

Contemporary Management of Allergic Rhinitis

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Allergy



- Malfunction of the immune system in which defensive action is taken against harmless substances (overshooting of the immune reaction.)
- Lymphocytes can become memory cells which store the identity of allergens and institute immune reaction upon subsequent exposures.
- Immune reactions – Types I to IV

Type I Immune Reaction

- Immediate hypersensitivity = atopy
- IgE mediated
- IgE is present in greater than trace amounts in about 20-30% of the population
- Only this type of allergy can be diagnosed reliably by skin testing (in vivo) or RAST (in vitro) methods.

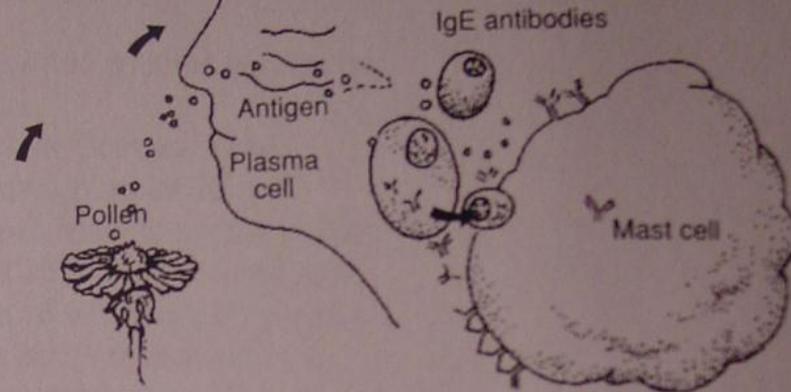
Type I Immune Reaction

- Type I reaction produces an immediate reaction within seconds to minutes.
- Symptoms include sneezing, rhinorrhea, itching, conjunctivitis, cough, wheezing, urticaria, angioedema, and anaphylaxis.
- Examples include all inhalant allergy, insect sting allergy, medication allergy, and small percent of food allergy.



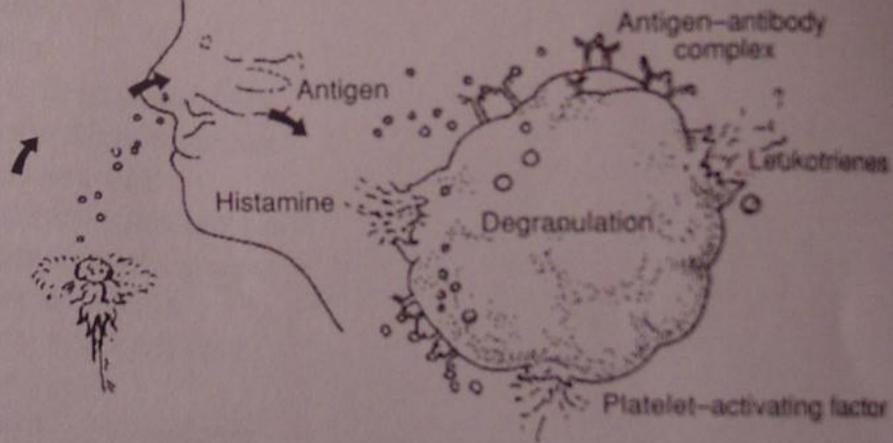
A

Sensitization



B

Reexposure to antigen



Immune Reactions

- Type II – Immunoglobulins (Blood type incompatibility.)
- Type III – Immune complexes activate complement system (most common form of allergy seen in food hypersensitivity.)
- Type IV – T cell-mediated delayed reaction (poison ivy.)
- Inhalant allergy is type I; Food allergy can be any of the four types.



Types of Allergy

- 1) Fixed Allergy – Type I IgE reaction
 - Repeated exposures lead to increasingly rapid and severe reactions
 - All or nothing response
 - Drug allergy – lack of exposure for many years could be misleading.
- 2) Cyclic Allergy

Types of Allergy

- 1) Fixed Allergy – inhalant allergens
- 2) Cyclic Allergy – food allergy
 - Severity of reaction is cumulative (dose and frequency dependent)
 - Delayed onset (not IgE mediated)
 - May affect any part of the body producing large range of symptoms

Priming Effect

- The speed and severity of an allergic reaction can be increased by prior exposure to other allergens. (The immune system is revved up.)
- Once primed, even nonantigenic stimuli such as smoke can trigger an allergic reaction.
- Very important concept impacting treatment of allergies.

