LMU DeBusk College of Osteopathic Medicine
LINCOLN MEMORIAL UNIVERSITY

FARRAGUT ENT & ALLERGY

Allergies and the Primary Care Practice

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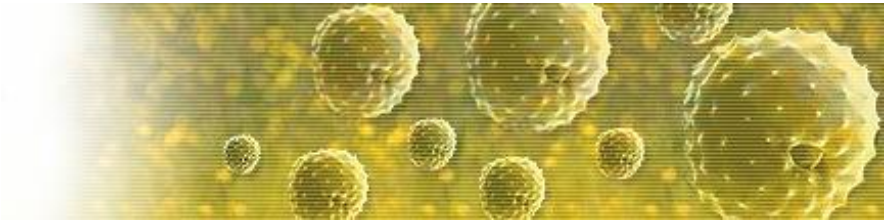
Dr. Mark Gurley- Disclosure

Neither I, nor an immediate family member (parent, sibling, spouse, partner, or child), has any financial relationship with or interest in any commercial interest connected with this presentation



INTRODUCTION TO ALLERGY

DIAGNOSIS AND TREATMENT

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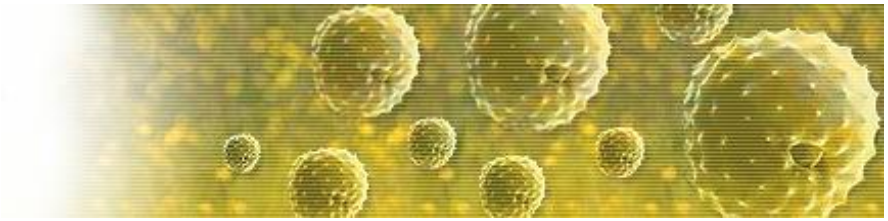
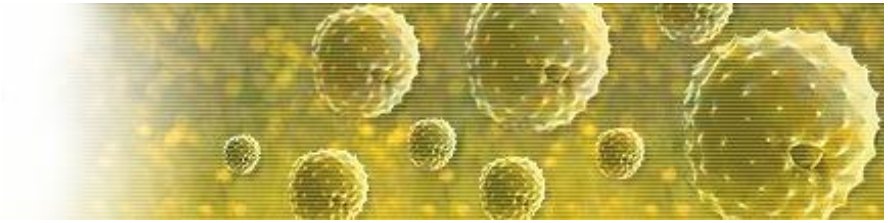
Objectives



- To introduce the concept of allergy
- To briefly review the immune response
- To discuss common physical manifestations of allergic disease
- Be better able to answer: is this allergy?



Introduction to allergy and immunity

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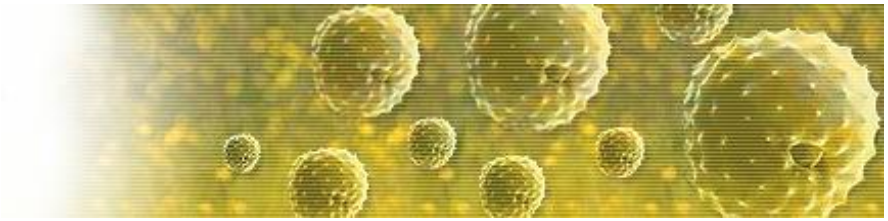
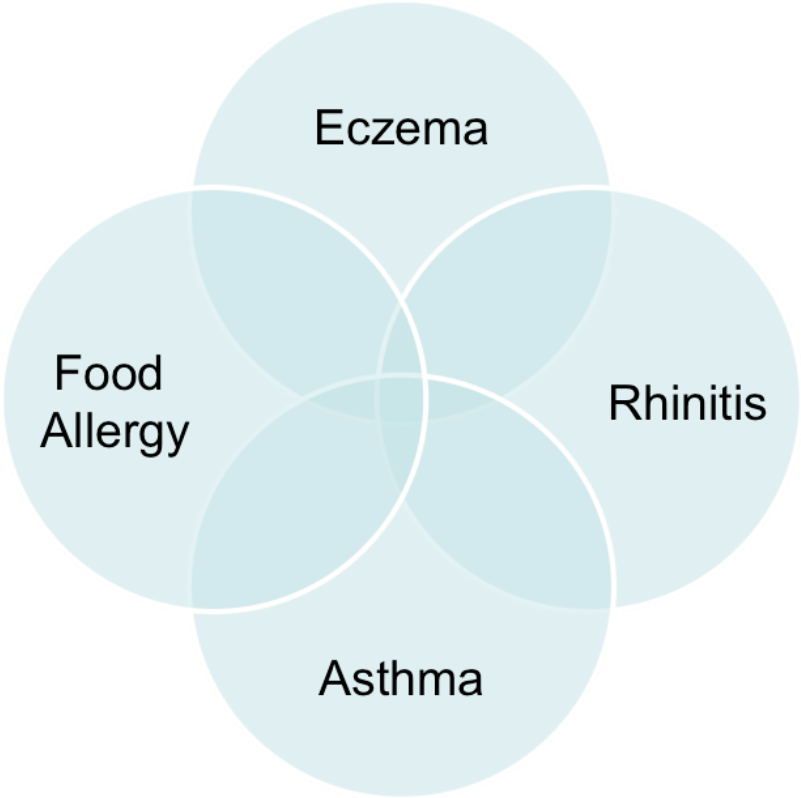
What is Allergy?



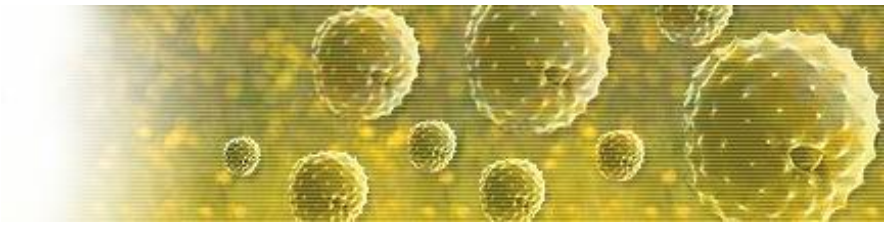
- Allergy: **altered reactivity to a foreign substance after prior exposure, whether helpful or harmful to host** (von Pirquet 1906)
- Allergies are generally triggered by protein molecules
  - Chemical or drugs that attach to proteins (haptens) can also be allergic
- Allergy can occur to substances that
  - You breathe in
  - You eat
  - Come in contact with your skin or eyes
  - You inject

Atopy



- GENETIC PREDISPOSITION TO DEVELOP ALLERGY
- Cluster in individuals and families
- Tends to be associated with elevated Total IgE

The Atopic March

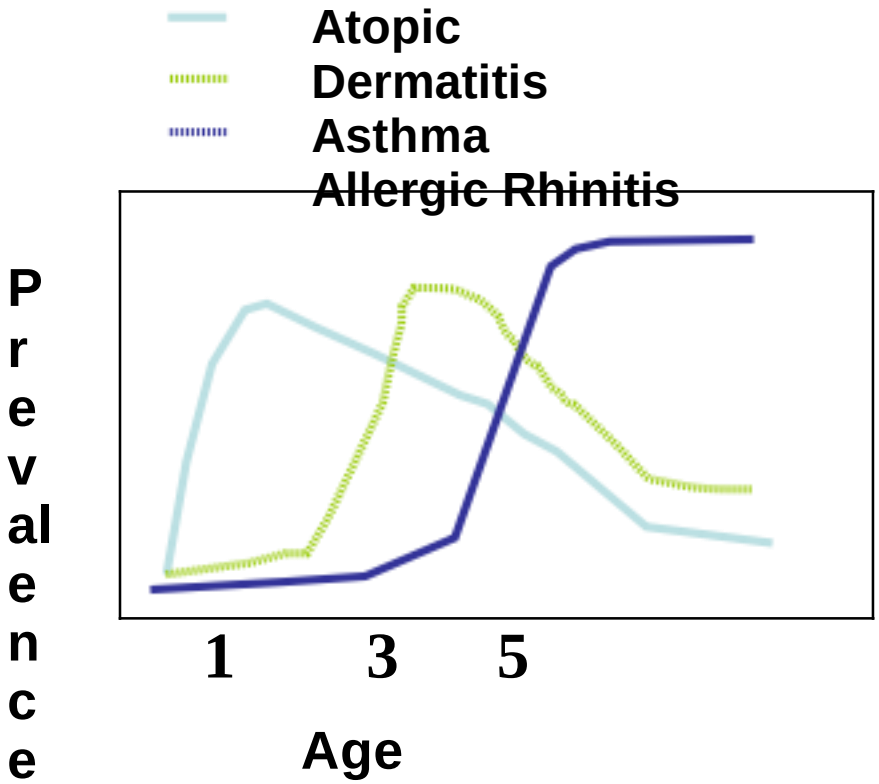


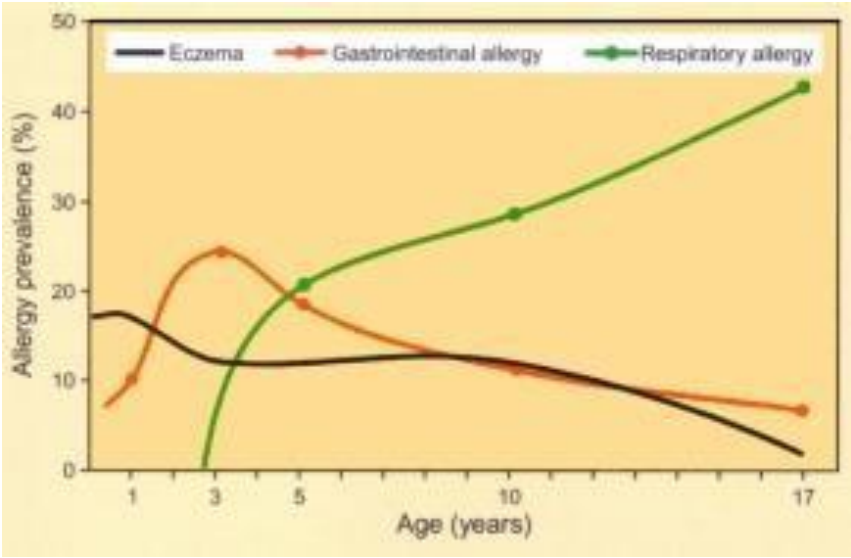
- Atopic dermatitis in infancy
- Proposed defects in the epidermal barrier
- Skin and gut as primary sensitization sites
- Followed by asthma and allergic rhinitis later in childhood

