Rhinitis, sinusitis, food and drug allergy, and allergic skin disorders [Part 1]

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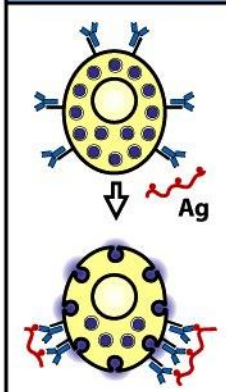
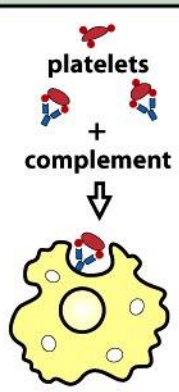
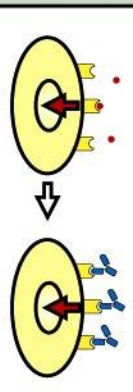
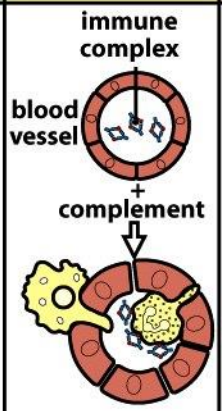
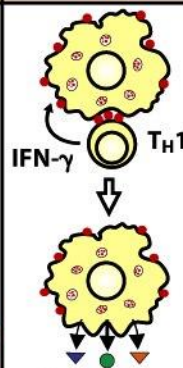
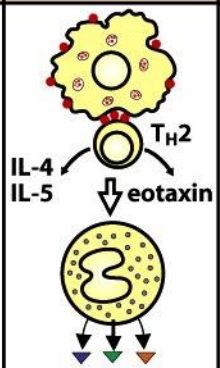
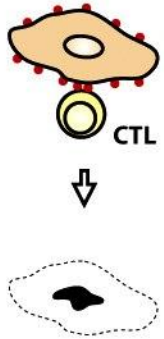
	Type I	Type II		Type III	Type IV		
Immune reactant	IgE	IgG		IgG	T_H1 cells	T_H2 cells	CTL
Antigen	Soluble antigen	Cell- or matrix-associated antigen	Cell-surface receptor	Soluble antigen	Soluble antigen	Soluble antigen	Cell-associated antigen
Effector mechanism	Mast-cell activation	Complement, FcR^+ cells (phagocytes, NK cells)	Antibody alters signaling	Complement, phagocytes	Macrophage activation	IgE production, eosinophil activation, mastocytosis	Cytotoxicity
							
Example of hypersensitivity reaction	Allergic rhinitis, asthma, systemic anaphylaxis	Some drug allergies (e.g. penicillin)	Chronic urticaria (antibody against FCεRIα)	Serum sickness, Arthus reaction	Contact dermatitis, tuberculin reaction	Chronic asthma, chronic allergic rhinitis	Graft rejection

Figure 13-1 Immunobiology, 7ed. (© Garland Science 2008)

The cell type that is important in Immediate Hypersensitivity is?

- A. T helper 1 cell
- B. T reg cell
- C. T helper 2 cell
- D. T 17 cell

- Ans:

The cell type that is important in Immediate Hypersensitivity is?

- A. T helper 1 cell
- B. T reg cell
- C. T helper 2 cell
- D. T 17 cell

- Ans: C

	Type I	Type II		Type III	Type IV		
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	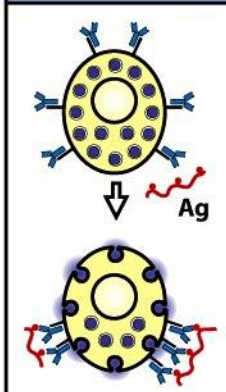	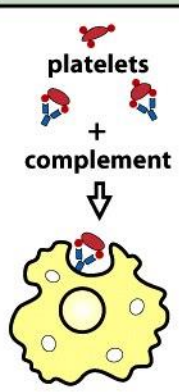	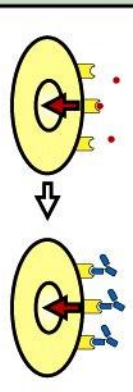	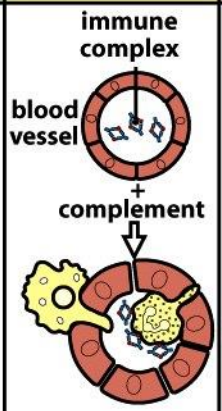	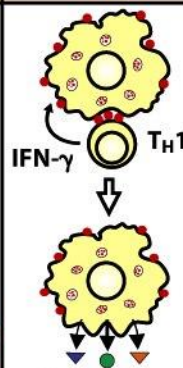	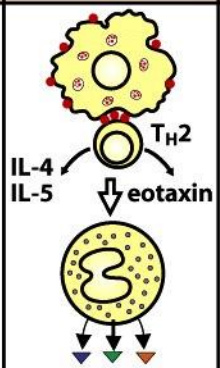	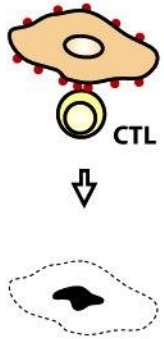
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Figure 13-1 Immunobiology, 7ed. (© Garland Science 2008)

The late phase of immediate hypersensitivity is mainly due to what cell?

- A. Neutrophils
- B. Eosinophils
- C. Mast cells
- D. T helper cells

- Answer:

The late phase of immediate hypersensitivity is mainly due to what cell?