Signs and Symptoms of Allergy

■ History

- Questionnaire
- Symptoms
- Onset & Fluctuation – perennial vs. seasonal
- Exposure – pets, smokers, home, job, meds, diet
- Family history – genetic predisposition of binding sites
- Previous allergy tests

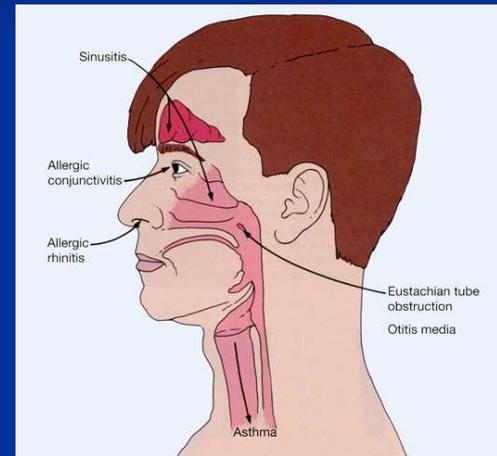
Signs of Allergy

- Adenoid facies
- Allergic salute
- Allergic shiners
- Dennie-Morgan Lines
- Excoriated nostrils



Physical Exam

- The ears, nose, and throat are portals of entry for most allergens
- Eyes
- Ears
- Nose/Nasopharynx
- Mouth/Oropharynx
- Larynx



Allergy Testing Indications

- Confirm diagnosis by history and exam.
- Improve allergen avoidance measures.
- Guide immunotherapy dose.
- No test is reliable for food sensitivity.
- Inhalant allergens can be tested with more than 95% reliability.

Allergy Testing

■ In Vivo Tests

- 1. Scratch test
- 2. Prick test
- 3. Intradermal test

■ In Vitro Tests

- 1. RAST
- 2. ELISA
- 3. Immunocap



Scratch Test

- Unreliability
- Quantification of amount of antigen introduced is poor
- AMA (1987) advised against its use due to unreliability



Prick Test

- Multiple prick-puncture apparatus applies controlled depth of penetration (approx. 1mm)
- Fair reliability allows use as a screening tool
- Convenient and inexpensive
- Quantification of the amount of antigen introduced is still imprecise



Intradermal Testing

- Skin Endpoint Titration (SET) – Rinkel
- Serial dilutions of concentrated extracts (1:5)
- Start with weakest dilution #6 and progress until positive reaction.



Intradermal SET Testing

■ Advantages

- Very reliable (>95%)
- Guides safe starting dose for immunotherapy

■ Disadvantages

- Time consuming
- Patient discomfort - ENT Surgical Consultants uses topical anesthetic cream applied 2 hours before testing

In Vitro Tests

■ Indications

- Dermatographs and other skin disorders
- Children/uncooperative patients and elderly
- History indicating severe risk of anaphylaxis with in vivo testing.
- Postmortem exam for IgE antibodies to identify allergens causing possible lethal anaphylaxis.
- Patients who cannot discontinue antihistamines, tricyclic antidepressants, or beta blockers.

In Vitro Tests

- RAST & ELISA
- 70-75% reliability as compared with SET test.
- Measures the amount of serum IgE specific to a particular allergen which tends to parallel the severity of the patient's symptoms.

Treatment Options

- 1. Avoidance
- 2. Pharmacotherapy
- 3. Immunotherapy



Avoidance Measures

- Allergenic attachment sites are genetically determined.
- Avoidance of contact with allergen eliminates activation of lymphocyte into plasma cells
- Reduces the priming effect by decreasing the total allergenic load.
- The number of exposures required to activate the immune reaction is variable.

Avoidance Measures

■ Geographic Move

- Radical method that may not work.
- May be only temporarily beneficial.
- Consult vegetation maps (U.S. Geological Survey)
- Not recommended unless allergic cripple.



Avoidance

- Recommend commercial cleaning of airducts followed by use of filtration system to prevent future buildup.
- 1. HEPA filter
- 2. Electronic Precipitator (ionizer)
- 3. Electrostatic Filter

HEPA Air Purifier

- High Efficiency Particulate Air Filter
- Filters down to 0.3 micron particles
- Expensive
- Requires frequent cleaning of filter