Atopy as a Function of Age

"atopic march"

(if AD, 30% later develop Asthma & 35% AR)





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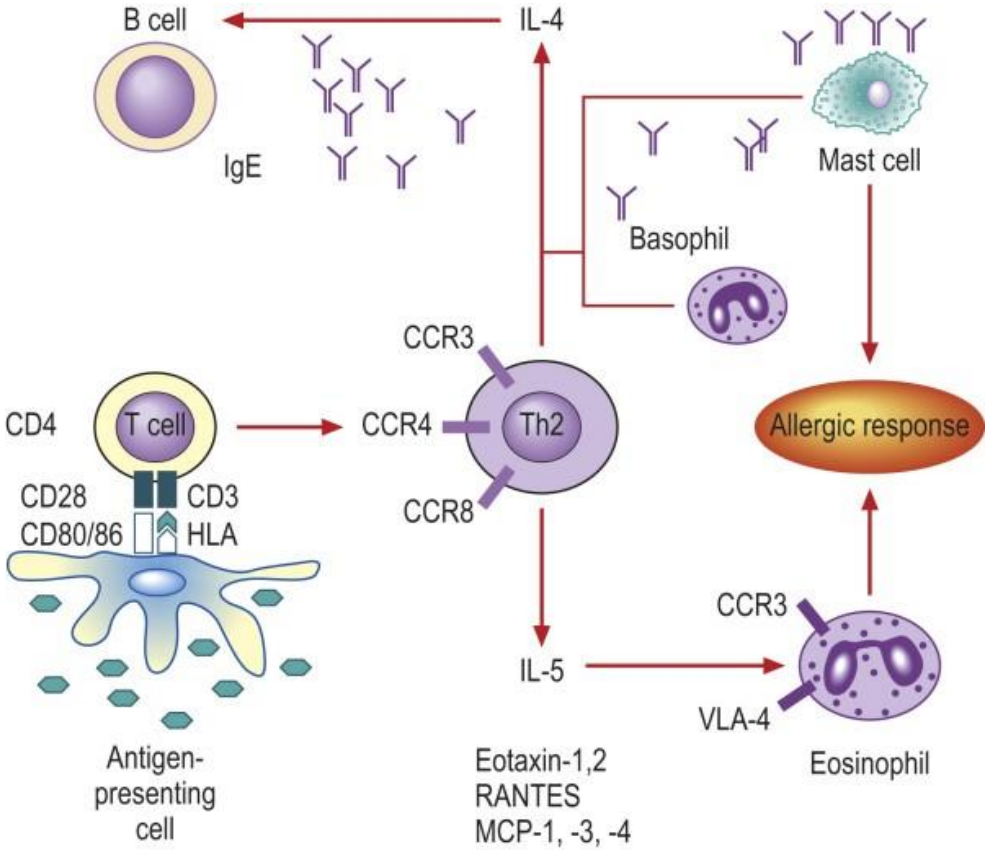
Adapted from Spergel J, Paller A. J Allergy Clin Immunol. 2003;112:S118-S127

Allergic Response



http://www.youtube.com/watch?v=UfLAwO4_NTQ

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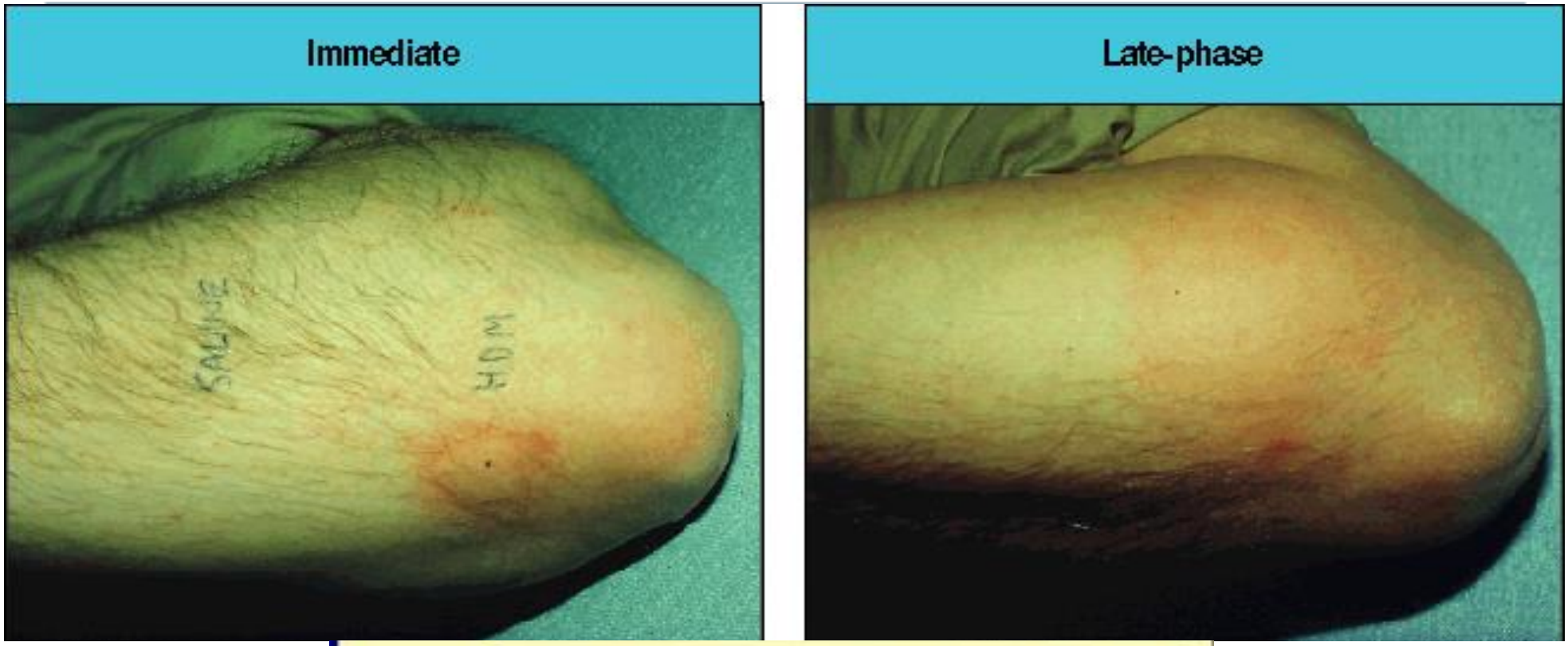
Adkinson NF et al (eds): Middleton's Allergy (7th ed). Mosby Elsevier. Phil. 2009 Kay A. NEJM. 2001;344:30-37

Acute Phase (Immediate) & Late Phase (Delayed) Responses



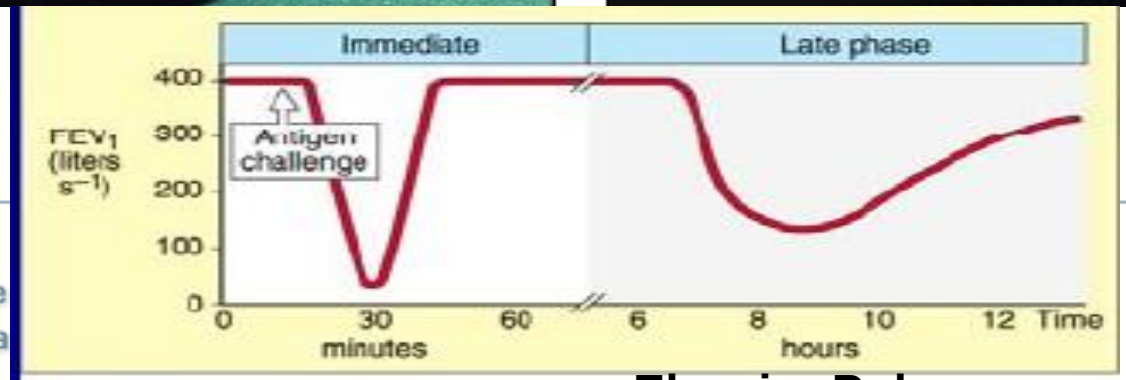


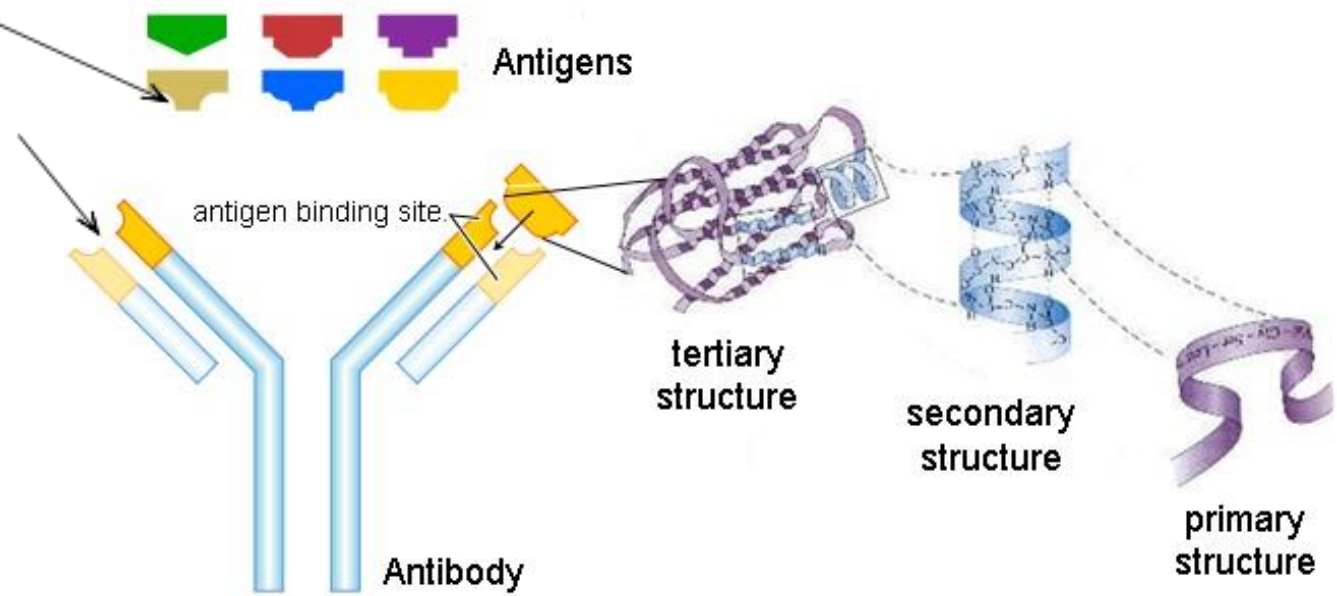
Fig 12.14 © 2001 Garland Science

Elsevier Pub.