- A. Neutrophils
- B. Eosinophils
- C. Mast cells
- D. T helper cells

- Answer: B

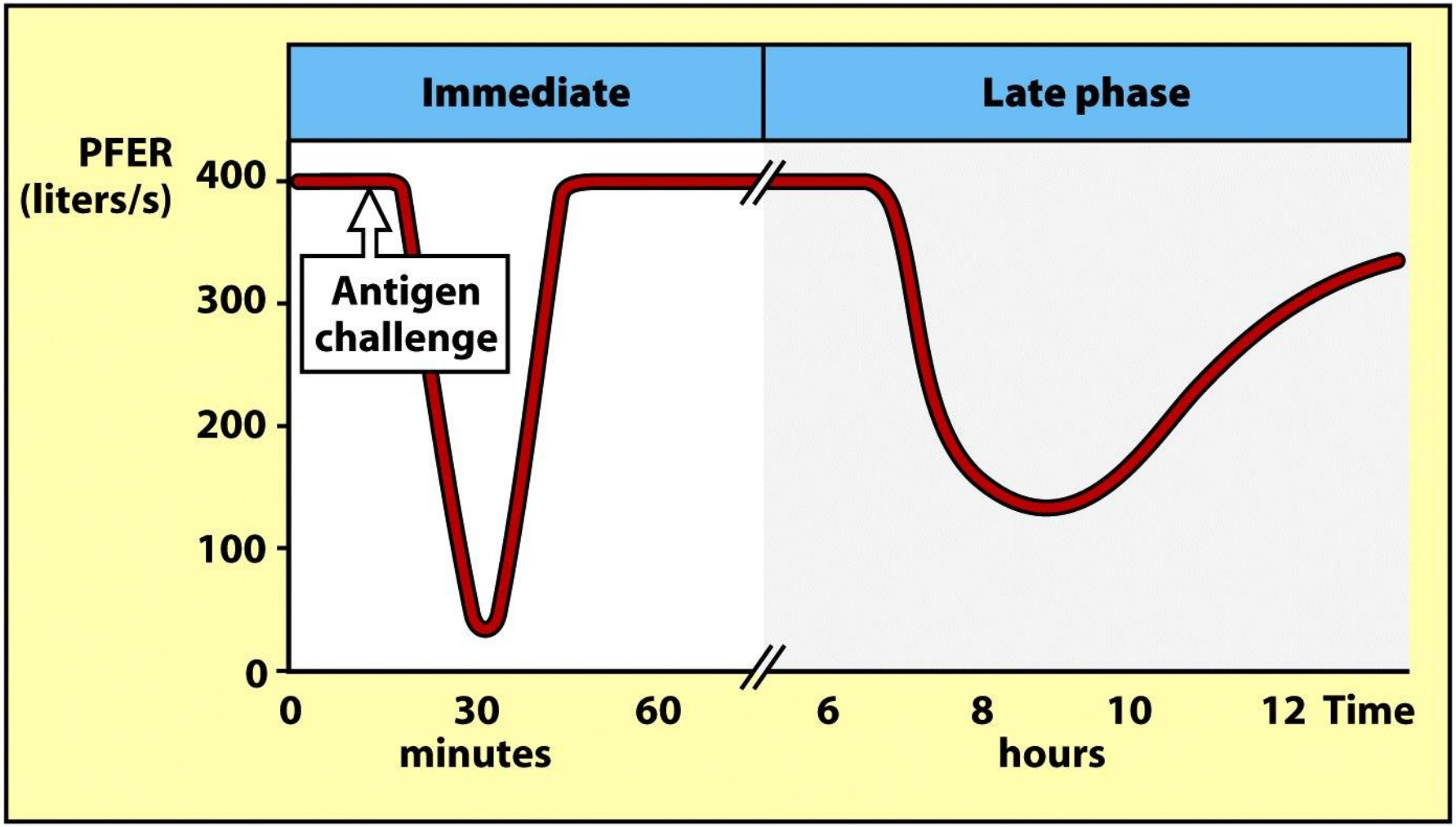


Figure 13-14 part 1 of 2 Immunobiology, 7ed. (© Garland Science 2008)

