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# Allergic Rhinitis and Its Complications

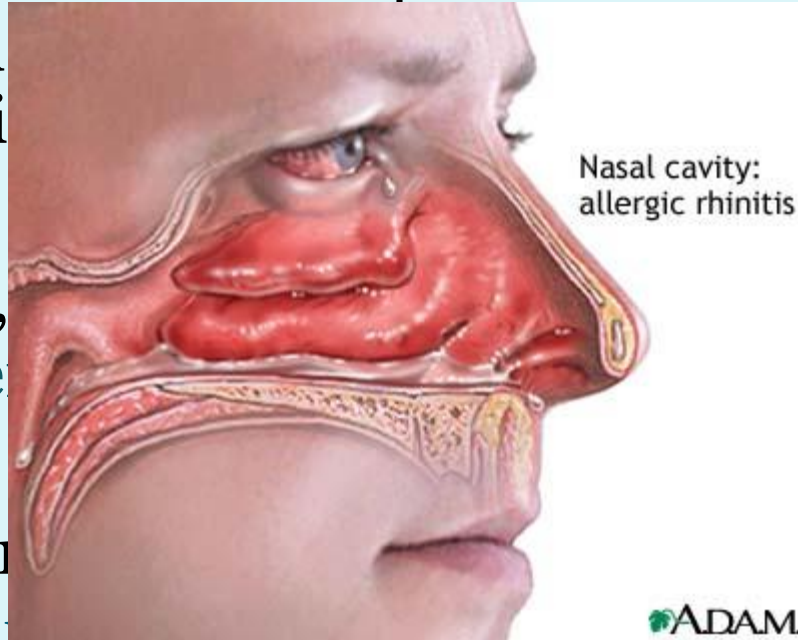


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**OTOLARYNGOLOGIST**  
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# Definition



- Inflammation of nasal and paranasal sinus mucous membrane due to allergic reaction caused by specific allergens (allergic rhinitis) disease
- Traditionally, allergic rhinitis (SAR) and Perennial allergic rhinitis (PAR)
- Clinically defined by the following symptoms:
  - Watery nasal discharge
  - Nasal obstruction
  - Sneezing
  - Itching

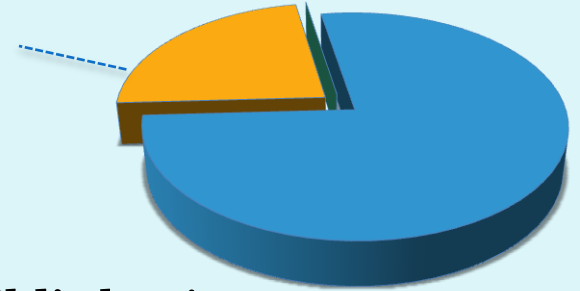


allergic rhinitis (AR)

symptom:

# Epidemiology

## Social Impact of Allergic rhinitis ( AR )



- AR prevalence **about 20%**
- If one parent has allergies, the chances of the child's having rhinitis are **30%** and increase **to 50%** when both parents have the disease
- Most prevalent in **Pediatric & Adolescent population**
- Most prevalent in **higher socioeconomic class**

# Social-economic Impact of Allergic rhinitis



- **3.4 million** workday lost annually in US

- **2 million** missed school days annually in US

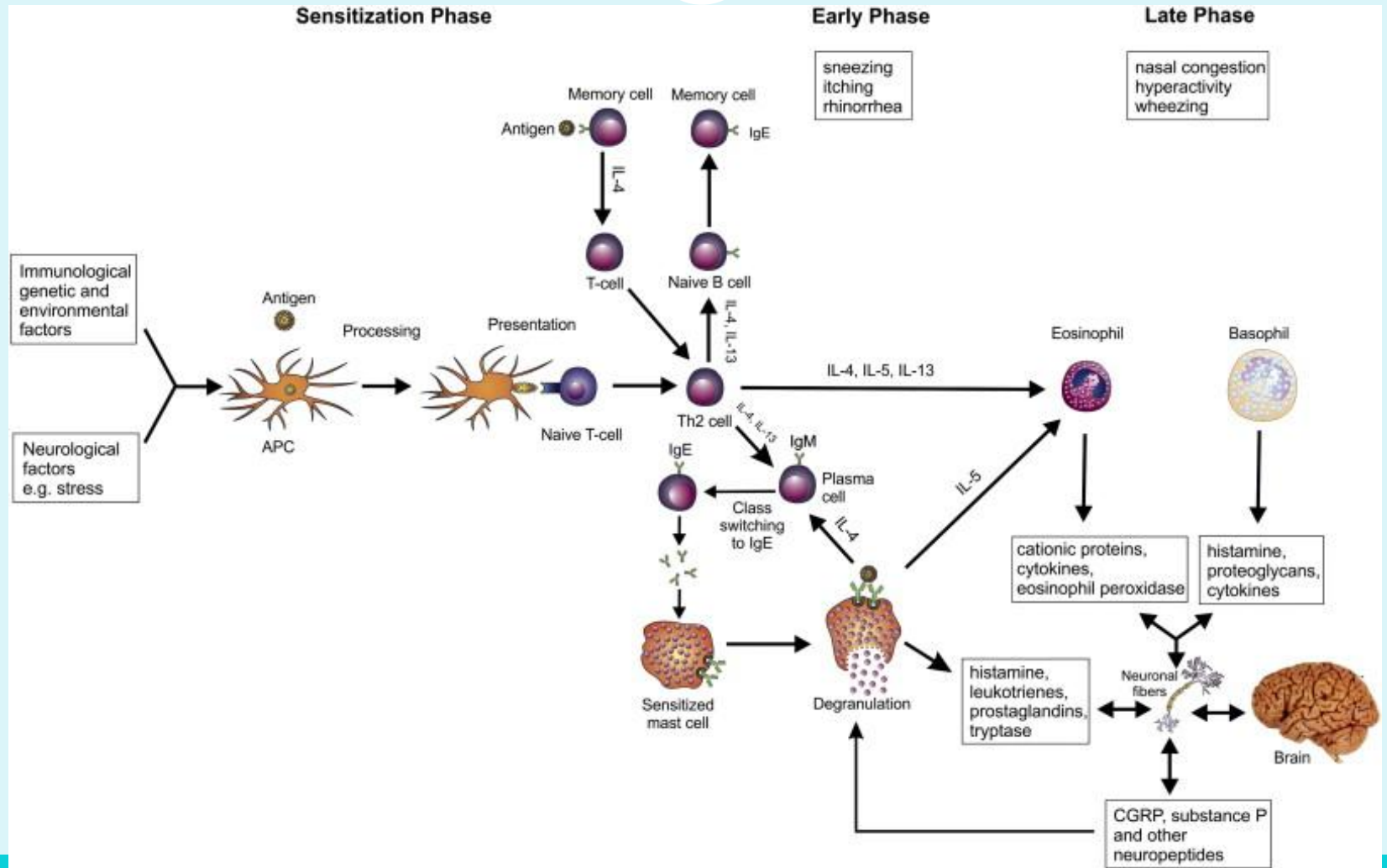
Total treatment costs of AR annually = **3.5 billion \$**