The Ame
of Otola

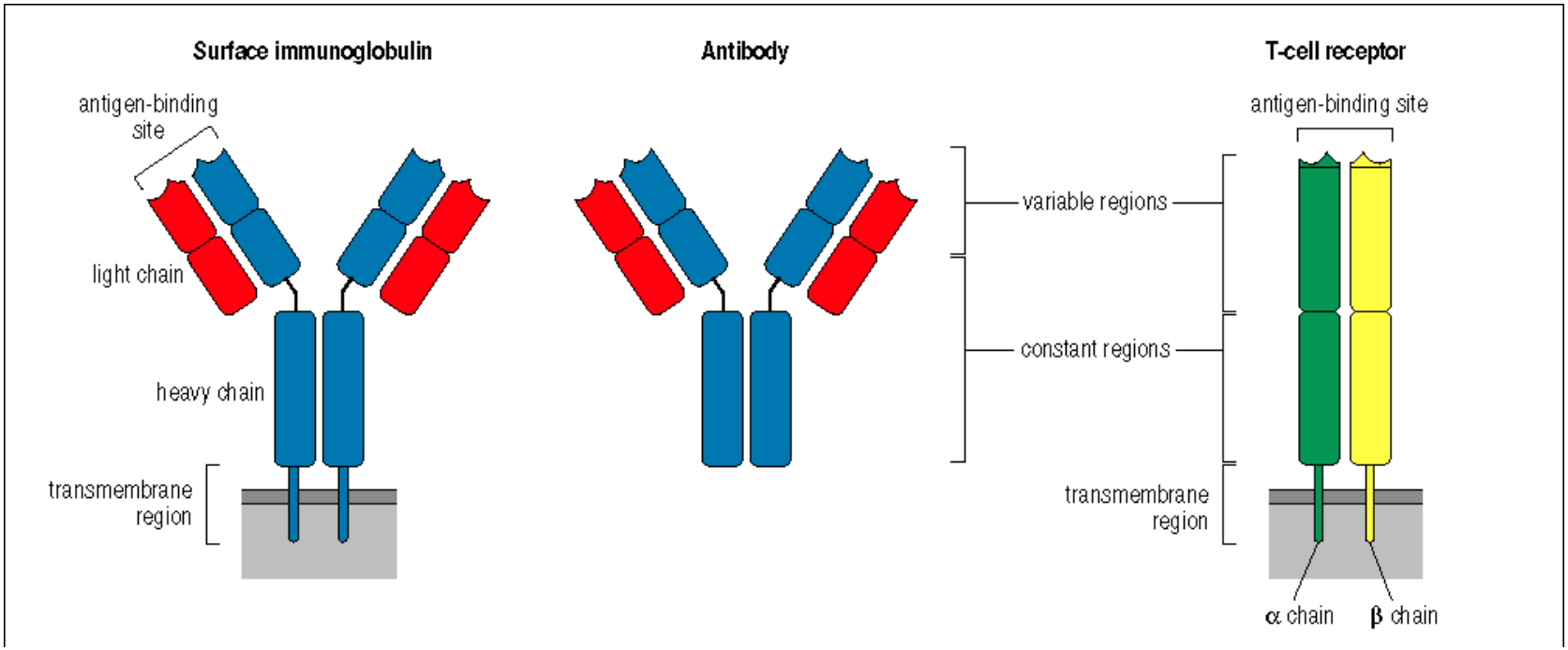
Immune Recognition

- Antigen
- Epitope
- Receptor

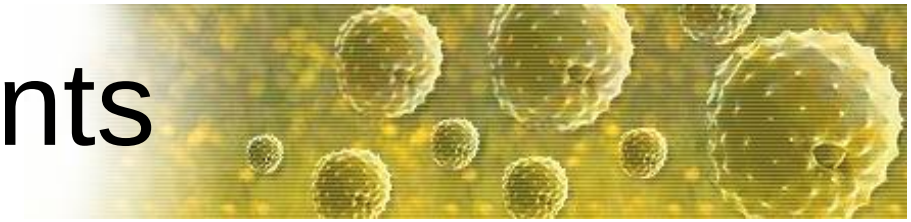


https://www.youtube.com/watch?v=lrYlZJiuf18

Surface Receptors



Immune Components

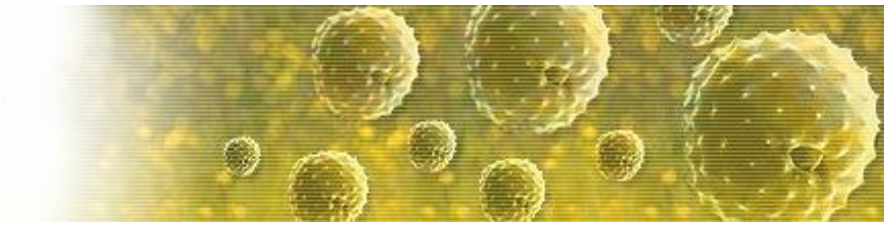


Cellular elements

- Neutrophils
- Eosinophils
- Basophils
- Macrophages
- Lymphocytes

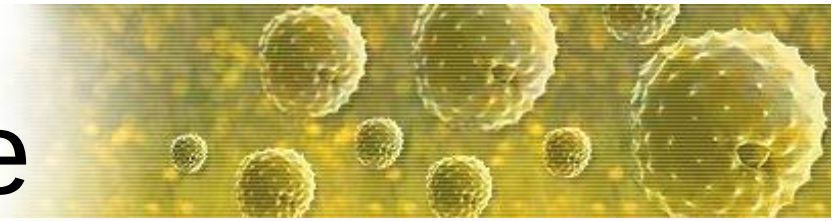
Soluble elements

- Specific = Ig's
- Non-specific
  - Cytokines
  - Complement
  - Prostaglandins
  - Leukotrienes
  - Histamine



ALLERGY – PREVALENCE AND RISK

Allergy Prevalence



Allergic Rhinitis

- Worldwide, allergic rhinitis affects between 10% and 30 % of the population.3
- Worldwide, sensitization (IgE antibodies) to foreign proteins in the environment is present in up to 40% of the population.3

Drug Allergy

- Worldwide, adverse drug reactions may affect up to 10% of the world's population and affect up to 20% of all hospitalized patients.3
- Worldwide, drugs may be responsible for up to 20% of fatalities due to anaphylaxis.3

General Allergy

- Worldwide, the rise in prevalence of allergic diseases has continued in the industrialized world for more than 50 years.3
- Worldwide, sensitization rates to one or more common allergens among school children are currently approaching 40%-50%.3

Skin Allergy

- Worldwide, urticaria occurs with lifetime prevalence above 20%.3

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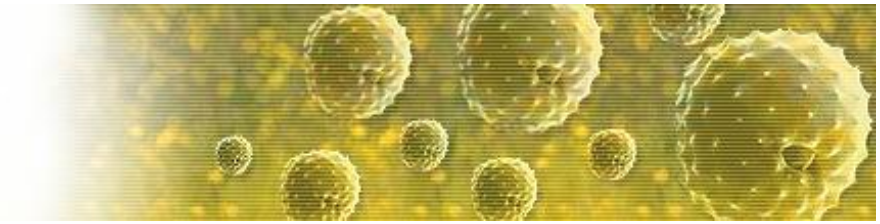
World Health Organization. *White Book on Allergy 2011-2012 Executive Summary*. By Prof. Ruby Pawankar, MD, PhD, Prof. Giorgio Walkter Canonica, MD, Prof. Stephen T. Holgate, BSc, MD, DSc, FMed Sci and Prof. Richard F. Lockey, MD.

Demographics of Allergic Rhinitis



- Prevalence : 10 to 30% in U.S. adults
  - Higher in children
  - (6th most prevalent chronic disease in adults; most common in children)
- Age and incidence:
  - < 1% in infancy (10 food issues & eczema)
  - ~ 5 - 8% from ages 5 to 9 (asthma)
  - Peaks in late teens - early 20's, & very slowly declines in later adulthood

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US Dept of Health and Human Services. AHQR 02:E023.