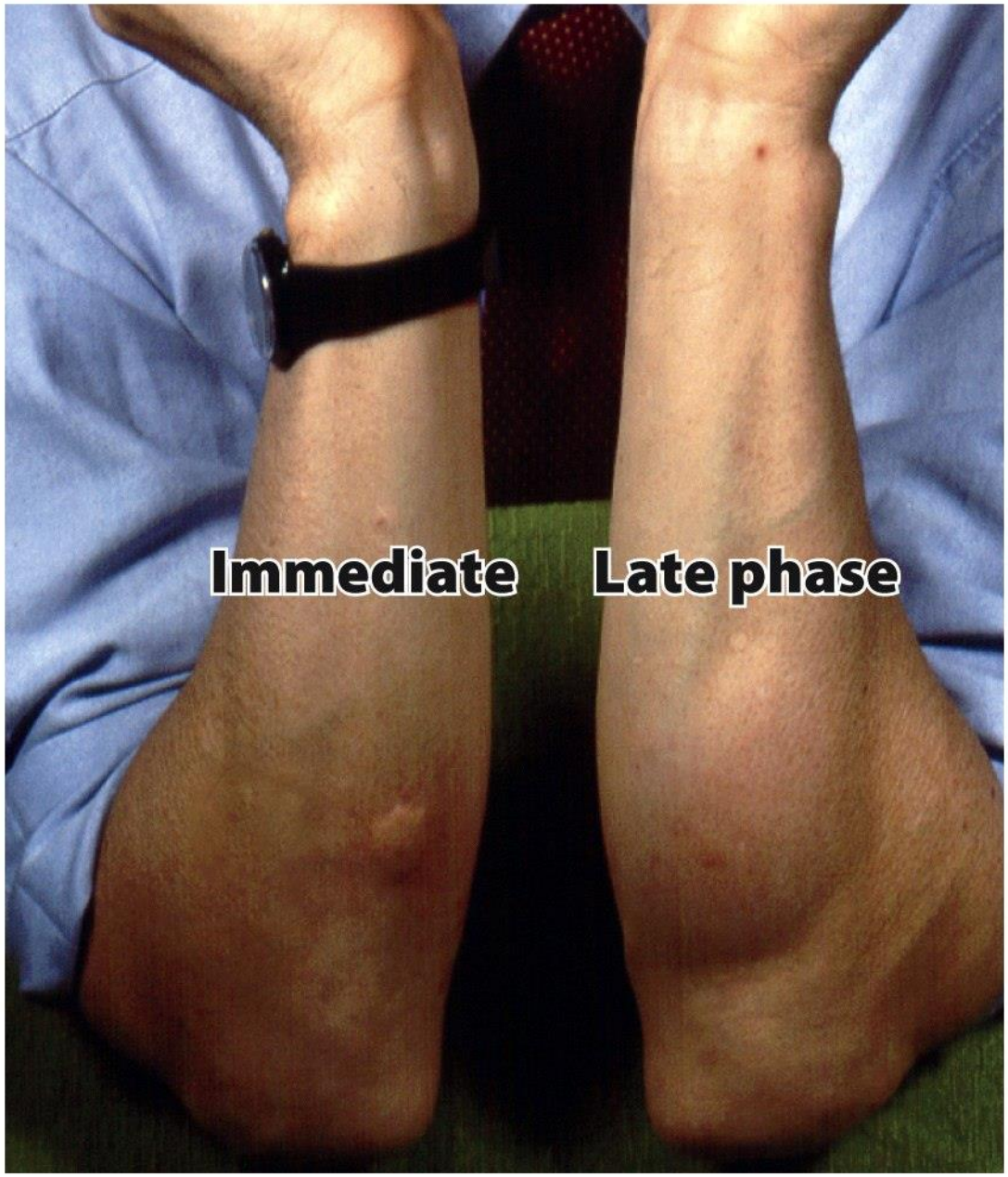


Figure 13-14 part 2 of 2 Immunobiology, 7ed. (© Garland Science 2008)

Allergic Rhinitis

- One of the most common diseases in the US
- Affects over 30-60 million Americans (20-30% of adults)
- Fifth most common chronic illness
- Sleep, physical and mental health status adversely affected
- Direct costs approximately over $5 billion/year
- Over 16 million office visits

American Academy of Allergy, Asthma, and Immunology. JACI 2008. Rhinitis Practice Parameter 2008

The most common allergen that people are allergic to outside of desert and mountain areas is?

- A. cat
- B. dog
- C. cockroach
- D. molds
- E. house dust mite

- ans

The most common allergen that people are allergic to outside of desert and mountain areas is?

- A. cat
- B. dog
- C. cockroach
- D. molds
- E. house dust mite

- Ans- E

Types of Allergic Rhinitis

- **Seasonal (intermittent) allergic rhinitis**
  - **IgE-mediated reaction of the nasal mucosa to one or more seasonal allergies**
    - **Generally less severe than perennial allergic rhinitis.**
    - **Itch #1 symptom**
- **Perennial (persistent) allergic rhinitis**
  - **IgE-mediated reaction to allergens that show little or no seasonal variation**
    - **Generally more severe and harder to treat than seasonal allergic rhinitis.**
    - **Congestion #1 symptom**

Ragweed

Tree pollen

Dust mites

Animal dander

The Allergy Report, vol. 1. Available at www.aaaai.org. Accessed 5/28/02.
Photos: DiscoveryHealth.com. Available at http://health.discovery.com. Accessed 6-2-02.

The most important spring allergen

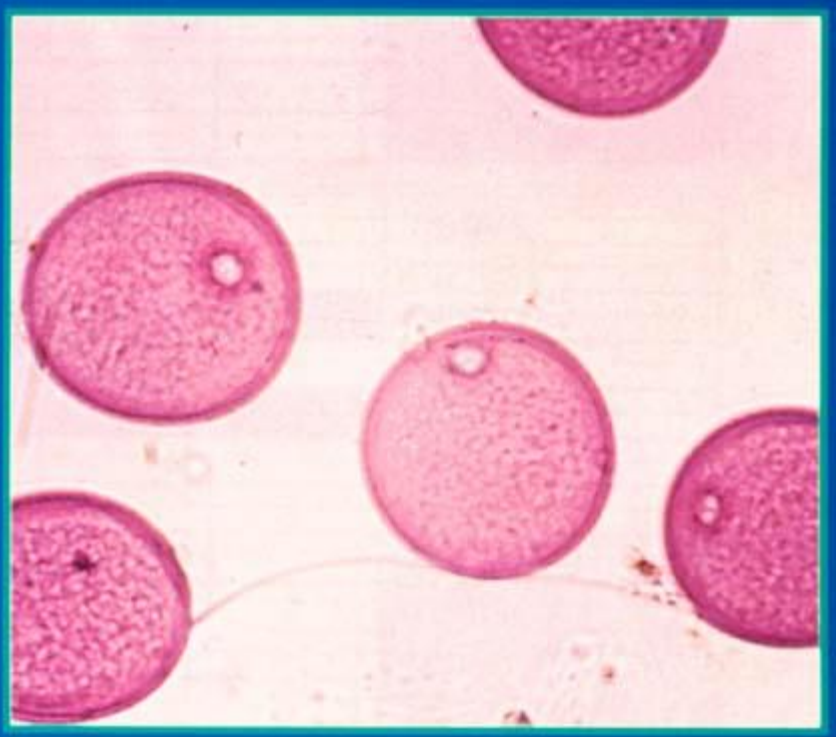
Tree pollen

Black Oak (Shown in Spring) & Oak Pollen (x 450)

