secrete cytokines, which activate macrophages and cytotoxic T cells and can cause macrophage accumulation at the site
Causes localized and systemic anaphylaxis, seasonal allergies including hay fever, food allergies such as those to shellfish and peanuts, hives, and eczema	Red blood cells destroyed by complement and antibody during a transfusion of mismatched blood type or during erythroblastosis fetalis	Most common forms of immune complex disease are seen in glomerulonephritis, rheumatoid arthritis, and systemic lupus erythematosus	Most common forms are contact dermatitis, tuberculin reaction, autoimmune diseases such as diabetes mellitus type I, multiple sclerosis, and rheumatoid arthritis

OpenStax College - Anatomy & Physiology, Connexions Web site. http://cnx.org/content/col11496/1.6/, Jun 19, 2013

Cascade of an IgE-mediated Reaction



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Case Study - Rhinitis

- 58 year old female, works as an elementary school teacher
- Headaches, facial pressure, runny nose, postnasal drip, coughing
- Symptoms present for many years, feels like used to be seasonal, now all the time
- No relief from oral antihistamines
- Using nasal decongestant every day
- In the last two years, has been started on anti-hypertensive and statin medications

Case Study Continued

- Cat in the home for ten years
- Wall-to-wall carpeting
- Patient smokes cigarettes daily, not ready to quit
- Physical exam is notable only for enlarged nasal turbinates

Approach to Rhinitis

Congestion

Sneezing

Rhinorrhea

Pruritus of the nose, eyes, oral mucosa, or face

Headache

Feeling of facial fullness

Reduction in or loss of sense of smell

… is it allergic or non-allergic?

Allergic vs Non-allergic Rhinitis

- Allergic rhinitis
  - Seasonal or perennial
  - Diagnosis made by history and skin prick or serum testing
- Non-allergic
  - Seasonal or perennial
  - History with negative skin or serum testing
  - Many potential etiologies

Etiologies of Non-allergic Rhinitis

- Irritants or occupational exposures
- Fragrances, smoke, dust
- Barometric or humidity changes
- Gustatory (induced by eating)
- Exercise
- Pregnancy
- Aging
- Medications

None of these can be treated with allergy shots

Rhinitis Tips

- Allergic rhinitis most common in adolescents, young adults
  - Uncommon under two year of age
  - Less common in elderly
- Rhinitis that happens with all/many foods does not indicate allergy
- Referring physician does not need to order any testing prior to Allergy referral
  - Advise no antihistamines one week before allergy visit

Rhinitis Tips Continued

- If rhinitis is not responding to medications, consider obstructions → ENT referral
  - Purulent, unilateral drainage – think foreign body
  - Nasal turbinate hypertrophy
  - Sinusitis
  - Nasal polyps

Allergy Testing Key Points

- Start with the history
  - If not having allergy symptoms, do not test
- Allergy tests are not good screening tests
  - It's possible to be "sensitized" and not allergic
- Diagnosis of clinical allergy = history + testing
  - Symptoms of allergy with negative testing = non-allergic etiology

Relevant Allergens for Testing

- Seasonal Outdoor Allergens
  - Tree pollens (early spring)
  - Grass pollens (late spring to early summer)
  - Weed pollens (late summer to fall)
- Molds
- Perennial Indoor Allergens
  - Cat epithelium
  - Dog epithelium
  - Mouse urine
  - *House dust mites (Dermatophagoides farinae* or *D. pteronyssinus*)
  - Cockroach

Percutaneous Skin Prick Testing

- Skin testing is usually the preferred testing modality
  - Fast (15-30 minutes)
  - Safe
  - Minimally invasive
  - Cost-effective
- Results of skin test should always be used as an adjunct to the clinical history and physical examination when making the diagnosis of allergic disease

Serum Specific IgE Testing

- Can be done while patient is taking antihistamine
- Good option for dermatographic skin
- Good option if patient is taking immunosuppressing medications
- Generally less sensitive, but does give a quantitative result
- Generally more expensive
- Can be a good choice for checking a small number of allergens, such as cat or dog

Case Study - Testing

- Allergy skin prick testing described to patient
- Patient gave consent for testing for pollens, dust mites, fury animals and molds
- After 15 minutes, adequate controls were present
- There were positive reactions for oak tree, dust mite, and cat hair
- Mixed rhinitis – features of allergic and non-allergic rhinitis

Rhinitis Treatment Options

Brief/Rescue	Long-term	Specialty Care
Intranasal decongestant	Intranasal corticosteroid	Allergen immunotherapy
Intranasal antihistamine	Intranasal antihistamine	Surgical intervention
Intranasal anticholinergic		
Oral antihistamine	Oral antihistamine	
Oral decongestant	Oral leukotriene receptor antagonist	
Oral corticosteroids		

Allergen Immunotherapy (AIT)

Indications for AIT

- Allergic Rhinitis
- Allergic Asthma
- Atopic Dermatitis
- Stinging Insect Hypersensitivity

- History correlates with testing results
- Allergen avoidance or medications not effective
- Patient prefers AIT

Allergen Immunotherapy (AIT)

Contraindications for AIT

- Uncontrolled asthma or severely compromised lung function
- Unstable angina or recent myocardial infarction
- Uncontrolled hypertension

Relative Contraindications for AIT

- Current treatment with a beta blocker
- Unable to come to allergy office for injections weekly
- Pregnancy
- Young child