Risk Factors for Allergic Rhinitis

- Cigarette exposure
- Family history of atopy
- Higher socio-economic class
- First-born or only child
- Elevated total IgE (>100 IU/L) before age 6

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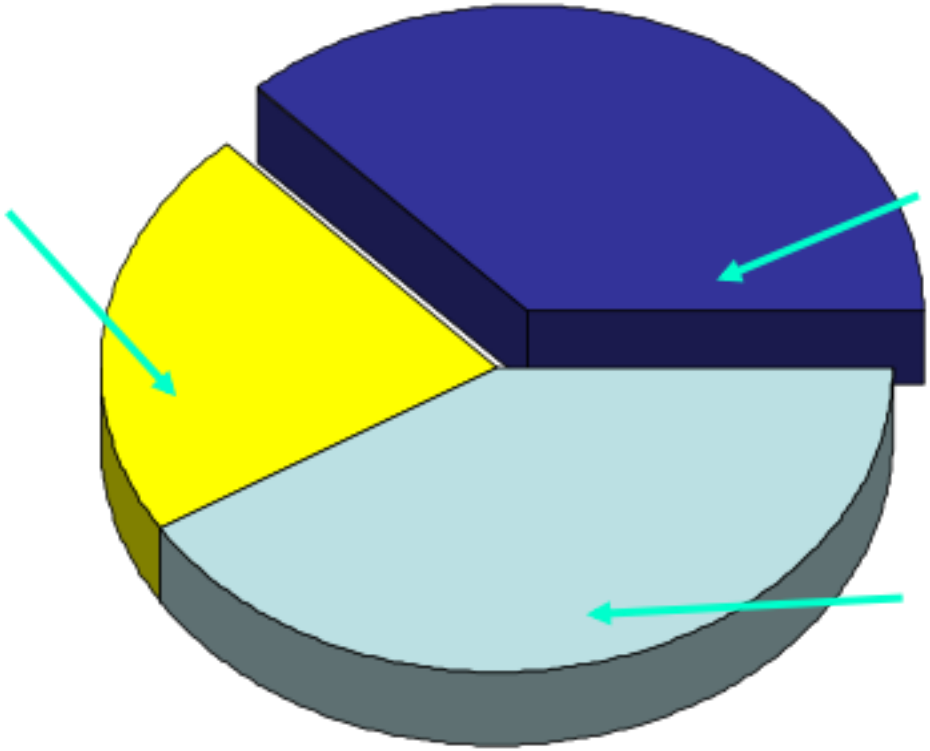
Skoner DP. Allergic rhinitis definition, epidemiology, pathophysiology, detection, and diagnosis. *J Allergy Clin Immunol* 2001;8:S2-8.

Allergic Rhinitis : Seasonal vs Perennial

Survey of Allergy Sufferers (N=400)



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Courtesy of Pfizer, Inc., 2002

Boulet L et al. Comparative degree and type of sensitization to common indoor and outdoor allergens in subjects with allergic rhinitis and/or asthma. Clin Exp Allergy 1997;27:525-9

Allergens tend to be -- small

Dust Mites	100-300 microns
Dust mite feces	4-25 microns
Cockroach particles	10-200 microns
Pollen – grass	30-40 microns
Pollen – trees	20-50 microns
Pollen – ragweed	15-25 microns
Pet dander	0.5-20 microns
Mold spores	0.5-20 microns

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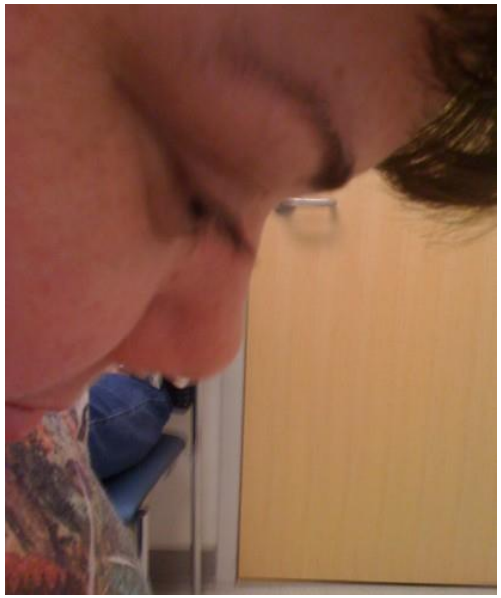
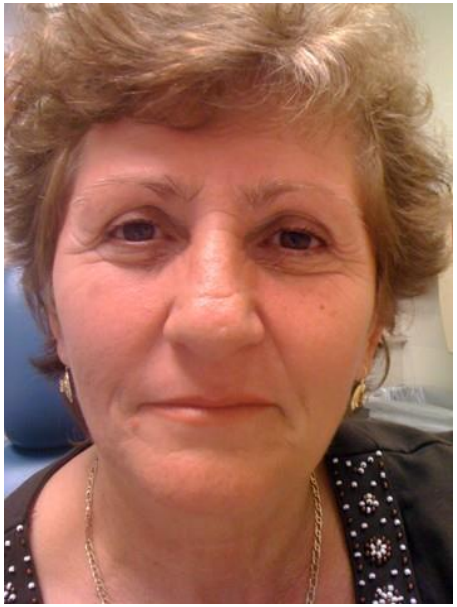
http://www.avoid-nasal-allergies.com/particlesizes.html

Diagnosis of AR

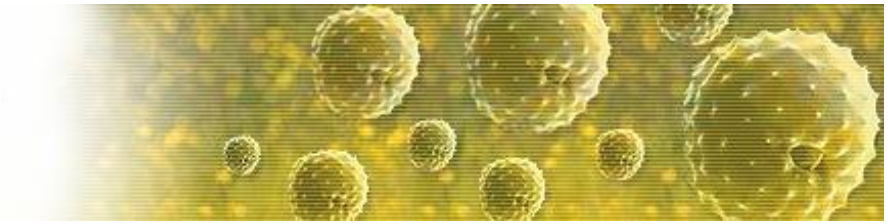
Gold Standard

History
Physical Exam
Allergy testing





Taking a History



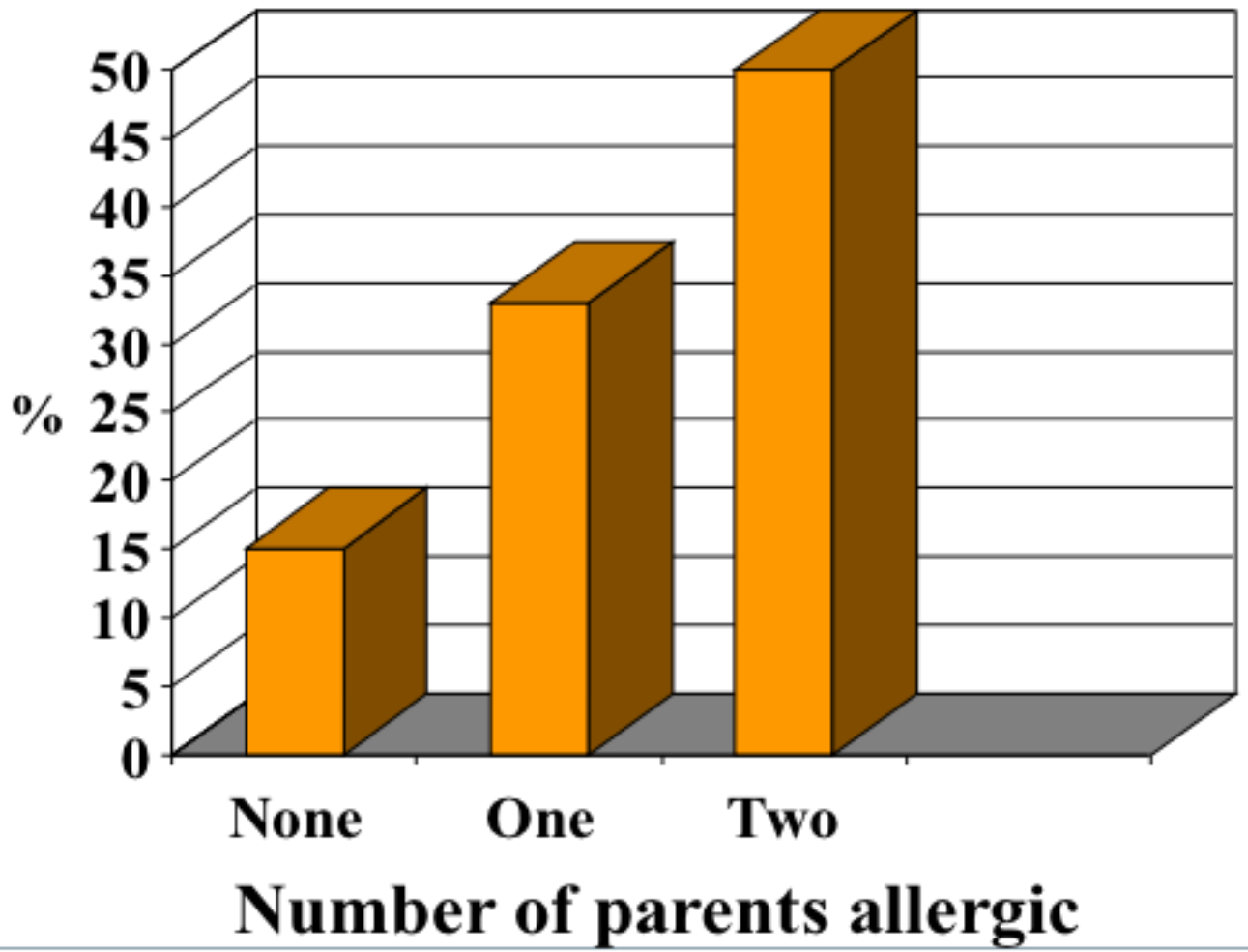
Establish main symptoms: itchy, sneezy, runny, etc.