The most important Summer allergen

Grass Pollen

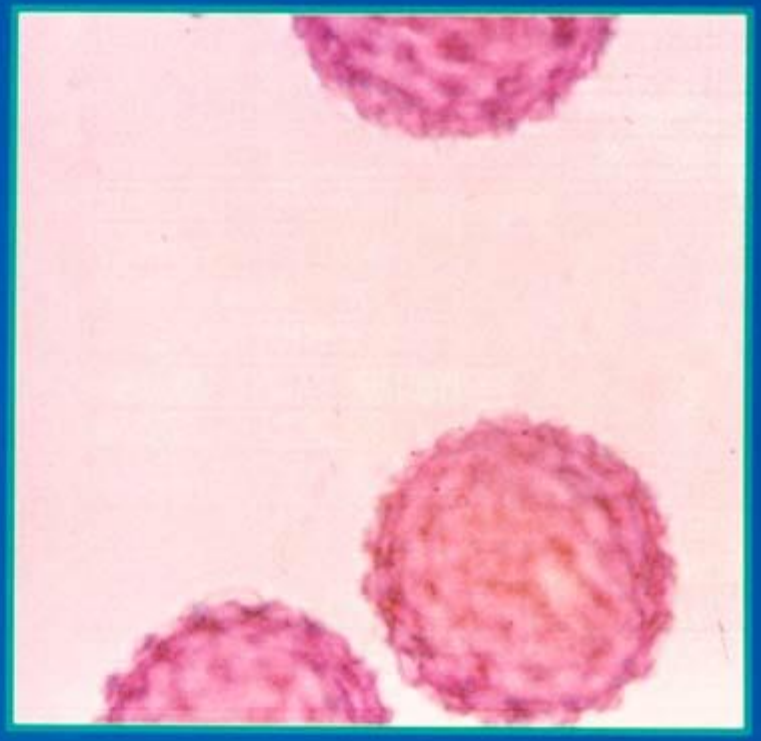
Timothy Grass & Pollen (x 450)



The most important fall allergens

Short Ragweed and Pollen (x 450)

Other weeds and mold spores such as Alternarnia are also important fall allergens



Major perennial allergens

- Dust mite
- Cat
- Dog
- Indoor molds such as penicillium and aspergillus

In a patient with active allergic rhinitis a smear of the nasal secretions will demonstrate which cells?

- A. neutrophils
- B. T-cells
- C. plasma cells
- D. eosinophils
- E. epithelial cells

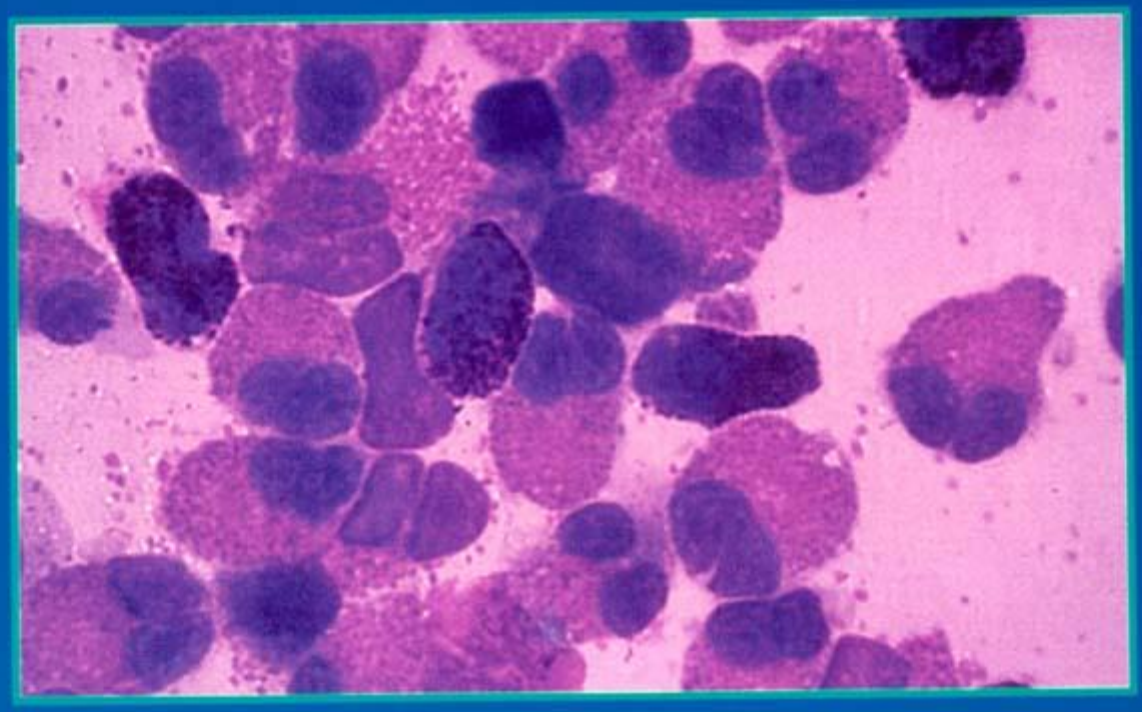
- Ans:

In a patient with active allergic rhinitis a smear of the nasal secretions will demonstrate which cells?