Allergen Immunotherapy

- Subcutaneous (SCIT)
  - given weekly, then monthly (3-5 years of treatment)
- Sublingual (SLIT)
  - FDA-approved tablets for ragweed, grass pollen and dust mites
  - Drops are not FDA approved
  - Administered at home daily
- Intralymphatic (ILIT)
  - Newer approach, injected directly into lymph node
  - Not FDA approved

Case Study - Treatment

- Allergen avoidance measures
- Stopping smoking could help greatly decrease rhinorrhea
- Very important to stop using nasal decongestant
- Natural aging, post-menopausal state and medications could be contributing to symptoms
- Start daily nasal corticosteroid
- Stop oral antihistamine because it isn't helping
- Return to allergy clinic in several months for reassessment
- Allergen Immunotherapy can be considered, but will not likely treat all symptoms

Rhinitis Take-home Points

- Rhinitis is not always caused by allergies.
- If allergy testing is negative, allergen immunotherapy will not be an effective treatment.
- Start treatment with a nasal corticosteroid or nasal antihistamine.
- If no improvement, use a combination of treatments and/or consider a referral.

Case Study – Food Adverse Reaction

- 42 year old female patient with concern about intermittent diarrhea and constipation
  - Symptoms present for about two years
  - Recent EGD/colonoscopy with no pathologic findings
- She previously experienced hives, lip swelling and difficulty breathing within minutes of eating peanut butter.
  - She continues to avoid peanuts, carries two epinephrine autoinjectors at all times.
  - Able to ingest cow's milk products, eggs, wheat, soy, and tree nuts without any immediate symptoms such as hives or wheezing
  - Vegetarian – doesn't eat meat, finned fish or shellfish
- No eye or rhinitis symptoms

Food Adverse Reactions

The term or diagnosis "food allergy" indicates an IgE-mediated reaction

The terms "food intolerance" or "food sensitivity" are much more common.

Treatments or interventions vary, depending on the cause of the food problem

IgE-Mediated Food Allery Symptoms

Cutaneous: Flushing, pruritus, urticaria, angioedema
Gastrointestinal: Nausea, abdominal pain, vomiting, diarrhea
Respiratory: Nasal pruritus, rhinorrhea, sneezing, throat tightness, dysphagia, shortness of breath, dyspnea, chest tightness, cough, wheeze
Cardiovascular: Faintness, hypotension, syncope, chest pain
Neurologic: impending sense of doom, blurred vision, seizure (rare),

Symptoms not associated with IgE

Persistent nausea, vomiting, diarrhea or constipation
Abdominal bloating
Headaches
Arthritis
Fatigue
Seizures or developmental disorders

Non-Immunologic Food Adverse Reactions

Toxic or Pharmacologic
- Food poisoning
- Effects of alcohol or caffeine
- Heavy metal poisoning

Non-Toxic/Intolerance
- Lactose intolerance
- Celiac disease or non-celiac gluten-intolerance
- Gustatory rhinitis
- Pancreatic insufficiency

Neither skin prick or sIgE serum testing is helpful in evaluation of non-IgE-mediated food conditions

Evaluation of Suspected Food Allergy

- Order based on history (do not screen for food allergies)
  - High risk of false positive results
- Skin prick testing or sIgE testing
- Graded Oral Food Challenge
  - Gold Standard for Diagnosis

Case Study – Food Testing

- Chronic diarrhea and constipation – not IgE-mediated, so neither skin prick nor serum sIgE testing indicated
- Peanut reaction was IgE-mediated, can consider repeat testing and food challenge
- Do not test for foods patient does not eat (meat, shellfish, fish)

Case Study – Food Testing

- Skin prick or serum sIgE testing will not help to identify potential causes for the patient's constipation or diarrhea
- Skin prick testing for peanut can be helpful to re-evaluate and make recommendations regarding peanut allergy
- Do not test for foods that the patient does not eat (meat, poultry, shellfish and finned fish)

Case Study – Testing Results

- The patient is happy to know that extensive food allergy testing is not needed. She is willing to try a food elimination eating plan.
- Skin prick testing was positive; the peanut wheal was 7mm in diameter with 30mm of surrounding erythema

Treatment of IgE-Mediated Food Allergy

- Allergen avoidance
- Education regarding reading labels, identifying allergen
- Advise patient to carry epinephrine autoinjectors and teach how to use
- Food Oral Immunotherapy (OIT) – currently being studied and used for treatment, mainly in children
- Omalizumab – recently FDA-approved for food allergy

Treatment of Food Allergy - Omalizumab

- FDA-approved children older than one year of age and adults for reduction of Type 1 food allergy reactions
- Omalizumab treatment is used in conjunction with food allergen avoidance
- Omalizumab inhibits binding of IgE to mast cells, IgE receptors are decreased, resulting in less allergen/antibody cross-linking
- While being treated with Omalizumab, allergy skin prick or sIgE serum testing will no longer be a valid marker for testing
  - Can test again after six months after stopping Omalizumab

Possible Interventions for Food Intolerances

- Food elimination eating plans
  - Low FODMAP
  - Decrease overall processed foods, additives, sugars
  - Plant-based diets
- Evaluation and counseling from a registered dietician

Key Points – Food Allergies and Intolerances

- Use history to guide food testing
- Food skin prick testing or sIgE testing does not identify food intolerances
- Food intolerance is better evaluated by food elimination eating plans
- If symptoms are concerning for anaphylaxis to a food, it is reasonable to prescribe epinephrine autoinjectors. Teach patient when/how to use and refer for further allergy evaluation.