Medications cost = **2.4 billion \$**

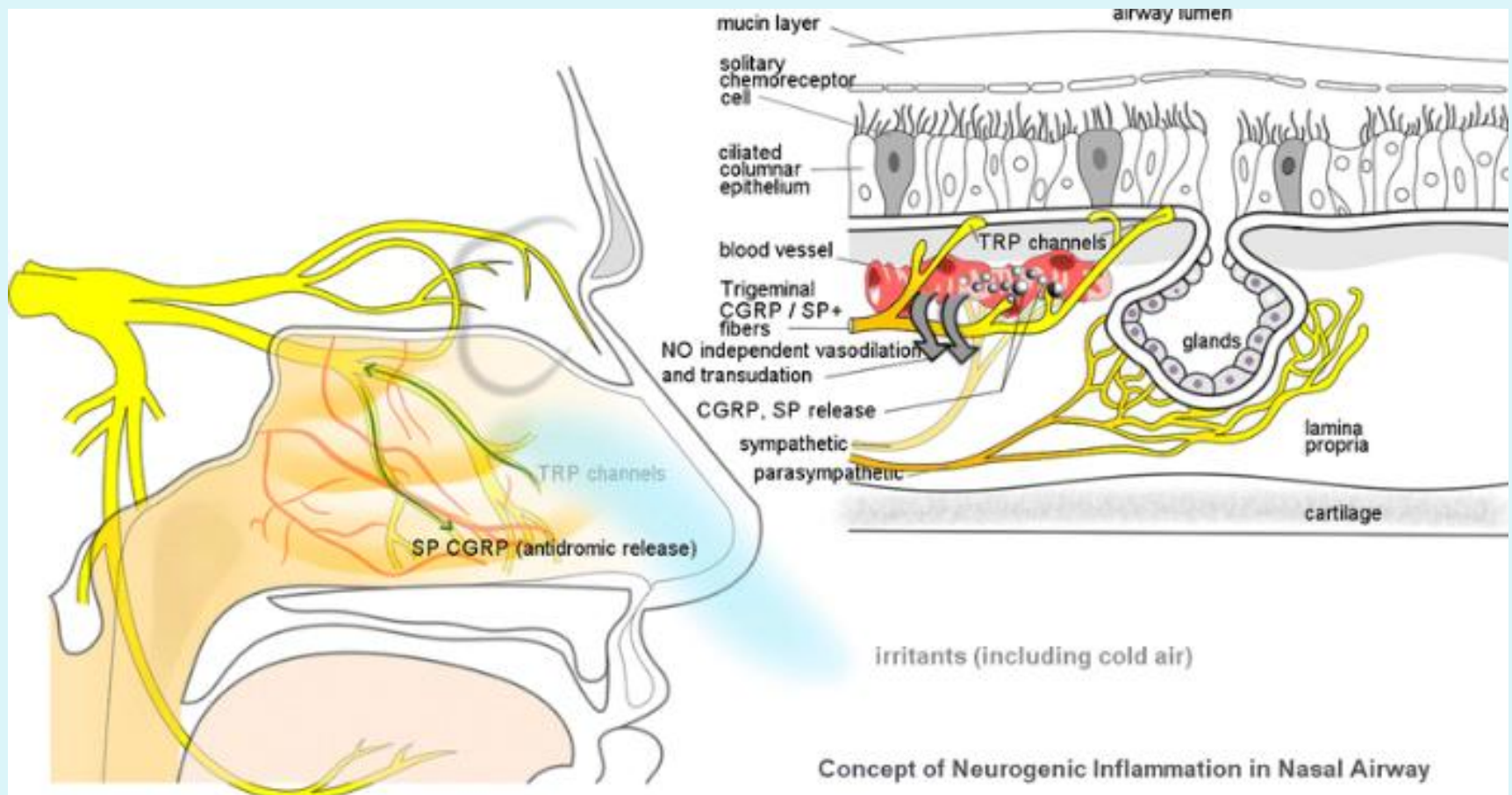
Physician visit = **1.1 billion \$**



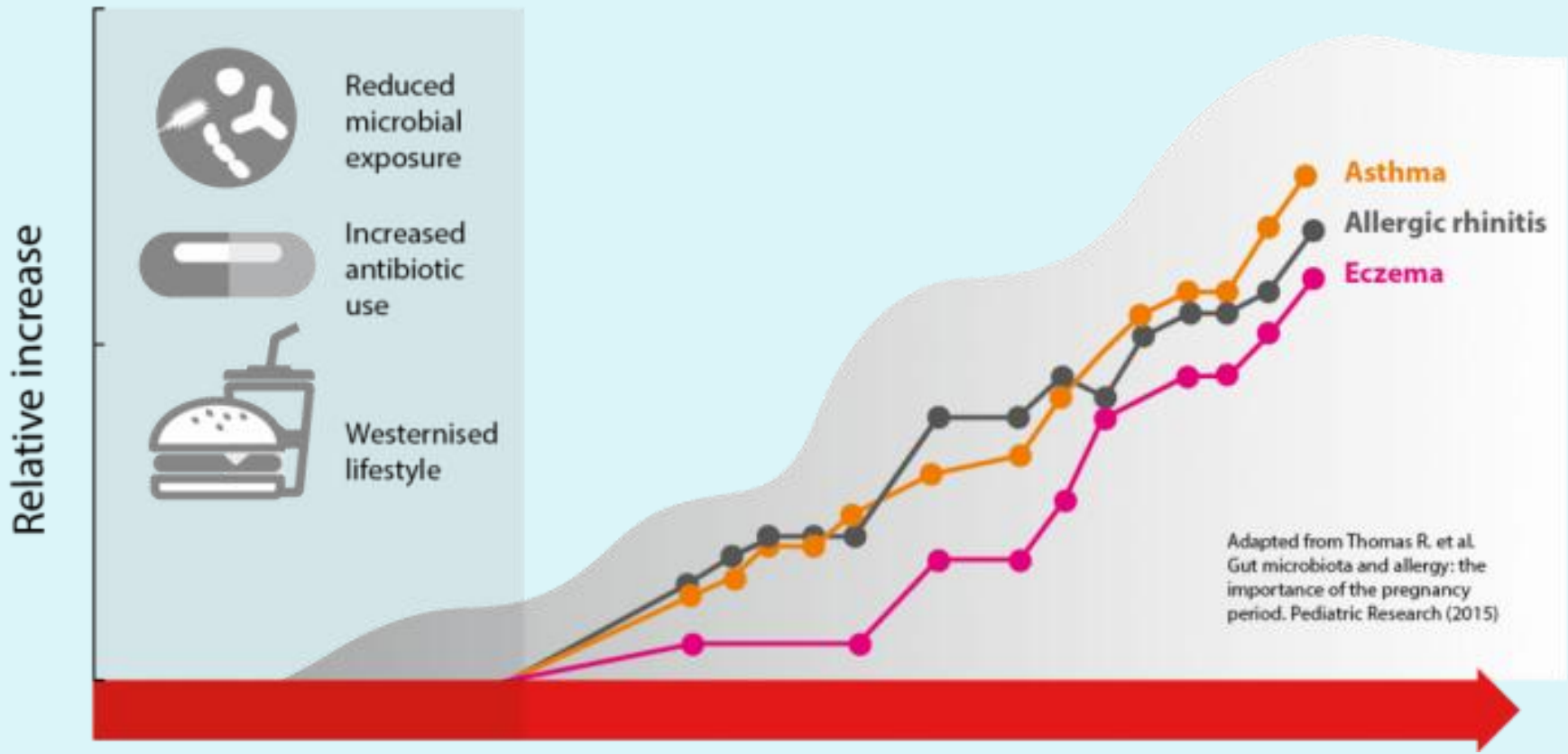
# Pathophysiology



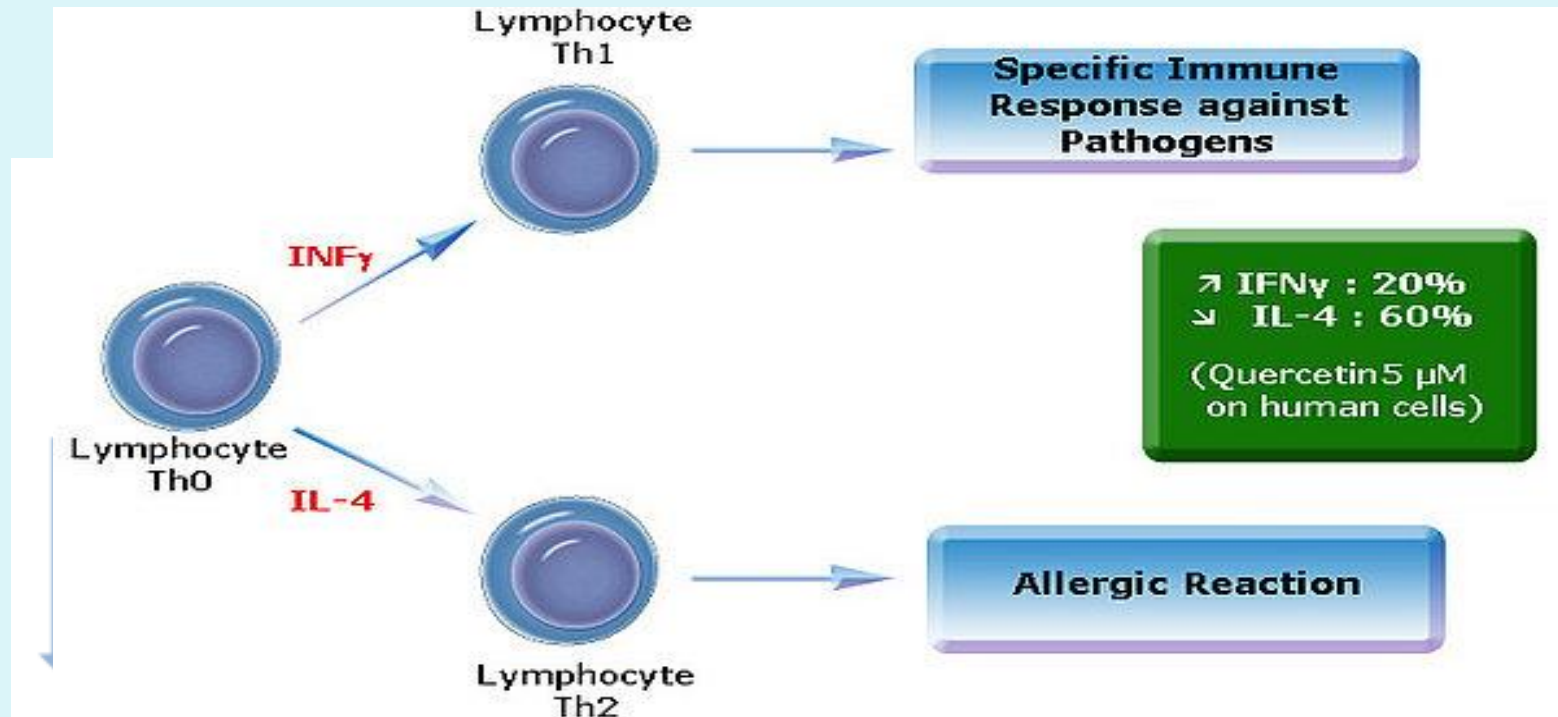
# Neural reflex Of AR



# Increase prevalence of AR

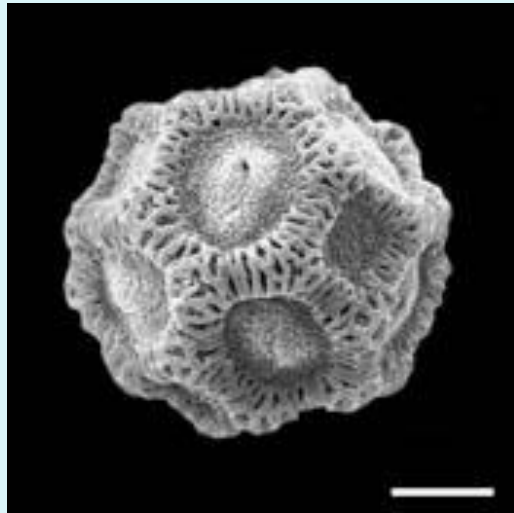


# Increase prevalence of AR





# Allergens - Outdoor



**tree pollination** from mid march to late April  
**Grasses** in may and June  
**Flowers** from mild August until first frost

# Allergens - Indoor



## Cockroaches

A Common  
Allergen  
&  
Asthma Trigger

# Allergic Rhinitis: Classification

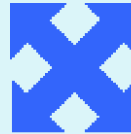


## Intermittent

- < 4 days per week
- or < 4 weeks

## Persistent

- > 4 days per week
- and > 4 weeks



## Mild

- Normal sleep
- No impairment of daily activities, sport, leisure
- Normal work & school
- No troublesome symptoms in untreated patients

## Moderate-Severe

one or more items

- Abnormal sleep
- Impairment of daily activities, sport, leisure
- Abnormal work and school
- Troublesome symptoms