- Total duration
- Frequency: intermittent, persistent, acute exacerbations
- Alleviating and exacerbating factors: e.g., smoke
- Associated symptoms: e.g., sinuses, eyes, throat, snoring
- History of asthma, eczema, oral allergy syndrome, food allergy
- Allergen exposure: e.g., home, hobbies, sports, occupational
- Family history
- Medication use: type, duration, compliance, efficacy
- Impact on quality of life

Family History

- Allergic rhinitis
- Asthma
- ASA sensitivity
- Eczema
- Angioedema, urticaria, anaphylaxis
- Food intolerance

Atopy & Family History



Chances of having clinical atopy based on family history

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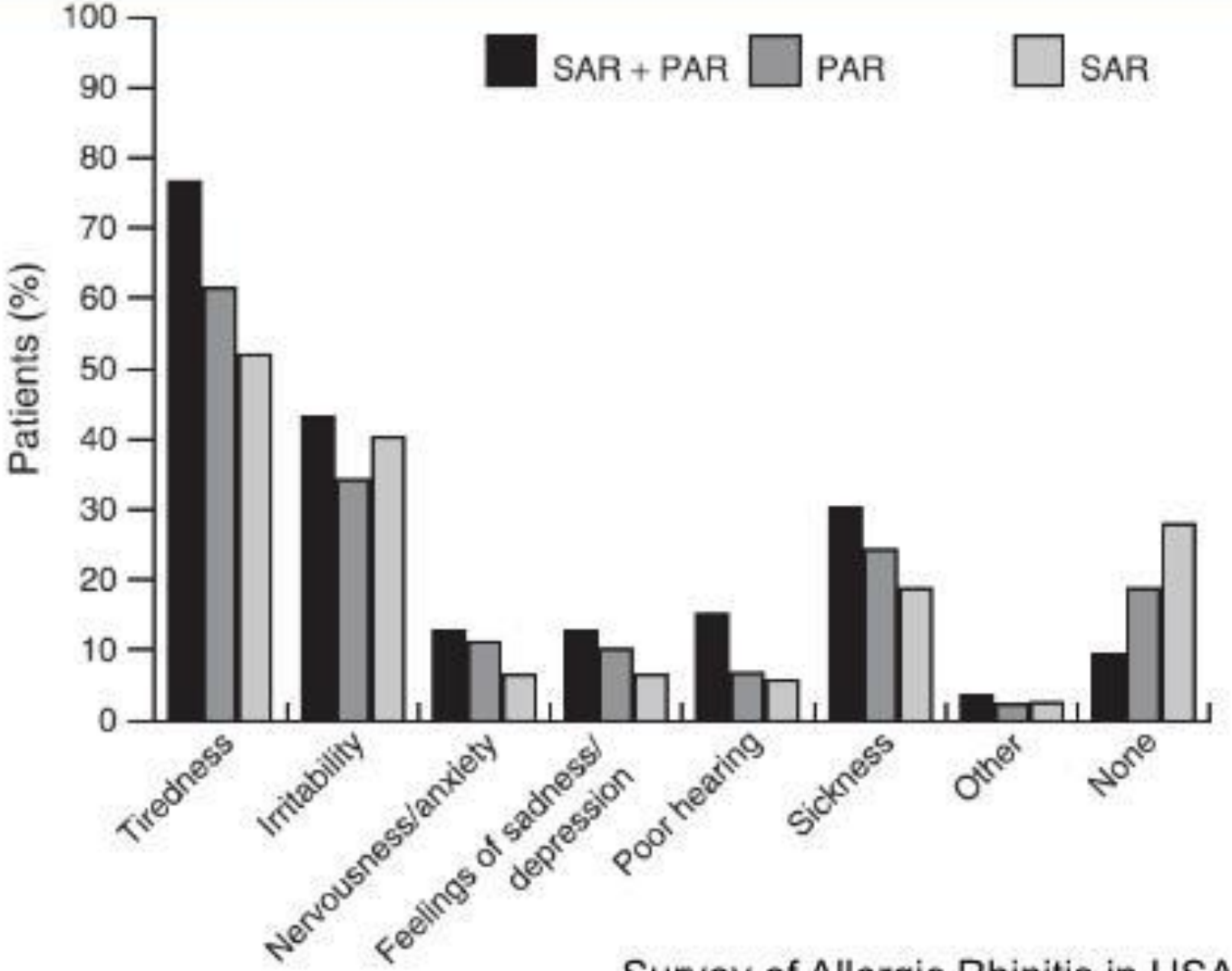
“Tiredness” is commonly reported in allergic patients

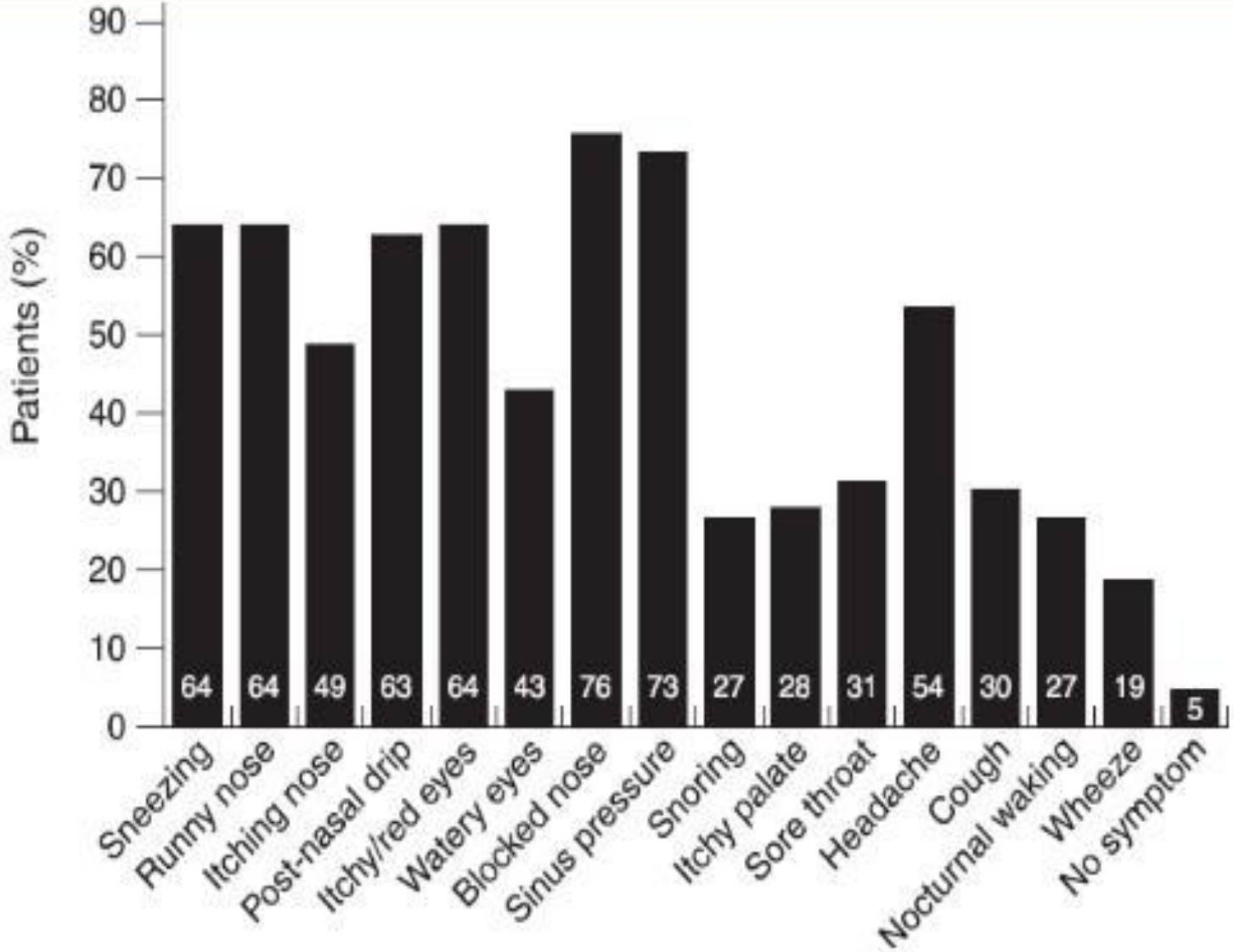


Survey of Allergic Rhinitis in USA

The American Academy of Otolaryngic Allergy

Schatz M, Allergy 2007: 62 (Suppl. 85): 9–16

Survey of Allergic Rhinitis in USA



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Schatz M, Allergy 2007: 62 (Suppl. 85): 9–16

Physical Signs of Allergy

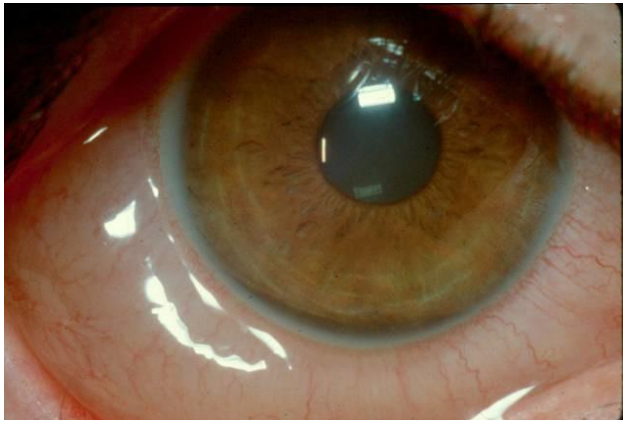
- Nose
- Throat
- Mouth
- Ears
- Eyes
- Skin
- Bronchial Tree
- GI Tract

Allergic Signs & Symptoms : Eye

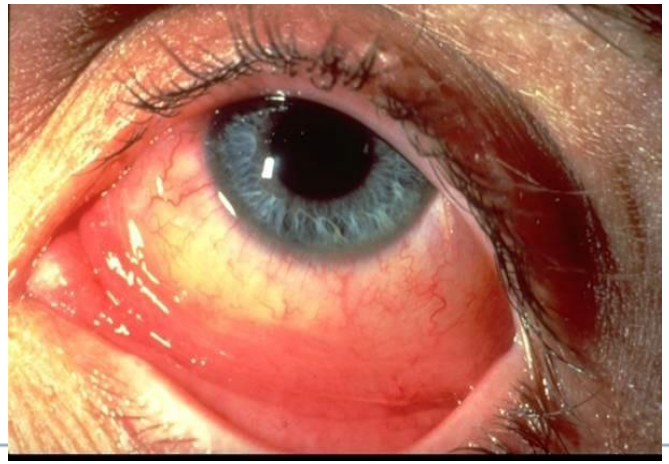
- Conjunctiva & lids
- Symptoms of pruritis, burning, tearing
- Acute Signs = scleral injection / chemosis, lid edema / erythema, tearing, photophobia
- Chronic Signs = allergic shiners &/or lashes, Dennie's lines, thick mucous, cobblestone mucosa, thick / lichenified lids, keratopathy