- A. neutrophils
- B. T-cells
- C. plasma cells
- D. eosinophils
- E. epithelial cells

- Ans: D

Nasal Smears for Eosinophils, Basophils, and Neutrophils

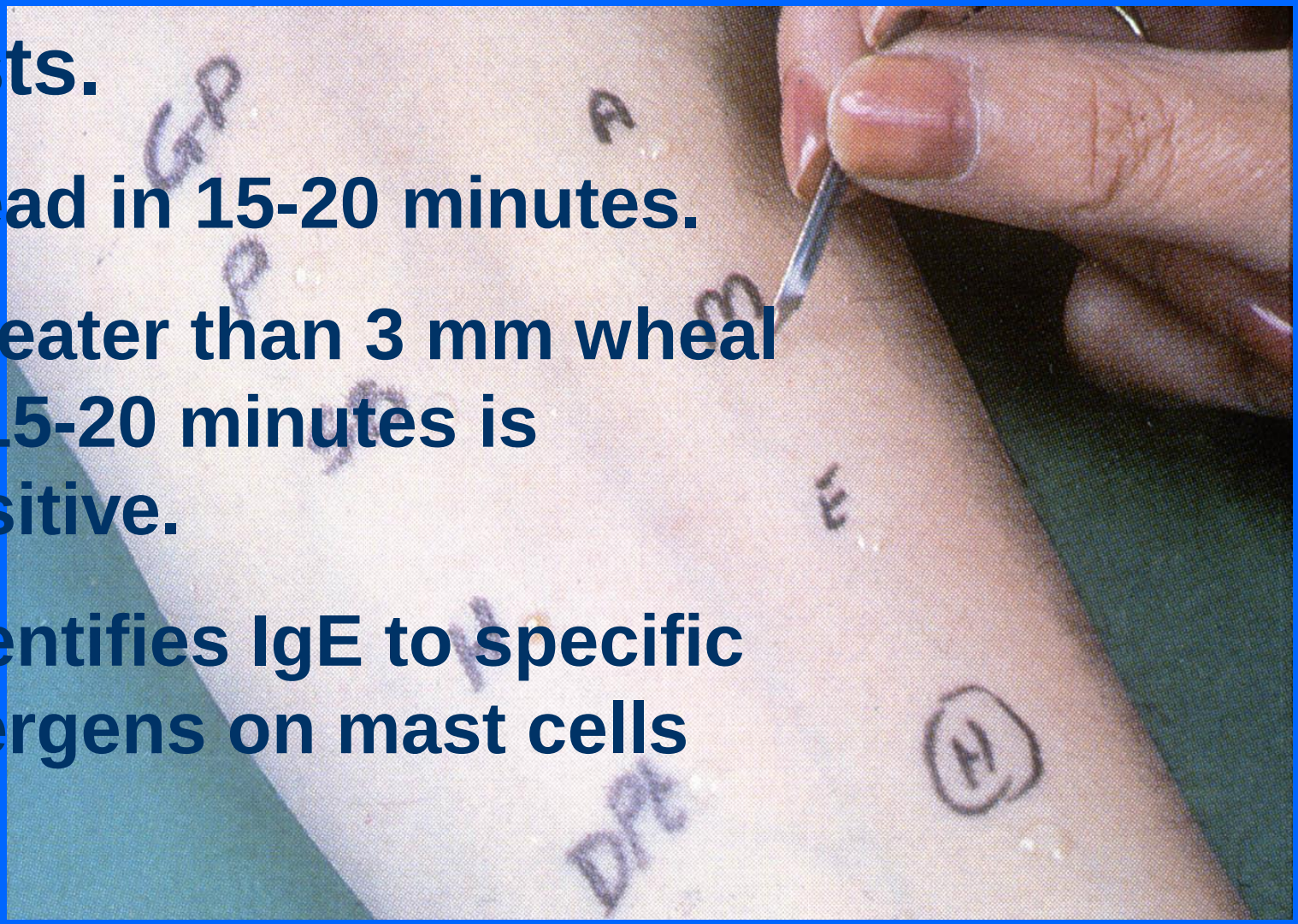


IgE mediated skin tests.

-Read in 15-20 minutes.

-Greater than 3 mm wheal at 15-20 minutes is positive.

-Identifies IgE to specific allergens on mast cells



Jackson WF. A Color Atlas of Allergy, 1988.

Skin Testing

•Prick	•Intradermal	•In Vitro IgE testing
•Most common	•More reproducible	•Very expensive
•Less risk	•More risk	•Difficult to interpret
•Less sensitive •More specific	•More sensitive •Less specific	•About equal in sensitivity and specificity with skin testing

An indication for IgE skin testing is?

- A. TB
- B. Sulfur allergy
- C. Bee sting allergy
- D. ASA sensitivity

- Answer:

An indication for IgE skin testing is?

- A. TB
- B. Sulfur allergy
- C. Bee sting allergy
- D. ASA sensitivity

- Answer: C

IgE Skin Testing

Indications:

- Asthma
- Allergic rhinitis
- Food allergy
- Drug allergy
- Bee sting/fire ant allergy
- Eczema
- Eosinophilic esophagitis

The highest risk for death from anaphylaxis to allergy vaccine or skin testing is?

- A. Severe asthma
- B. Bee sting anaphylaxis
- C. Autoimmune disease
- D. Pregnancy

- Answer:

The highest risk for death from anaphylaxis to allergy vaccine or skin testing is?

- A. Severe asthma
- B. Bee sting anaphylaxis
- C. Autoimmune disease
- D. Pregnancy

- Answer: A

A 22 year old patient has severe asthma and rhinitis. His FEV1 is 55% predicted. What test is contraindicated?

- A. Skin testing
- B. DLCO
- C. Spirometry
- D. eNO (exhaled nitric oxide test)
- E. Lung volumes with helium

- Ans:

A 22 year old patient has severe asthma and rhinitis. His FEV1 is 55% predicted. What test is contraindicated?