# symptoms



**Sneezing**



**Nasal obstruction**



**Watery Rhinorrhea**

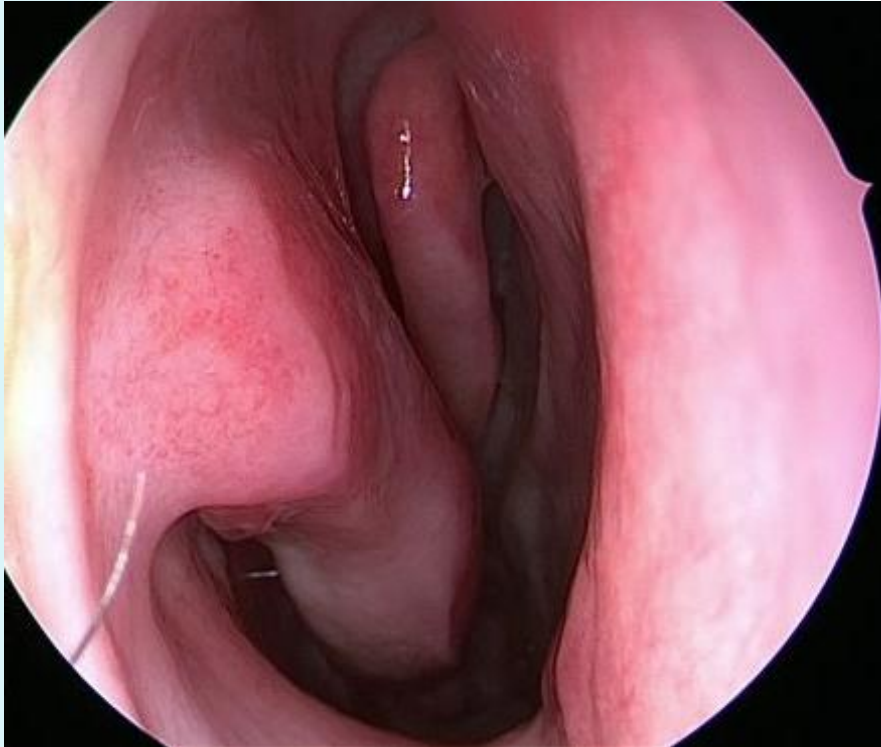


**Nasal itching**

# Allergic faces



# Nasal Endoscopy



Normal



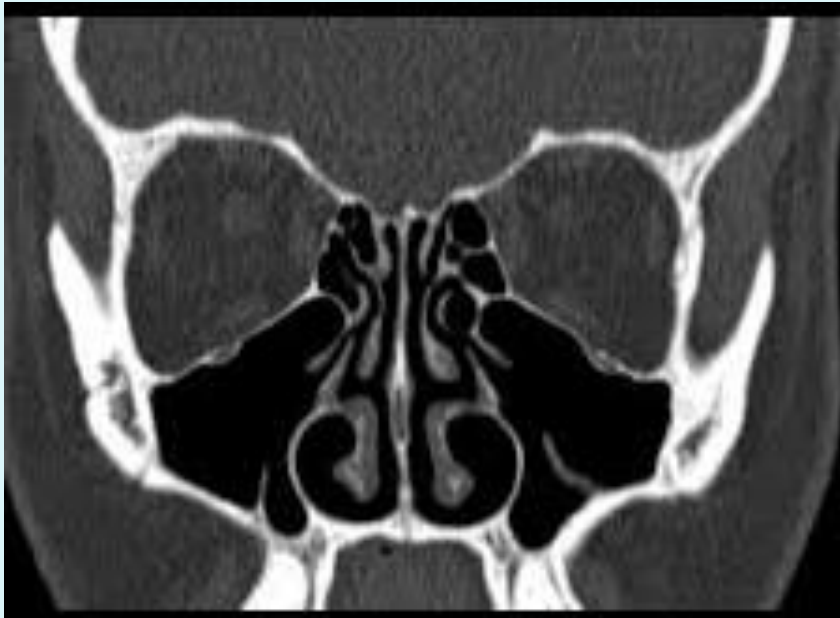
Allergic Rhinitis

# Nasal Endoscopy

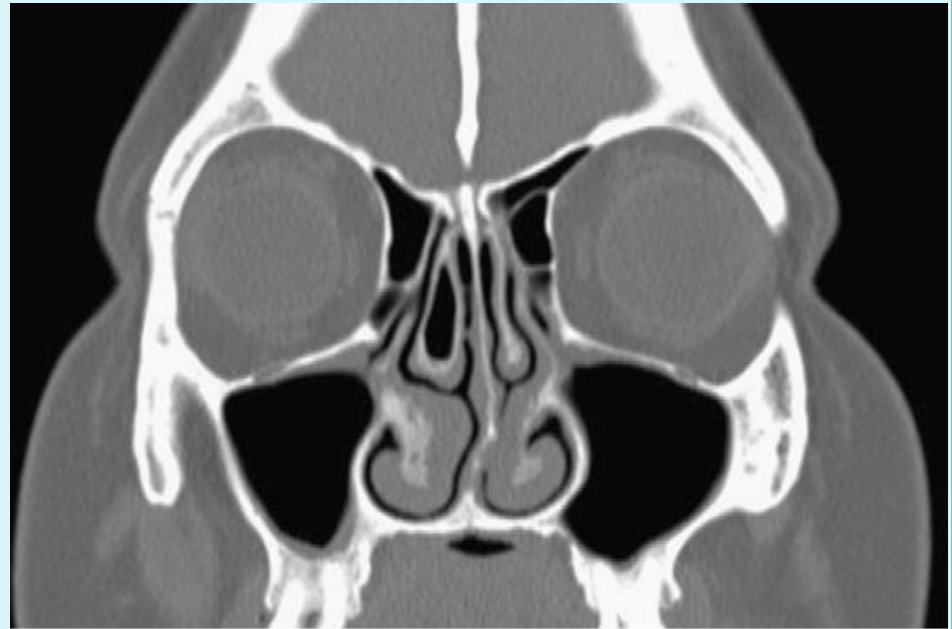


Allergic Rhinitis with Turbinate hypertrophy

# CT-Scan



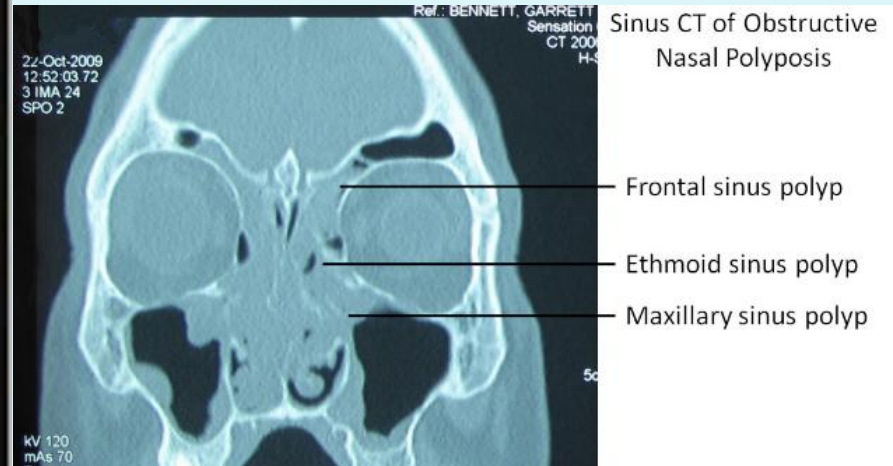
Normal



Allergic Rhinitis



# AR and Nasal polyposis



# AR and adenoid hypertrophy





## Is there any correlation between allergy and adenotonsillar tissue hypertrophy?

M. Sadeghi-Shabestari <sup>a</sup>, Y. Jabbari Moghaddam <sup>b</sup> , H. Ghaharri <sup>b</sup>

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<https://doi.org/10.1016/j.ijporl.2011.01.026>

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### Abstract



#### Objectives

Tonsil and adenoid are part of Waldeyer's ring; the basic function of which are antibody formation, which later react against a great variety of antigens. The Adenotonsillectomy is the most common operation in small children but the exact reasons of adenotonsillar hypertrophy remains unknown, some researches have shown that allergy may be at risk factor for adenotonsillar hypertrophy.

formation, which later react against a great variety of antigens, The Adenotonsillectomy is the most common operation in small children but the exact reasons of adenotonsillar hypertrophy remains unknown, some researches have shown that allergy may be at risk factor for adenotonsillar hypertrophy.