Signs of Allergic Conjunctivitis

Hyperemia

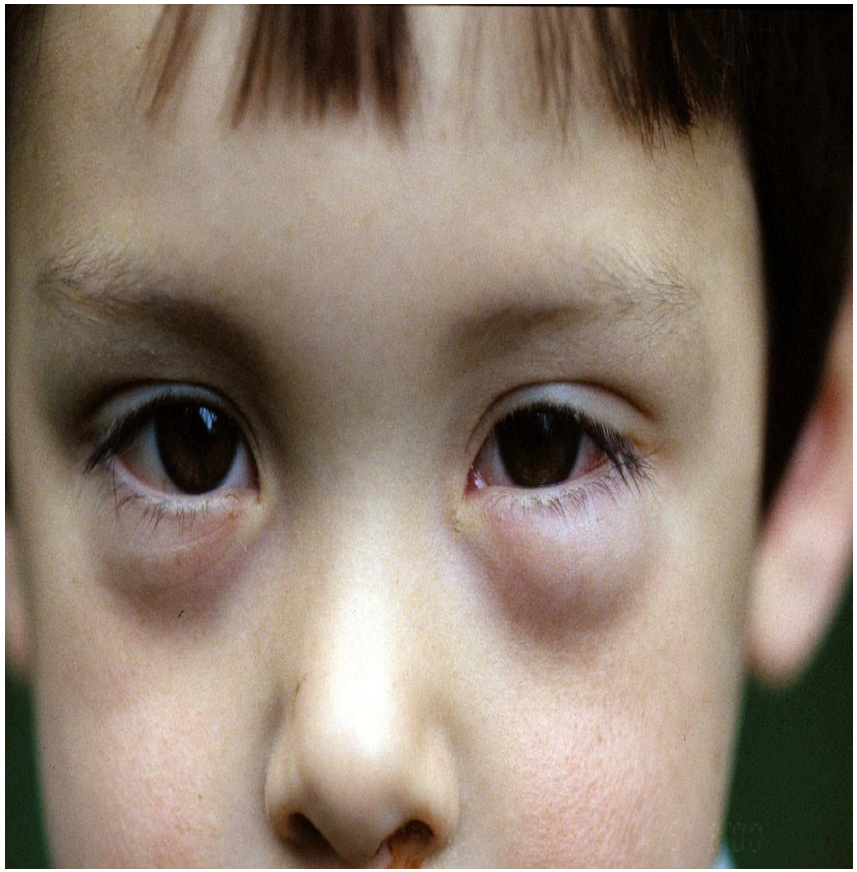


Chemosis

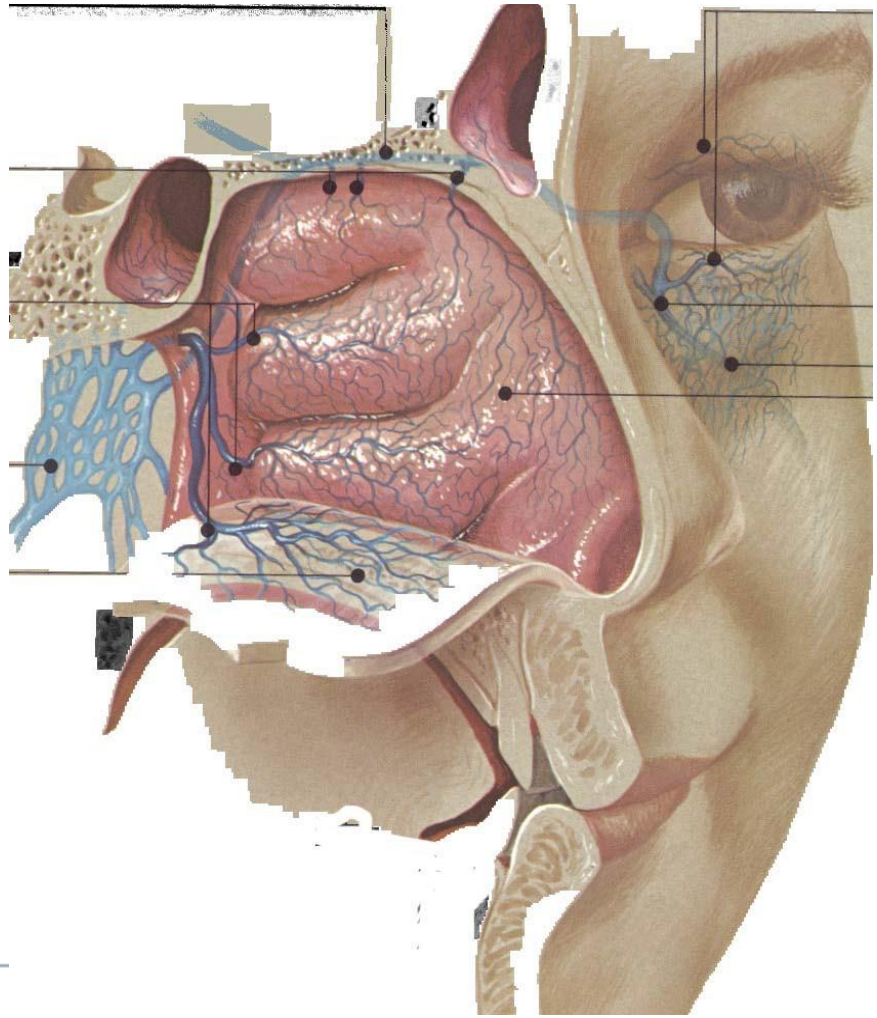


Tearing

Allergic Shiners



Courtesy of BJ Ferguson



Courtesy of Upjohn, Inc.

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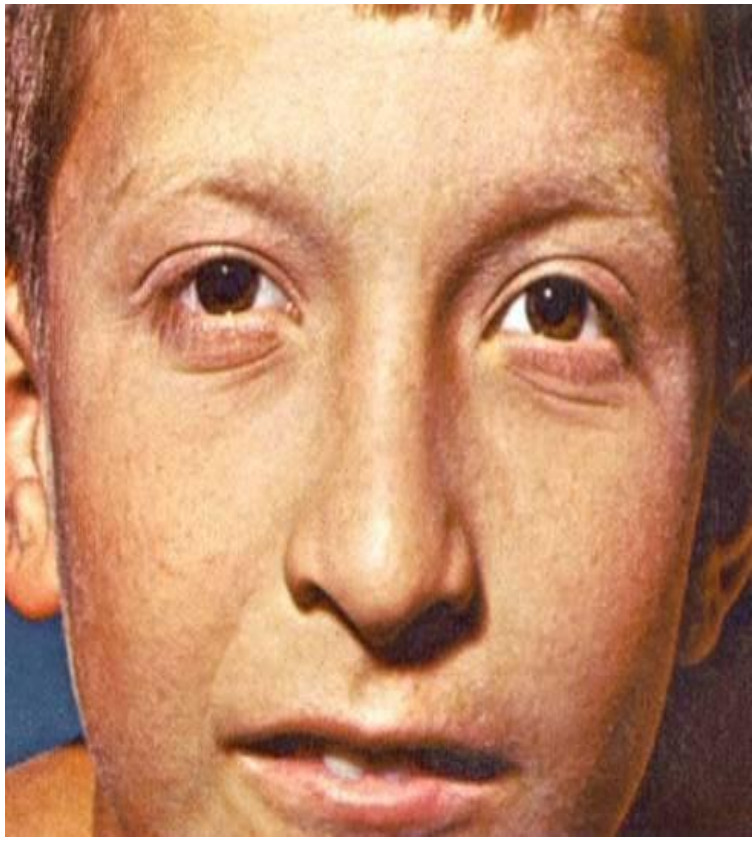
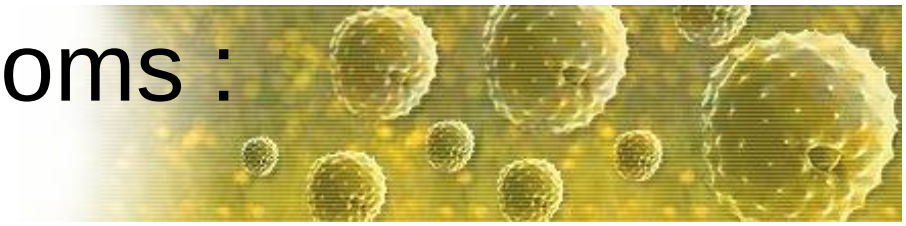
Dennie's Lines