- A. Skin testing
- B. DLCO
- C. Spirometry
- D. eNO (exhaled nitric oxide test)
- E. Lung volumes with helium

- Ans: A

Skin testing contraindications

- Unstable asthma
- Dermatographia
- Past anaphylaxis
- Non-selective beta-blockers
- FEV-1 below 70% predicted
- Pregnancy
- Severe eczema
- Unable to treat anaphylaxis

The best therapy for congestion associated with rhinitis is?

- A. topical cromolyn
- B. cetirizine
- C. montelukast
- D. topical fluticasone
- E. topical azelastine

- Answer:

The best therapy for congestion associated with rhinitis is?

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- D. topical fluticasone
- E. topical azelastine

- Answer: D

Treatment Considerations in Allergic Rhinitis: ARIA Guidelines

	Congestion	Rhinorrhea	Itching/ Sneezing	Eye Symptoms
Intranasal steroids	+++	+++	++/+++	++
Oral antihistamines	+	++	+++/++	+++
Intranasal antihistamines	++	++	++/++	++
Oral decongestants	++	-	-/-	-
Intranasal decongestants	++++	-	-	-
Intranasal cromones	+	+	+/+	-
Anticholinergics	-	+++	-/-	-
Antileukotrienes	++	+	-/-	++

Unique Dx Indications for Rx

- Perennial
- Non-allergic

- Intranasal steroid
- Intranasal steroid
- Topical antihistamine
- Ipratropium
- Chromolyn
- NS oral antihistamine

- Gustatory
- Pre-exposure allergic
- Mild Seasonal allergic

- With asthma
- Severe allergic rhinitis

- Montelukast
- Intranasal steroid

Unique symptom indication for Rx

- Congestion
- Itchy mucosa
- Excess secretions

- Nasal steroid
- Antihistamine
- Nasal steroids
- Topical antihistamine
- Anticholinergics

- Severe symptoms
- Poor sleep
- Uncontrolled with medications

- Nasal steroids
- Nasal steroids
- Immunotherapy

Immunotherapy is indicated in?

- 1. Eosinophilic esophagitis
- 2. Urticaria
- 3. Sinusitis
- 4. Asthma
- 5. Hypersensitivity Pneumonitis

- Ans

Immunotherapy is indicated in?

- 1. Eosinophilic esophagitis
- 2. Urticaria
- 3. Sinusitis
- 4. Asthma
- 5. Hypersensitivity Pneumonitis

- Ans 4

26 year old with rhinitis and asthma is 8 weeks pregnant. Which below would you discontinue from her regimen?

- A. immunotherapy
- B. fluticasone nasal spray
- C. cetirizine
- D. oral decongestant
- E. montelukast

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- C. cetirizine
- D. oral decongestant
- E. montelukast

- Ans- D

Immunotherapy

Indications:

- Asthma
- Allergic conjunctivitis
- Bee allergy
- Fire ant allergy
- Allergic rhinitis
- Drug allergy
- Atopic Dermatitis

Contraindications:

- Unstable asthma
- FEV-1 below 70%
- PF below 70%
- Anaphylaxis
- Unable to Rx anaphylaxis
- Non-selective Beta blockers
- Build-up- during pregnancy

How long should a patient stay on allergy immunotherapy?

- A. 1-2 year
- B. 2-3 years
- C. 3-5 years
- D. 5-10 years

- Answer

How long should a patient stay on allergy immunotherapy?

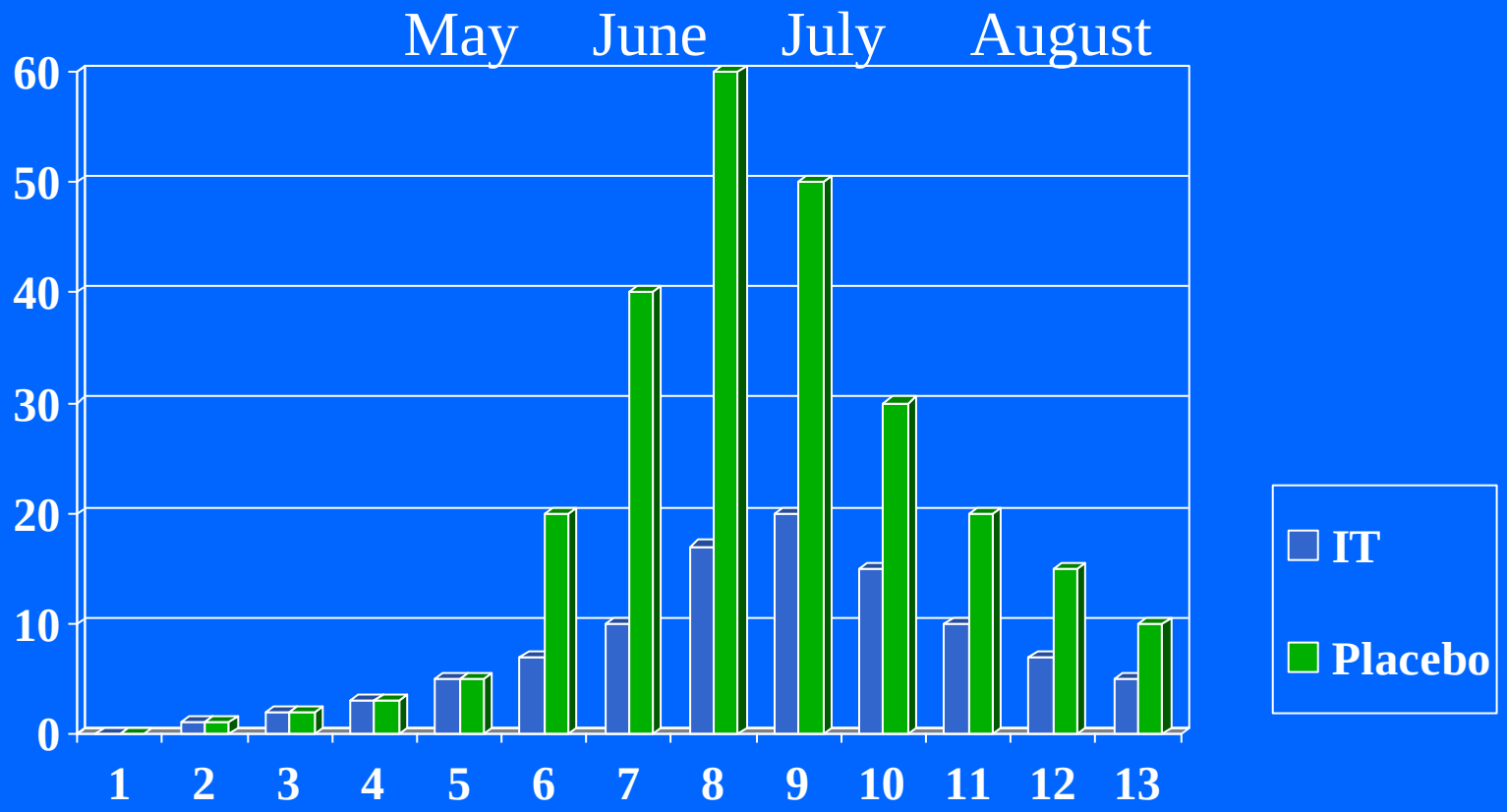
- A. 1-2 year
- B. 2-3 years
- C. 3-5 years
- D. 5-10 years