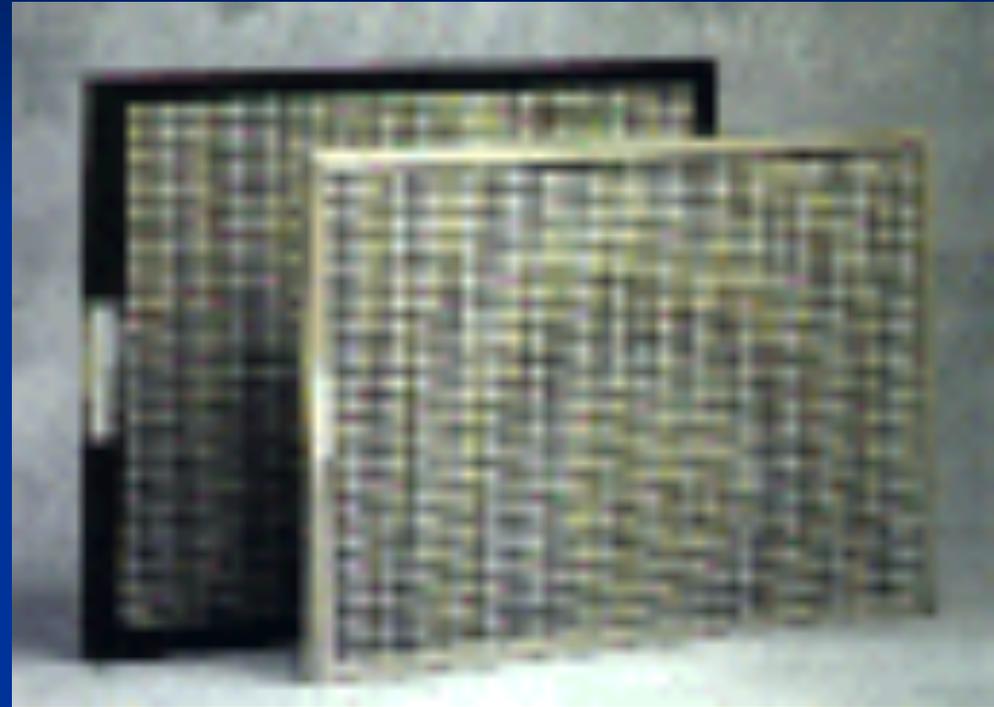
Electronic Precipitator/Ionizer

- Charges allergenic particles causing them to deposit on filtration plates.
- Expensive
- Requires frequent cleaning of filter



Electrostatic Filter

- Less effective but simplest and cheapest to install.
- Removes particles by electrostatic attraction.



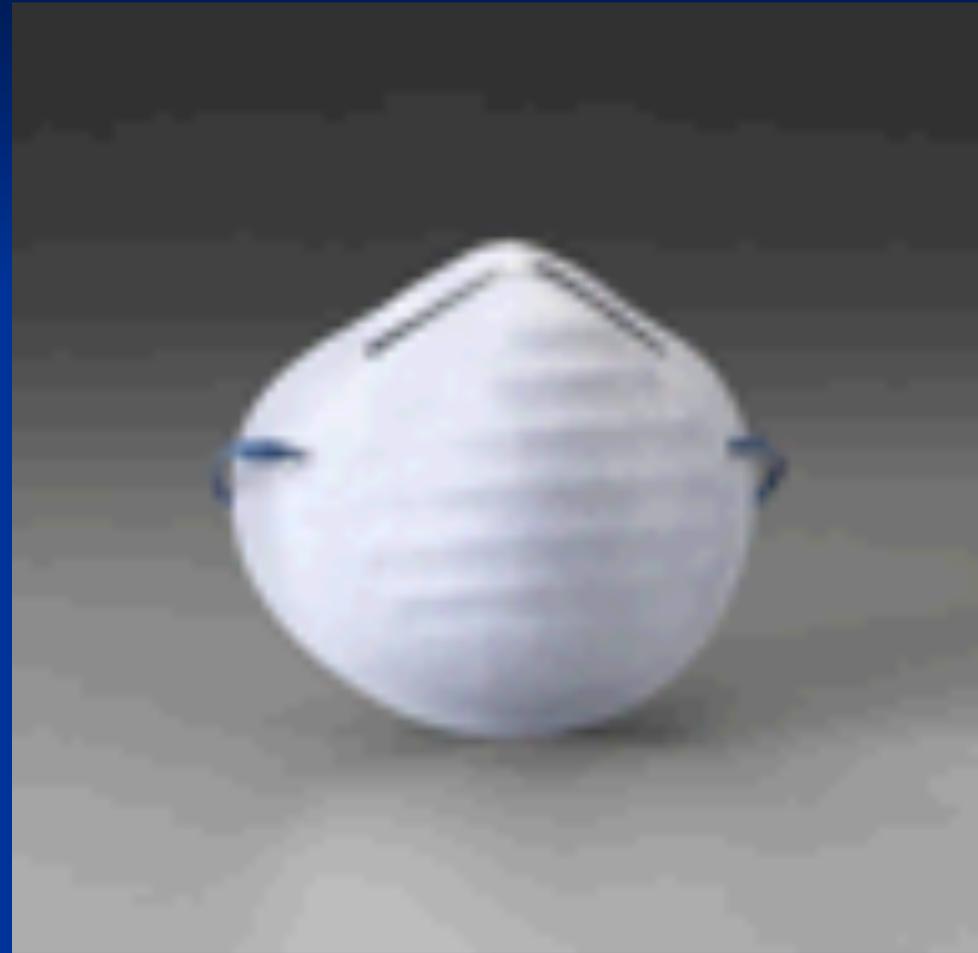
Avoidance Measures

- Immunotherapy & pharmacotherapy are more beneficial when avoidance implemented.
- 1. Pollen control
- 2. Mold control
- 3. Dust control