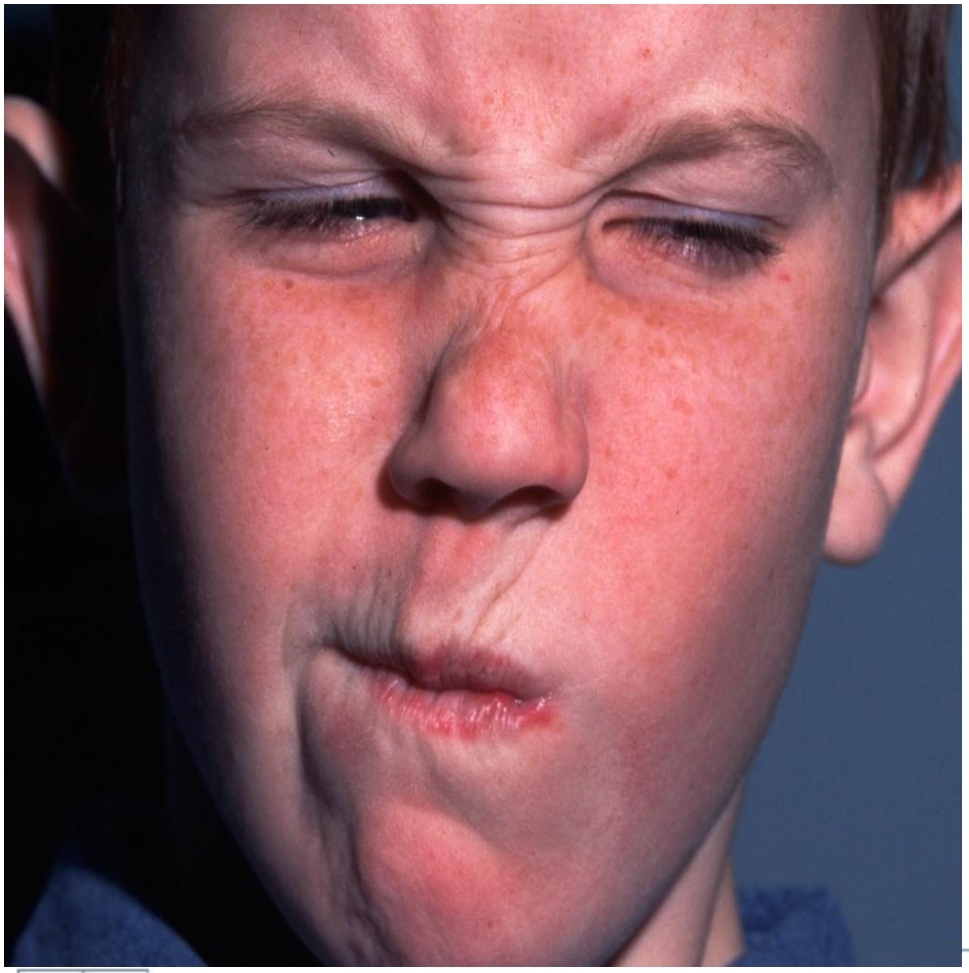


Allergic Signs & Symptoms : Nose



- Enlarged inferior & middle turbinates
- Pale, boggy, bluish mucosa
- Watery rhinorrhea
- Nasal / palatal pruritis
- Transverse nasal crease
- Facial grimacing

Facial Grimacing from Nasal Pruritis



Courtesy of BJ Ferguson

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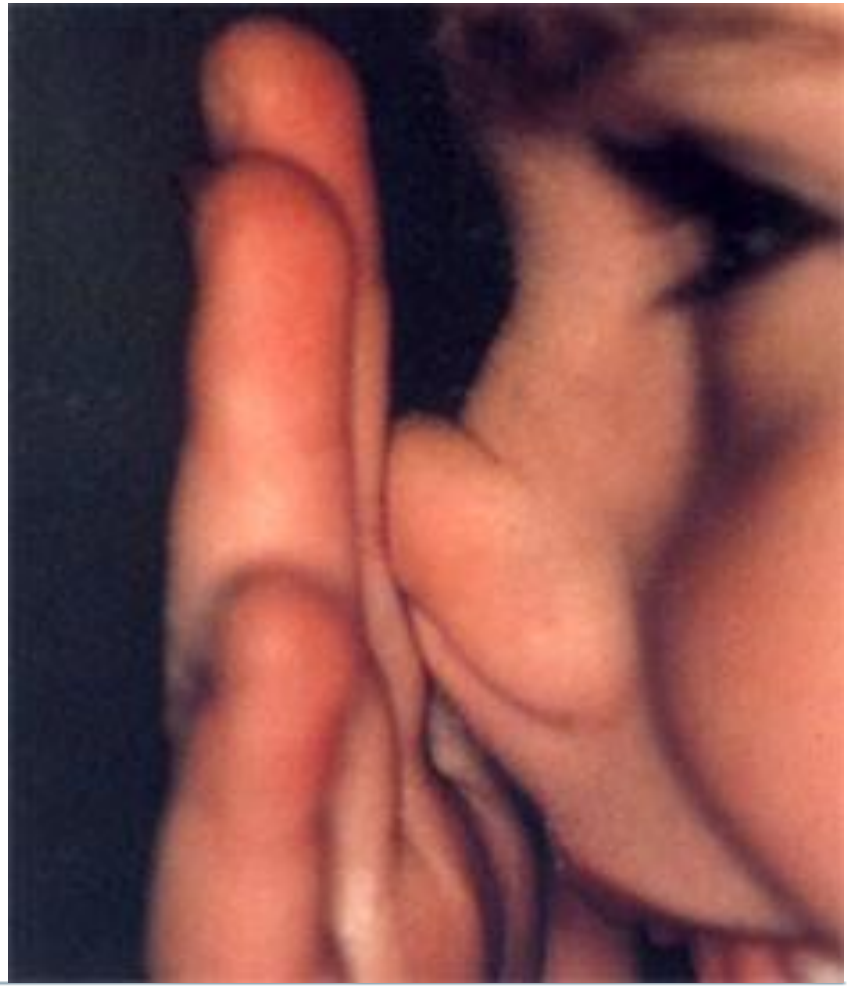
“Allergic Salute”



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Edematous (“Boggy”), Pale or Bluish, & “Wet” Turbinate

Courtesy of BJ

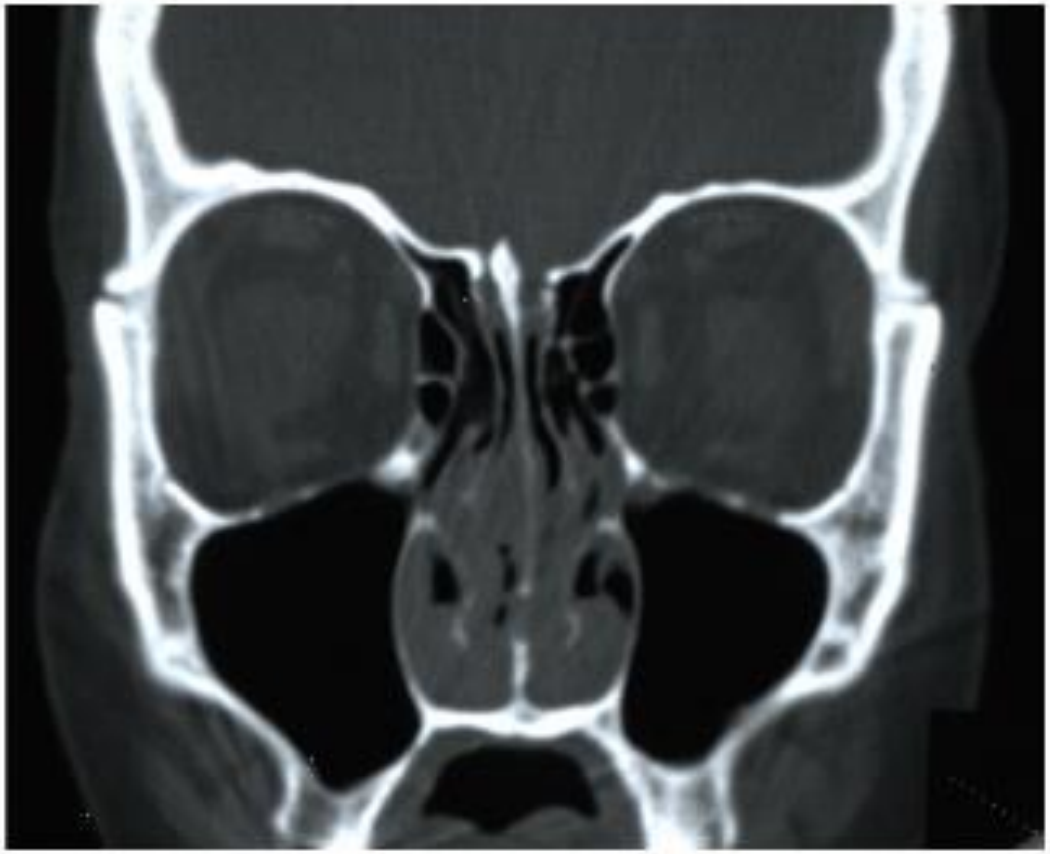
Two Causes of Sleep Disturbance in AR

- Obstructive model
  - Nasal obstruction interferes with nasal breathing
  - Arousals/awakenings 2º to obstruction
- Inflammatory dysregulation model
  - Inflammatory mediators disrupt sleep on a central level

Craig et al., *J Allergy Clin Immunol*, 2005;116:126

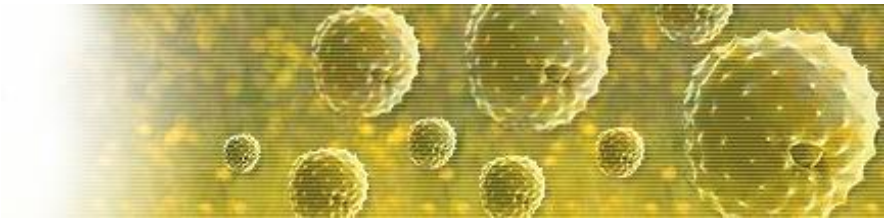
Obstructive Model of Sleep Disturbance in AR

- Mechanical obstruction of the airway leads to increased nasal airway resistance
- Disruption in normal breathing leads to awakenings and arousals
- Treatment strategies aimed toward reducing physical obstruction