- Answer C

Allergy Vaccine in Allergic Rhinitis

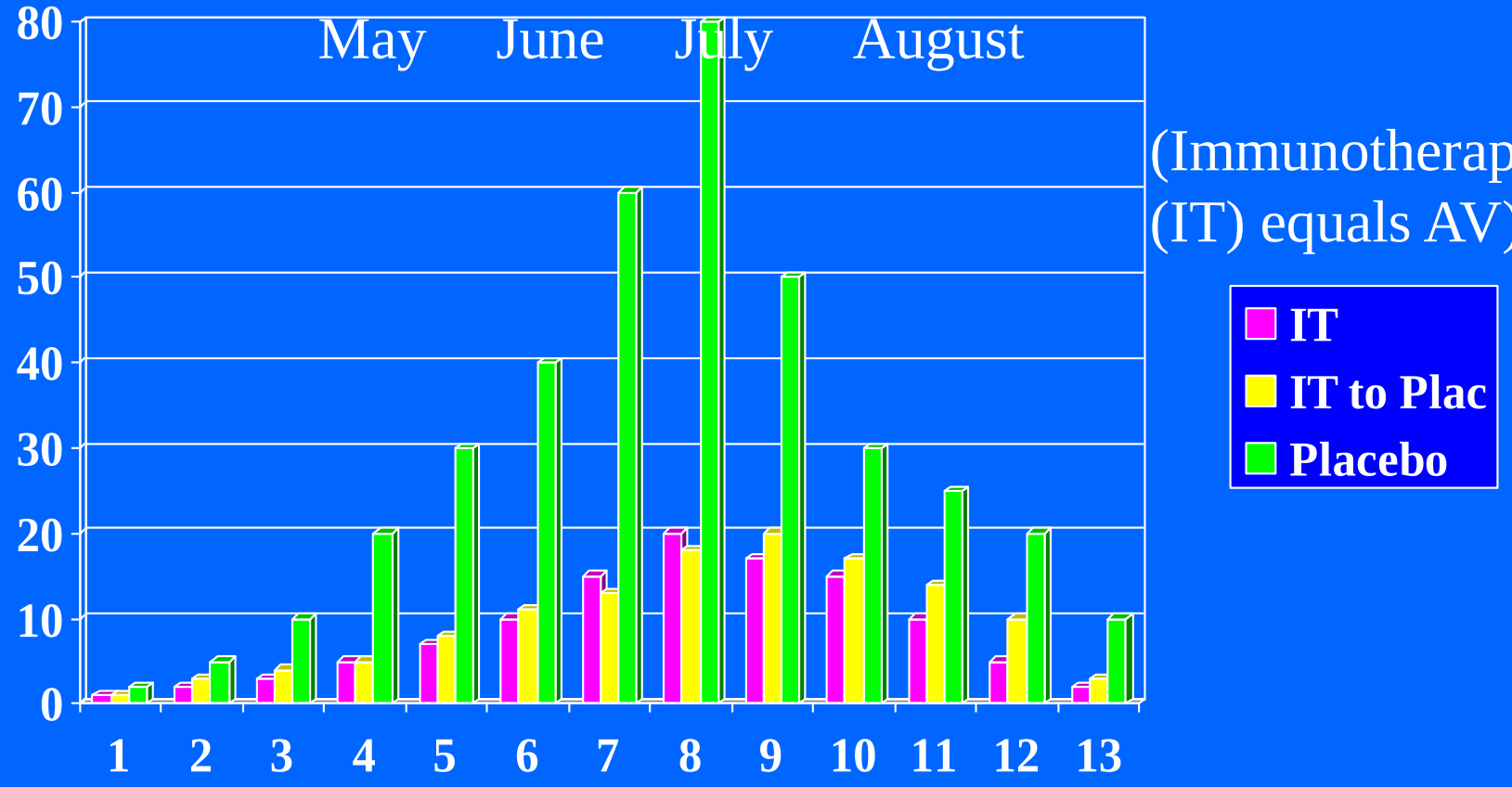
(Durham et al. NEJM 1999;341;468)

After treatment with allergy vaccine (AV) for 3 years



Symptoms scores in grass allergic patients during grass pollen season on AV vs. placebo during weeks 1 to 13 of the grass season.