Pollen Avoidance

- Trees – spring
- Grass – summer
- Weed – fall

- Pollens most prevalent in mornings so stay indoors or wear mask.



Mold Avoidance

- Year round presence indoor and outdoor.
- Mold spores vary in particle size making their removal by filtration more difficult.
- Affinity for dampness

Mold Avoidance

- Outdoor Molds
 - Presence peaks in evening hours
 - Bodies of water
 - Decaying vegetation



Mold Avoidance

■ Indoor Molds

- Moisture – drip pans, drains, sinks
- Clean with bleach
- Old newspapers, firewood, old clothing
- Indoor plants, bird cages (droppings)
- Xmas tree
- Farmers

Dust Avoidance

- House dust contains 28 allergens
- All 28 balance to act like a single allergen
- Active ingredient – degenerating lysine sugars
- Degenerating residue of upholstery, carpets, mattresses, bedding, pollen, molds, insect parts, and food particles.

Dust Avoidance

- Potency depends on age of dust.
- Winter – tightly closed homes.
- Dust mite



Dust Avoidance

- Spartan home – free of “dust catchers”
- Pillow covers and mattress covers
- Dust mites killed by high temperature (unaffected by laundry detergent)



Dust Avoidance

- Anti-dust compounds
 - Tannic acid – denatures dust mite allergen (X-Mite)
 - Benzyl benzoate – kills dust mites (Acarosan)
- Regular use of HEPA commercial vacuum cleaners



Treatment Options of Allergy

- 1) Avoidance

- **2) Pharmacotherapy**

- 3) Immunotherapy

Pharmacotherapy

	Nasal Congest.	Sneezing	Nasal Drainage	Eye itch & redness	Skin hives & itching
Nasal steroids	++++	++++	++++	0	0
Antihistamines	0	++	++	0	++
Antihistamine-D	++	++	++++	-	++
Patanol	0	0	0	++++	0

Pharmacotherapy

■ AntiHistamines

- Block H1 receptor sites
- Prevents histamine from producing typical symptoms
- Very little decongestant effect

First Generation AntiHistamines

- OTC's
 - AntiCholinergic
 - Sedative
 - Tachyphylaxis

Second Generation AntiHistamines

- Seldane (terfenadine) and Hismanal (astemizole)
- Less anticholinergic
- Less tachyphylaxis
- No sedation (does not cross BBB)
- Causes ventricular arrhythmias with macrolides and antifungals.

Third Generation AntiHistamines

- Claritin (loratadine), Zyrtec (cetirizine), & Allegra (fexofenadine)
- No cardiotoxicity
- Otherwise similar to 2nd generations.