#### Methods

Thorough one year two separated groups of children at the ENT and allergy ward of children's hospital was enrolled in the study. The study group consisted of 117 children between 1 and 14 years old (with average of 6) who had adenotonsillar hypertrophy. The control group consisted of 100 children in the similar age that had not adenotonsillar hypertrophy. Both groups were examined for the incidence of allergic disease, results of skin prick test, serum IgE levels and close contact to smoke.

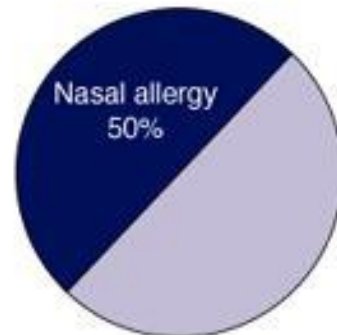
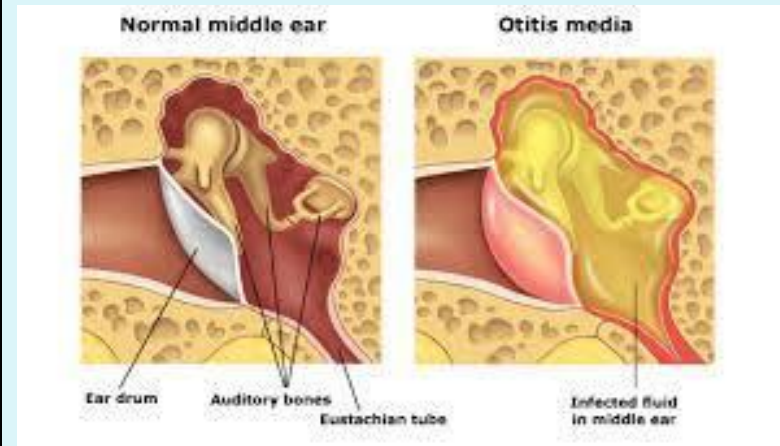
#### Results

In the study group 70.3% of children with adenotonsillar hypertrophy had positive skin prick test. But only 10% of children in control group had positive skin prick test. Increased serum total IgE level was confirmed in 48% of children with positive skin prick test in study group were in close contact with smoker parents.

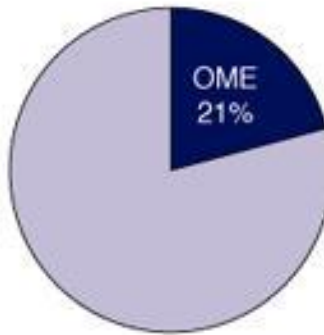
#### Conclusion

Allergy and sensitivity to different kinds of allergens are important risk factors for adenotonsillar hypertrophy in children. Allergy control may have a role in reducing the rate of adenotonsillectomy in children suffering allergic reactions with adenotonsillar hypertrophy.

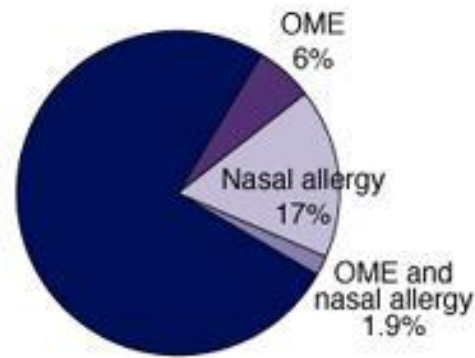
# AR and Chronic serous otitis media



OME (n = 259)



Nasal allergy (n = 605)



Controls (n = 104)

## Tympanometric Patterns of Children with Allergic Rhinitis Treated at a Tertiary Health Institution.

Fasunla AJ<sup>1</sup>, Ijitolola JO<sup>1</sup>, Nwaorgu OG<sup>1</sup>.

### ⊕ Author information

#### Abstract

**OBJECTIVES:** To determine the prevalence of otitis media with effusion (OME) and compare patterns of tympanogram between children with and without allergic rhinitis in Ibadan, Nigeria.

**STUDY DESIGN:** A case-control study of children (2-7 years) with AR from May 2015 to March 2016.

**SETTING:** Tertiary hospital.

**SUBJECTS AND METHODS:** Consecutive 86 children with AR and 86 healthy controls (nonallergic) participated in the study. A structured questionnaire was administered to parents or caregivers of the participants to obtain relevant sociodemographic and clinical information. Diagnosis of AR was by symptomatology and nasal cytology. Both groups had ear, nose, and throat examination and tympanometric evaluation. OME was diagnosed according to Jerger's tympanometric patterns.

**RESULTS:** The mean  $\pm$  SD ages of cases and controls were  $3.80 \pm 1.72$  and  $3.78 \pm 1.71$  years, respectively. All cases presented with watery nasal discharge, bouts of sneezing, and nasal itching. The duration of AR symptoms was  $18 \pm 13$  months. Among cases and controls, Jerger's type A tympanogram was the most common pattern, while type C was the least common. Thirty-nine (45.3%) children with AR had OME, as compared with 8 (9.3%) controls, and the difference was statistically significant ( $P < .001$ ; odds ratio = 8.090; 95% CI = 3.48-18.79).

**CONCLUSION:** Prevalence of OME was significantly high among children with AR. Jerger's type B and C tympanograms were more common among children with AR than the healthy pediatric population. This background information supports the need for routine tympanometric evaluation of children with AR.