Allergy Vaccine (AV) in Allergic Rhinitis or Asthma after 6 years on placebo, 3 years of AV followed by 3 years of placebo, or 6 years of AV (Durham et al. NEJM 1999;341;468)



Symptom scores in grass allergic patients during grass pollen season on AV vs. placebo during weeks 1 to 13 of grass season.

Allergic Conjunctivitis

- intranasal corticosteroids, oral antihistamines, and intranasal antihistamines have similar effectiveness in relieving ocular eye symptoms associated with rhinitis.
- Topical antihistamines with mast cell stabilization for the eye are the preferred agents

Drug-induced rhinitis may be caused by a number of medications

- angiotensin-converting enzyme
- phosphodiesterase-5–selective inhibitors
- phentolamine,
- beta- blockers
- ASA and nonsteroidal anti-inflammatory drugs (NSAIDs).

Rhinitis medicamentosa is a syndrome of rebound nasal congestion
- adrenergic decongestants
- cocaine

Cerebral spinal fluid rhinorrhea

- Refractory clear rhinorrhea
- Usually unilateral
- History of recent trauma or surgery

The presence of b-2-transferrin or glucose in the nasal secretions is a sensitive method of confirming cerebral spinal fluid rhinorrhea.

The true statement about sinusitis is?

- A. Clinicians continue to overprescribe antibiotics for acute sinusitis
- B. there is a lack of efficacy of intranasal corticosteroids in sinusitis
- C. Antibiotics are usually effective for chronic sinusitis
- D. Antibiotics are necessary for most cases of acute sinusitis

- ANS:

The true statement about sinusitis is?

- A. Clinicians continue to overprescribe antibiotics for acute sinusitis
- B. there is a lack of efficacy of intranasal corticosteroids in sinusitis
- C. Antibiotics are usually effective for chronic sinusitis
- D. Antibiotics are necessary for most cases of acute sinusitis

- ANS: A

The most common organism in acute sinusitis is?

- A. Staph
- B. Pneumococcal
- C. Rhinovirus
- D. Beta strep

- Answer:

The most common organism in acute sinusitis is?

- A. Staph
- B. Pneumococcal
- C. Rhinovirus
- D. Beta strep

- Answer: C

First line agent for acute bacterial sinusitis is?

- A. SMX-TMP
- B. amoxicillin
- C clarithromycin
- D. Azithromycin
- E. amoxicillin with clav

- Ans:

First line agent for acute sinusitis is?

- A. SMX-TMP
- B. amoxicillin
- C clarithromycin
- D. Azithromycin
- E. amoxicillin with clav

- Ans: B or E

- *Streptococcus pneumoniae, Haemophilus influenzae, Moraxella catarrhalis*
- 33-44% of *H influenzae* and almost all of *M catarrhalis* strains have beta-lactamase–mediated resistance
- 64% of *S pneumoniae* strains are penicillin resistant
- Empiric therapy is amoxicillin with clav

- Chow AW, Benninger MS, Brook I, Brozek JL, Goldstein EJ, Hicks LA, et al. IDSA Clinical Practice Guideline for Acute Bacterial Rhinosinusitis in Children and Adults. *Clin Infect Dis*. Apr 2012;54(8):e72-e112.

Acute Sinusitis

- Most cases resolve without therapy
- nasal steroids, decongestants and saline lavage are first line therapy
- Refractory disease- Augmentin or doxycycline if penicillin allergic

Chronic sinusitis

- Chronic - anaerobes
  - staph
  - mixed cultures
  - allergic fungal sinusitis
  - inflammatory

Question if antibiotics help in chronic sinusitis

Nasal polyps in an adult suggests?

- A. sensitivity to ASA
- B. cystic fibrosis
- C. maxillary sinusitis
- D. ciliary dyskinesia

- Answer:

Nasal polyps in an adult suggests?

- A. sensitivity to ASA
- B. cystic fibrosis
- C. maxillary sinusitis
- D. Cilia dyskinesia

- Answer: a

Nasal Polyps

- NARES (non-allergic rhinitis with eosin)
- eosinophils in nasal secretions
- 15% ASA sensitivity
- 25% develop asthma
- treat nasal steroids, montelukast, ASA desensitization
- youth with polyps- Cystic Fibrosis
- adult- ASA sensitivity, CF, cilia defect

ASA sensitivity

- Non-IgE,
- Inhibits cyclooxygenase with a decrease in PG-E2, increase leukotrienes
- Asthma (15%)
- avoid ASA in severe asthma and those with nasal polyps (40% if polyps + asthma)
- Samter's Triad- ASA sensitivity, nasal polyps, chronic sinusitis, rhinitis and asthma
- also can trigger angioedema, eye and nose symptoms

ASA sensitivity

- Rx: avoid ASA and NSAID
- may use acetaminophen below 1000 mg, and COX-2-inhibitors
- acetaminophen – at high doses cross reacts in extreme ASA sensitivity
- May desensitize, which may improve asthma, rhinitis, sinusitis and nasal polyps, but must remain on ASA or NSAID indefinitely.

- For questions or concerns please contact me at 717-531-6525 or Email me at tcraig@psu.edu
- Good luck with your boards!