Craig et al., *J Allergy Clin Immunol*, 2005;116:1265-

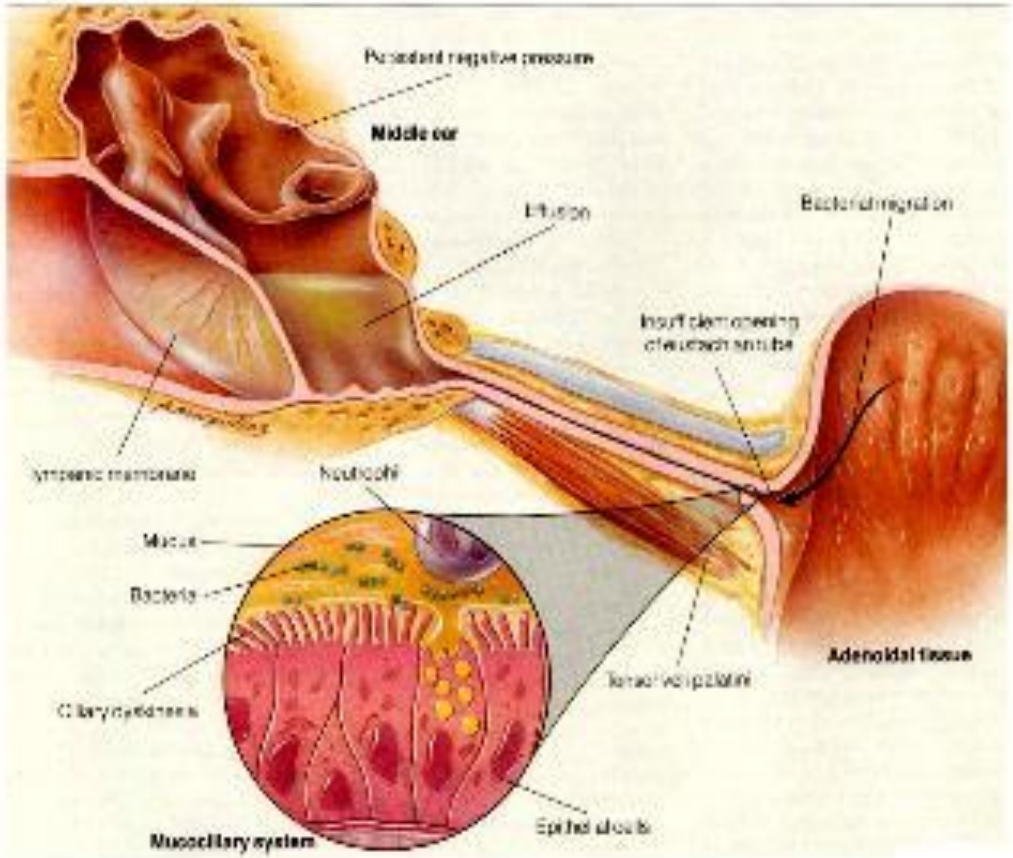
Allergic Signs & Symptoms : Middle Ear



- Chronic Eustachian tube dysfunction with difficulty equalizing, pressure / fullness sensation, vague unsteadiness, tympanic membrane retraction
- Otitis media with effusion, acute or chronic

Potential Mechanisms of Allergy and OME

- Inflammatory Obstruction of ET
- Inflammatory Obstruction of nose and nasopharynx
- ME mucosa as target organ



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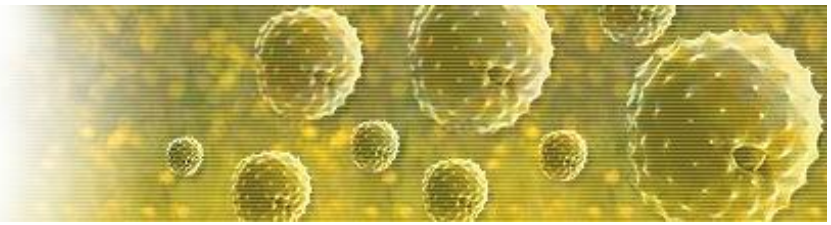
Fireman P. JACI 1997;99:s787-97

Allergic Signs & Symptoms: Oral Cavity / Pharynx



- Post nasal drip
- Cobblestoning of pharyngeal wall
- Hypertrophy of lateral pharyngeal bands
- Mouth breathing

Posterior Pharyngeal Cobblestoning

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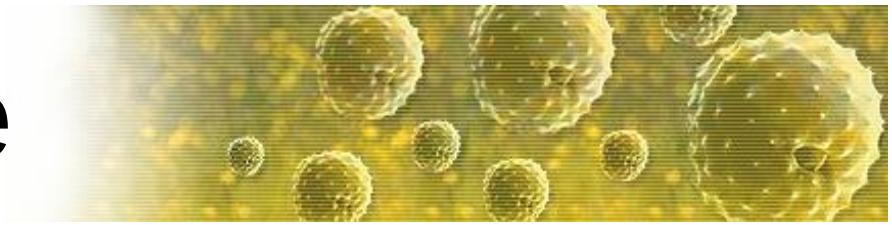
Courtesy of BJ Ferguson

Allergies and Voice

Inhalant allergies can affect voice by :

- Excess secretions (PND, tracheal & locally generated)
- Mucus trafficking
- Direct local reaction (vocal fold edema)
- Laryngeal drying from mouth breathing
- Decreased pulmonary function (asthma)

Allergies and Voice



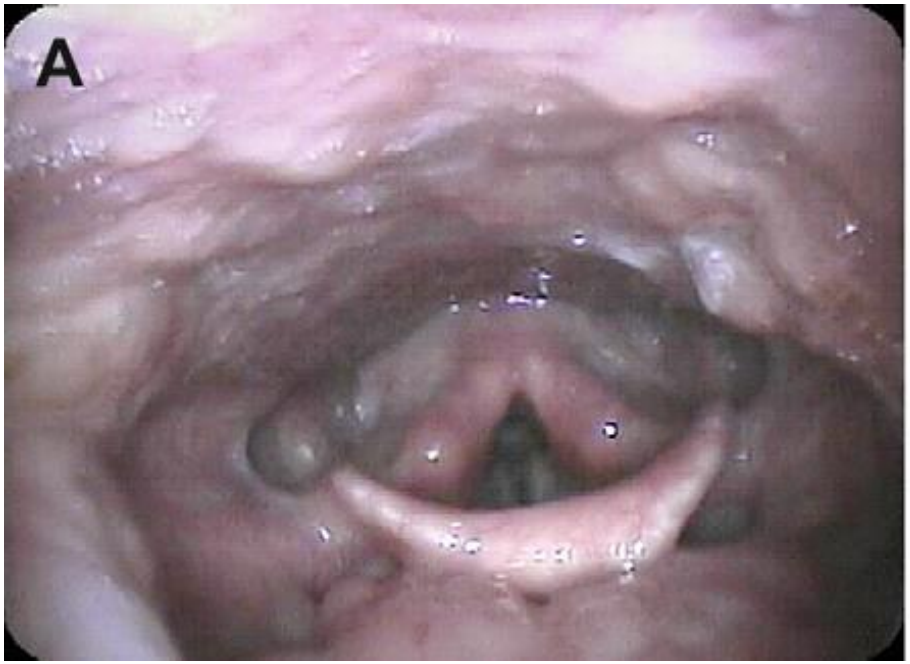
- Physical findings
  - Mild vocal fold edema &/or erythema
  - Slightly reddened arytenoids
  - Accumulation of secretions
  - Viscous mucus bridging true vocal folds

The American Academy of Otolaryngic Allergy

Corey J et al. Otolaryngol Clin N Am 1998;31:189-205

Jackson-Menaldi C, et al. Log Phon Vocol 2002;27:74-79

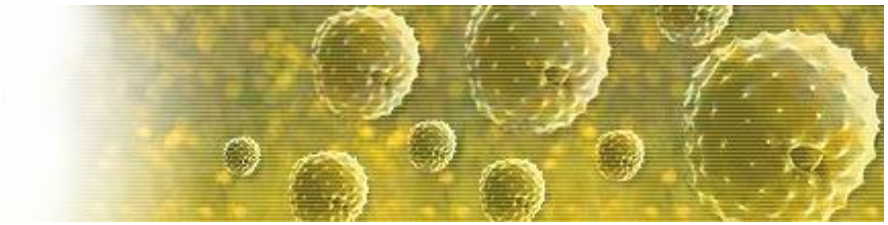
Allergies and Laryngeal Changes



The American Academy of Otolaryngic Allergy

Krouse JH, Altman KW. Oto Clin North Am 2011

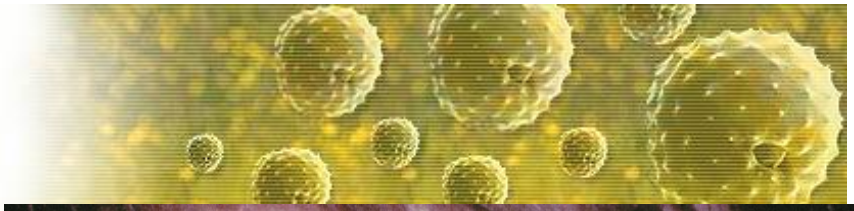
Allergic Signs & Symptoms : Skin



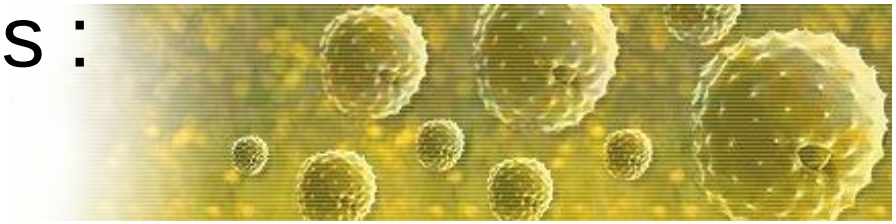
Dry, scaly skin, ranging from dandruff to lichenification

Pruritis is characteristic (signs of scratching)

Varies from eczema (esp. antecubital & popliteal fossa), contact dermatitis & urticaria to angioedema



Allergic Signs & Symptoms : Chest



- Asthma = most common manifestation

- "Cough variant" asthma is mild form common in children: chronic, dry cough
  - Upper respiratory infections
  - Exercise
  - Allergen exposure

Non-allergic, non-infectious rhinitis

(a poorly-defined phenotype)

Pathophysiologic hypotheses

- Non-inflammatory (vasomotor)
  - Sensorineural hyperresponsiveness
  - Hyperesthesia
  - Dysautonomia
- Local allergic reaction

Conditions that mimic rhinitis

- Cystic fibrosis
- Mucociliary defects
- Cerebrospinal rhinorrhoea
- Anatomic abnormalities
- Foreign bodies
- Tumors
- Granulomas: Sarcoid, Wegener's, Midline Granuloma