Topical Nasal AntiHistamines

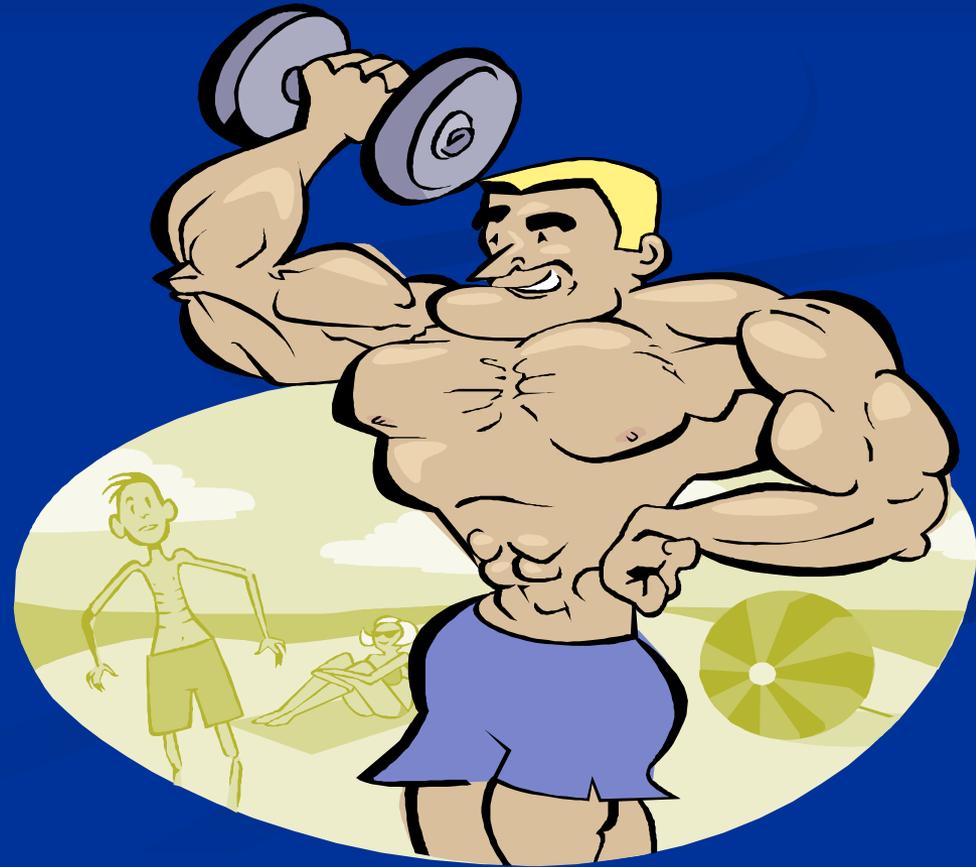
- Astelin (azelastine) – equivalent potency
 - Side effect is taste perversion.

AntiHistamine-Decongestant Combination

- Pseudoephedrine
- Relieves nasal congestion by vasoconstriction
- Side effects
 - CV stimulation
 - Dryness

Systemic Corticosteroids

- Oral or I.M. injection
- Very effective in controlling symptoms
- Significant adverse effects



Topical Nasal Steroids

- Useful in allergic and nonallergic rhinitis
- Few systemic side effects
- Effective without drying
- Cannot be used PRN
- Nasal septal ulceration can occur
- Available OTC



Topical AntiCholinergic Nasal Sprays

- Atrovent (ipratropium bromide)
- Effective for rhinorrhea (allergic or vasomotor) only
- Available OTC



Mast Cell Stabilizer

- Cromolyn sodium (Nasalcrom)
- Prevents allergic event
- Must be applied prior to exposure to allergen
- Must be applied every 4-6 hours
- Exceptionally safe (available OTC)
- Effective for well-defined, unavoidable allergens not encountered on a continuous basis.

Ophthalmic Drops

- Patanol (olopatadine 0.1%), Pataday (0.2%), Pazeo (0.7%), Optivar
- Very effective for allergic eye symptoms
- Safe to use with contact lenses



Allergy Treatment

- 1) Avoidance
- 2) Pharmacotherapy
- 3) Immunotherapy



Immunotherapy

- Potentially curative (80-90%)
- Cheaper than lifetime of pharmacotherapy.
- Even partial cure would decrease total allergic load (eliminates priming effect).
- Inconvenient

Immunotherapy Indications

- IgE mediated allergy
- Failed avoidance and pharmacotherapy
- Multi-seasonal allergies
- Severe single season allergies
- Motivated compliant patient



Immunotherapy Contraindications

- Absence of allergy
- Immunodeficiency
- Beta blockers
- Pregnancy



Immunotherapy

- SCIT (allergy shots) vs. SLIT (allergy drops)
- SCIT is done weekly in the office, cost depends on insurance policy
- SLIT is done at home, cost is \$60 per month
 - more convenient
 - no pain of injection (kid friendly)
 - much lower chance for side effects

Immunotherapy

- Increase to maximally tolerated dose for 5 years average.
- Must be prepared for anaphylaxis with allergy shots (SCIT=subcutaneous immunotherapy)
 - Escalation phase - (weekly shots for 1-3 years average)
 - Maintenance phase - (every 2 weeks for 6 months, then every 3 weeks for 6 months, then monthly for 2 years)
- No risk of anaphylaxis with allergy drops so done at home
 - (SLIT=sublingual immunotherapy)
 - Place one drop under the tongue three times per day
 - Escalation phase - retest molds every 3-6 months and increase strength of vials for 1-3 years average
 - Maintenance phase - stop retesting and continue drop three times per day for 3 more years.

Conclusion

- Allergy is quite prevalent.
- Intradermal skin testing is highly reliable for inhalant allergy.
- Treatment options include avoidance, medications, and allergy shots (SCIT=subcutaneous immunotherapy) or allergy drops (SLIT=sublingual immunotherapy).

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