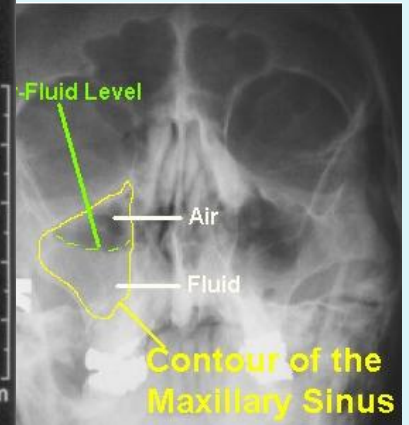
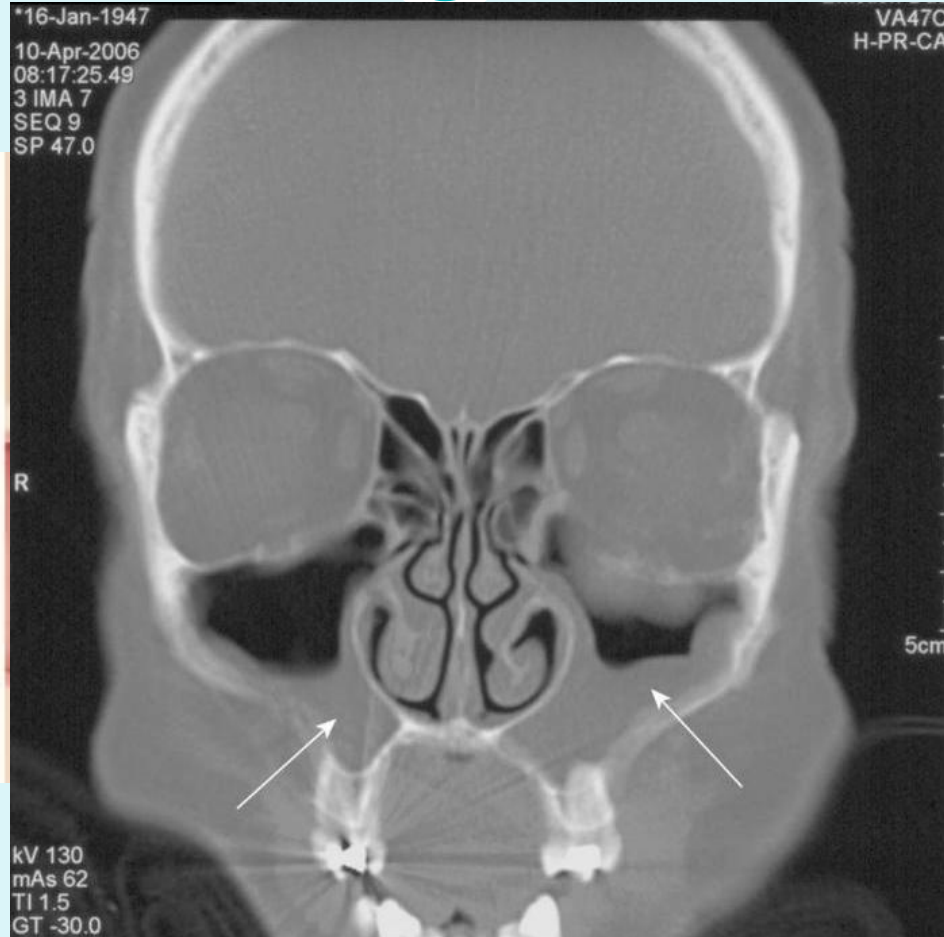
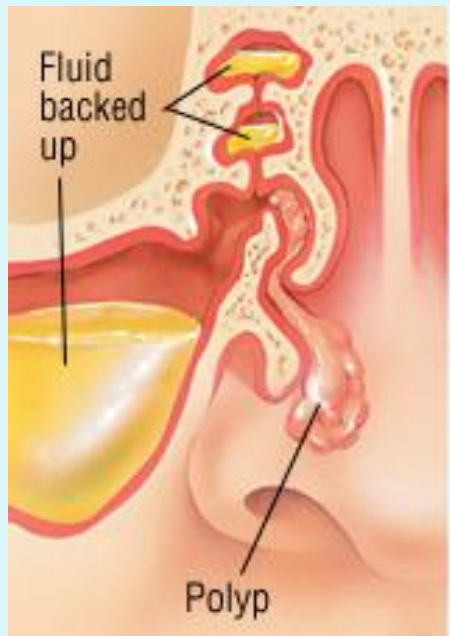
**KEYWORDS:** allergic rhinitis; children; nasal cytology; otitis media with effusion; tympanometry

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Free PMC Article



# AR and Sinusitis



# Allergic fungal sinusitis



- **Most common** form of fungal sinusitis

- 

- **Hypersensitivity** reaction resulting

- Common organisms: **Fusarium**

- The condition

**with intractable sinusitis and extensive nasal polyposis**



Allergic fungal sinusitis with  
sinu-nasal polyposis

organisms  
fungus

**Alternaria**,

**Aspergillus** patient

**with intractable sinusitis and extensive nasal polyposis**

# Allergic fungal sinusitis



- Often **unilateral**
- Surgery reveals **allergic mucin** (ie, **allergic**)
- Allergic mucin is **expansile mass**
- **Growth of the bone**, rupture of the sinus contents



l (ie, **allergic**)

calcified

**Erosion of**  
age of the



# Radiologic finding of AFS





ORIGINAL RESEARCH PAPER

ENT

INCIDENCE OF FUNGAL INFECTION IN SINONASAL POLYPOSIS

KEY WORDS: sinonasal polyps, fungal sinusitis

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ABSTRACT

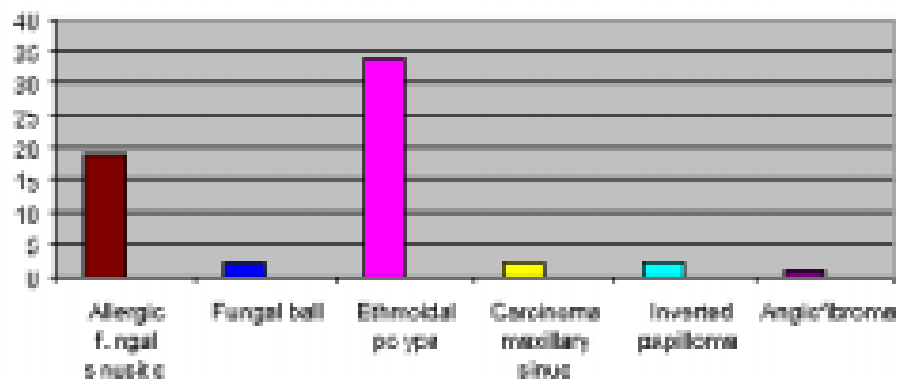
**Aims**

1. To study the incidence of fungal infection in sinonasal polyposis.
2. To correlate clinical, microbiological and histopathological characteristics of nasal polyps.

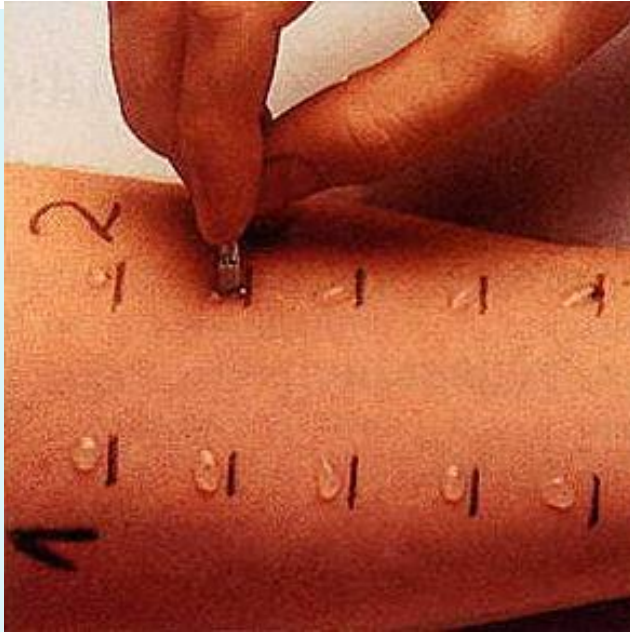
**Material and Methods** Prospective non-randomized cohort study was conducted in 60 patients with nasal polyps [unilateral or bilateral] and nasal debris along with tissues were examined for the presence of fungus.

**Conclusion** Incidence of fungal rhinosinusitis is on the rise in this era of antibiotics and diagnostic facilities. As the incidence is rising, more and more researches are taking place in this field and debates linger over its classification, diagnosis and management. Nasal polyps are associated with fungal sinusitis. In our study, the incidence of fungal infection in patients with sinonasal polyposis was 63%. ←

TYPES OF NASAL POLYPS



# SKIN TESTING



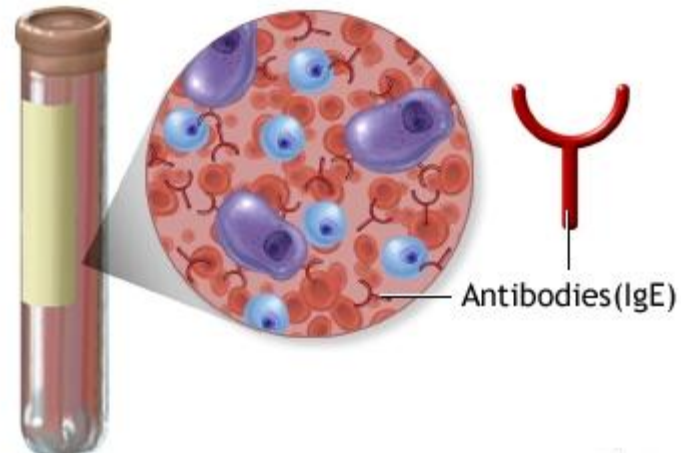
**Advantages** greater sensitivity, rapidity, and low cost.

**Disadvantages** inability to perform the test in patients with dermatologic problems such as eczema, poor tolerance of many children for multiple needle pricks, inhibitory effect of certain drugs such as antihistamines on skin test reactivity, need to maintain the potency of the allergen extracts, and possibility of systemic reactions.

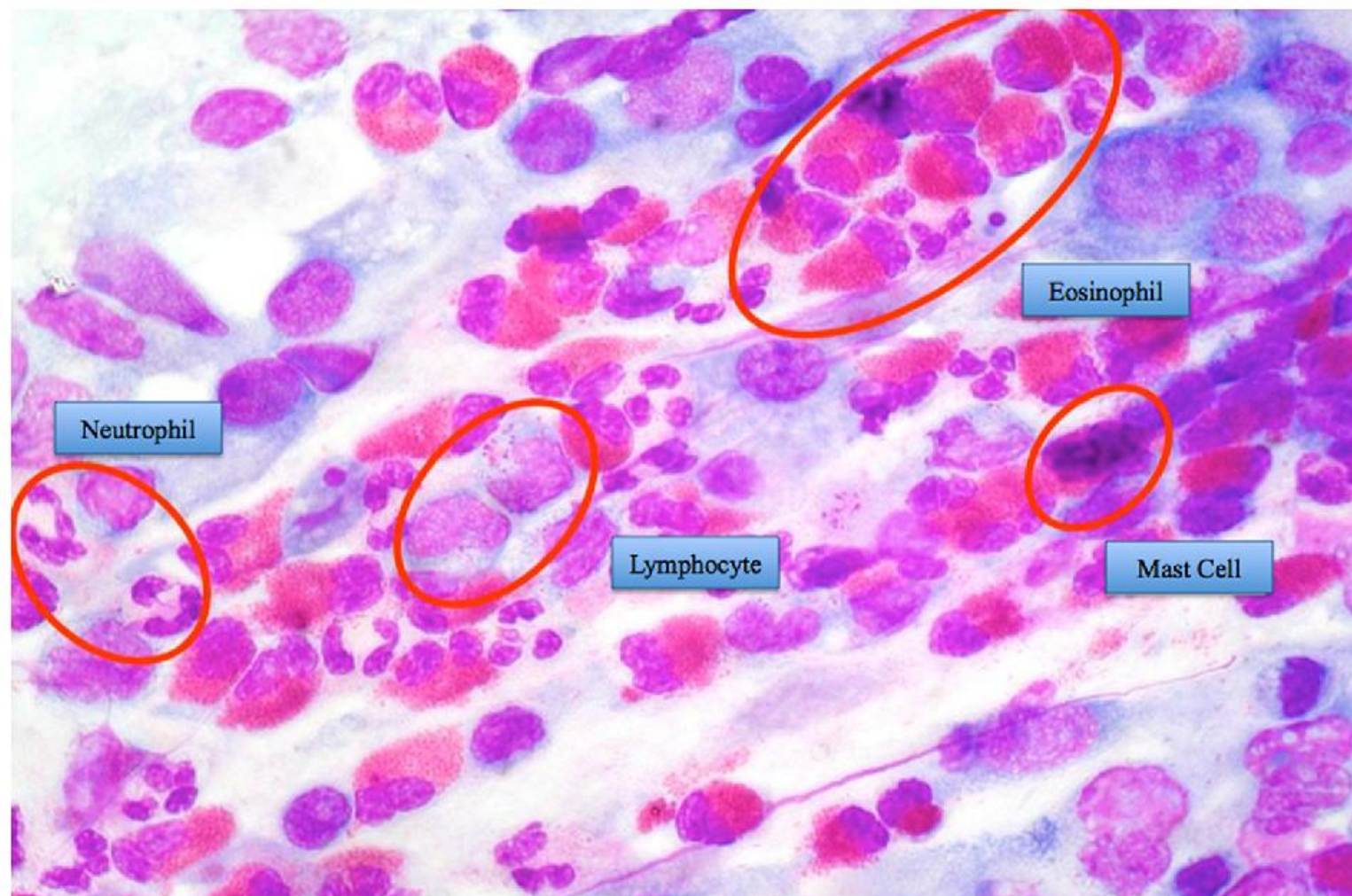
# MEASUREMENT OF SPECIFIC IgE (Radio-allergo-sorbent assay or RAST)

- Disadvantages include  
Cost  
slightly lower sensitivity  
and the time delay before obtaining the results

The blood test measures the levels of allergy antibody, or IgE, produced when your blood is mixed with a series of allergens in a laboratory



# NASAL CYTOLOGY



# Anti histamine H1



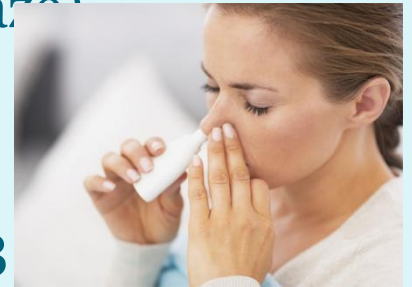
- **First-generation (sedating):**
  - Chlorophexamine (Allergex)
  - Chlorophenramine maleate (Allergyl)
  - Clemastil (Tavagyl)
  - Dimethinidine maleate (Fenestil)
- **Second-generation (non-sedating):**
  - Loratidine (Claritine, Lortan)
  - Fexofenadine (Telfast)
  - Citirizine (Zyrtec)
  - Azelastine (Zalastin) & Levocapastine (Livostin) intranasal preparations.
- **Third generation:**
  - Desloratidine (Areus)



# TOPICAL INTRANASAL CORTICOSTEROIDS



- Inhibits the synthesis of the **proinflammatory cytokines** IL-1-6; interferon- $\gamma$ ; tumor necrosis factor- $\alpha$  and induces the **synthesis of anti-inflammatory substances** such as vasocortin and lipocortin.
- Fluticasone propionate (Flixonase), Mometazone foroate (Nasonex), Beclometazone dipropionate (Beconase), Budesonide (Rhinocort).
- FDA approved to be used starting at the ages of 3 (mometasone) and 4 years (fluticasone)



# SYSTEMIC CORTICOSTEROIDS



- Administered to patients during **severe exacerbations** of allergic symptoms
- **Nasal polyposis**
- **Prednisolone & Betamethasone dipropionate**
- Consider side effect





# TOPICAL ANTI-CHOLINERGIC AGENTS



- Ipratropium bromide (Atrovent)
- **Inhibit parasympathetic stimulation of glandular secretion by competing for muscarinic receptors on glands**
- highly effective in **reducing rhinorrhea but have no effect on the other symptoms**
- Excessive **drying of the nasal mucosa and epistaxis** are the most frequent side effects.

# SODIUM CHROMOGLYCATE



- Prevent mast cell degranulation.
- Protective effect on the allergic response when given four to six times daily **beginning before the development of symptoms**
- Its effectiveness approximates that of antihistamines, **but the need for frequent dosing limits compliance**
- Like antihistamines, cromolyn is more **helpful for sneezing, rhinorrhea, and nasal itching** than for nasal congestion.

# LEUKOTRIENE RECEPTOR ANTAGONISTS



- Montelukast , Zafirlukast
- More effect to nasal congestion in late phase
- May be useful in the treatment of patients with allergic rhinitis and concomitant asthma.
- Combination of a leukotriene modifier with an antihistamine increases the efficacy of both medications. This combination can be considered as an alternative in patients who do not tolerate intranasal corticosteroids.

## Individualized treatment for allergic rhinitis based on key nasal clinical manifestations combined with histamine and leukotriene D4 levels.

Shen C<sup>1</sup>, Chen F<sup>1</sup>, Wang H<sup>1</sup>, Zhang X<sup>1</sup>, Li G<sup>1</sup>, Wen Z<sup>2</sup>.

### ⊕ Author information

#### Abstract

**INTRODUCTION:** The types of allergic rhinitis are roughly classified based on the causative antigens, disease types, predilection time, and symptom severity.

**OBJECTIVE:** To examine the clinical typing and individualized treatment approach for allergic rhinitis and to determine the optimal treatment method for this disease using various drug combination therapies.

**METHODS:** A total of 108 participants with allergic rhinitis were divided into three groups based on symptoms. Subsequently, each group was further categorized into four subgroups based on the medications received. The efficacy of the treatments was evaluated using the visual analog scale VAS scores of the total and individual nasal symptoms, decline index of the symptom score, histamine and leukotriene levels, and mRNA and protein expression levels of histamine 1 and cysteinyl leukotriene 1 receptors.

**RESULTS:** Loratadine+mometasone furoate and loratadine+mometasone furoate+montelukast significantly improved the sneezing symptom and reduced the histamine levels compared with the other combination therapies ( $p<0.05$ ). Meanwhile, montelukast+mometasone furoate and montelukast+mometasone furoate+loratadine considerably improved the nasal obstruction symptom and decreased the leukotriene D4 levels compared with the other combination therapies ( $p<0.05$ ).

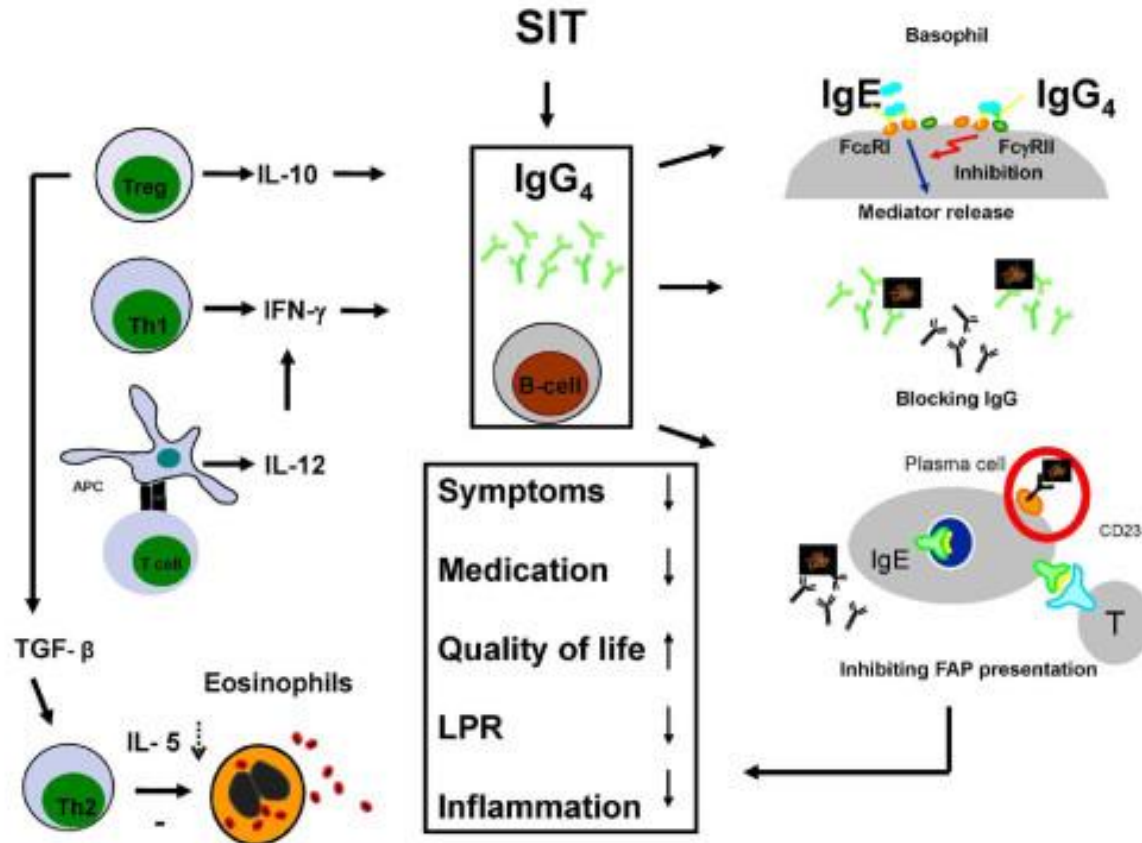
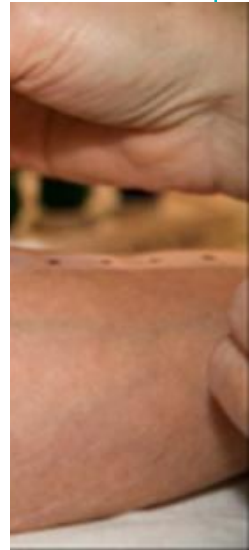
**CONCLUSION:** Clinical symptom evaluation combined with experimental detection of histamine and leukotriene levels can be an objective and accurate method to clinically classify the allergic rhinitis types. Furthermore, individualized treatment based on allergic rhinitis classification can result in a good treatment efficacy.

# IMMUNOTHERAPY



- Indication is symptoms **not adequately controlled** by avoidance measures and pharmacotherapy.
- Patients with **perennial symptoms** may prefer immunotherapy to yearlong daily medication.
- **Technique:**
- Choice of allergens for treatment is made after a careful diagnostic workup.
- **Begins with low-dose** injections of allergen extracts till reaching a **maintenance dose**. Injections usually **begin at weekly intervals** and are **then reduced in frequency** when maintenance doses are reached.
- Improvement begin after **3 months**, but an optimal effect takes **1 year**.
- Patients who do not achieve symptomatic improvement after 1 year of immunotherapy should discontinue.

# IMMUNOTHERAPY



# ARIA Guidelines: Recommendations for Management of Allergic Rhinitis

