

## NATURAL ALLERGENS

- **ALLERGENS:** Inciting agents of allergy (the substance capable of sensitizing the body unusual response-hypersensitive persons)
- Allergens may be of biological, chemical or of synthetic origin eg-Pollen grains, dust etc.(Natural Allergens)
- Chemical identity of allergen is unknown.
- Most of the allergens are protein or glycoprotein.
- Allergens resemble immunogens except size  
.Allergens are smaller in size(mol.wt 10,000-70,000)
- A number of 1000 mol.wt chemicals 'allergenic haptens' are partial immunogens and induce allergy in combination with suitable protein carrier is called as "Drug Allergy".

- **What is a Allergy?**
- The allergy (hypersensitivity) may be defined as a specific immunologic reaction to an immunogens a normally harmless substance(allergens).
- “Allergy” was first defined in 1906 by “von Pirquet”. He described ‘Allergy as changed or altered reaction in the body of an individual, in the response to a substance or condition that is harmless to others.
- Sneezing-symptom of cold –allergic reaction due to air.
- 30% of population suffers from allergic syndrome.

- Children of allergic parents develop allergies to the particular allergen (even if one parent is allergic) on first exposure.
- The immune system functions as the body's defense against, invading agents such as virus and bacteria.
- The allergic person comes in to contact with an allergens.
- The immune system treats the allergens as an invader and mobilizes to attack, by generating large amount of antibody(a disease fighting protein) called immunoglobulin E-(IgE).

## Primary Exposure

- Each IgE antibody is specific for one particular allergy producing substance.
- IgE antibody is attached to the body's mast cells like tissues, cells and basophils.
- Primary exposure (first meet of body and an allergen(antigen)no allergic symptoms will be produced due to the absence of antibodies.
- On subsequent exposure the specific IgE attacks the allergens and Antigen-Antibody reaction occurs, with the liberation of powerful inflammatory substances like histamine, cytokines, leukotrienes or SRS(slow reacting substances)Bradykinin.
- The above chemicals acts on various parts of the body such as respiratory system and causes symptoms of allergy.

## **Factors which make the person Hypersensitive**

1. Hereditary tendency to allergic response.
2. Dysfunction of the endocrine glands.
3. Increased excitability of sympathetic and parasympathetic nervous systems.
4. Absorption of metabolic and catabolic substances.
5. Hepatic dysfunction.
6. Psychic influences.

## **Types of Allergens**

The allergens can be classified on the basis of types of symptoms and route of entry into the body(allergens).

1. Inhalation allergens(Air)
2. Ingestant allergens(Food)
3. Injectant allergens(Antibiotics-injections)
4. Contactant allergens (plants allergens)
5. Infectant allergens(Bacteria,fungus,etc)

## **1. INHALATION ALLERGENS (AIR)**

- Air borne substances as chemicals – Respiratory disease, inflammation in the nose and lungs (sneezing, lacrimation, itching and swelling of nose and eyes). The above condition is called as "Sinusitis or hay fever".
- Air pollution-Asthma (Inflammation)

# Symptoms of Air borne substances Allergy

- Sneezing with running or clogged nose.
- Coughing.
- Itching eyes,nose and throat.
- Allergies shiner(dark circles under the eyes caused by increased blood flow near the sinuses)
- Allergic salute(upward rubbing of nose, causes mark on the nose)
- Watering eyes,conjunctivitis(inflammation in eyelids causing red rimmed, swollen eyes).
- Allergens entrance in to the nose causes histamine release and causes nasal congestion.

**Examples:**Pollens,Dust,Mites,Mold spores and animal allergy.



# ALLERGIC SYMPTOMS

- POLLEN –Symptoms intensify in morning and worse on windy days. Eyes may itch or swell
- MOLDS- Symptoms intensify in evening and on cold climates .exposure to moldy foods such as blue cheese etc
- HOUSE DUST AND DUST MITE –Symptoms are worse in dusty places

## POLLEN ALLERGENS

- Tiny, eggshaped,round,angular,squre,rectangular shaped cells of flowering plants(male cells)
- Helps for plant fertilization.
- The average pollen particle size →less than the width of average human hair.
- Pollen grains may be single(acolpate) or many (multicolpate) dicolpate,tricolpate,tetracolpate
- Outer surface of pollen grain is exine , smooth(psilate)
- To spiny(echinate)

# POLLENS

- **Anemophilous ( wind pollinated)**
- Small in size 15 – 45 in Dm light non adhesive
- (eg) –**trees** –oak, walnut , **grasses** – bermuda ,timothy , **weeds** – rag weeds , plantain
- **Entamophilous(insect pollinated)**
- Larger in size 200 micro meter in Dm heavier,adhesive , spiny (eg) – scented plants with colored flowers – rose , cloves hollyhock honey suckle etc

**Grasses:** The following grasses shed allergenic pollens

- ***Cynodon dactylon*** Linn (Bermuda grass) – ***Sorghum halepense*** Linn
- (Johnson grass)
- ***Dactylis glomerata*** Linn (Orchard grass) – ***Phleum pratensis*** Linn (Timothy)
- ***Poa pratensis*** Linn (Kentucky blue grass) – ***Agrostis alba*** Linn (Red top)
- ***Anthoxanthum odoratum*** Linn (Sweet vernal grass)  
– ***Lolium perenne***
- (perennial rye)
- The grasses pollinate through out the year.

**Weeds:** The weeds belonging to the family Chenopodiaceae, Polygonaceae, Plantaginaceae, Amaranthaceae and Compositae are responsible for shedding allergenic pollens.

- ***Rumex crispus*** Linn (yellow dock) – ***Chenopodium ambrosioides*** Linn (Mexican tea)
- ***Rumex acetosella*** Linn (sheep sorrel) – ***Amaranthus palmeri*** (Palmer's amaranth)
- ***Chenopodium album*** Linn (Lamb's quarters) – ***Amaranthus retroflexus*** Linn (Pig weed)
- ***Achillea millefolium*** wood (western water hemp)
- ***Salsola kali*** Linn (Russian thistle)
- ***Iva xanthifolia*** Nutt (Marsh elder)

## **MOLD ALLERGY**

- Mold season: Peak from July to late summer.
- Mold growing indoors : “Allergic rhinitis” (HAY fever)
- Foods : Cheese (processed with fungi)
- mushrooms  
dried fruits, yeast, soya, sauce or vinegar .
- **Common molds found indoors and outdoors in U.S & India**
- **Common mold genera** : *Alternaria* *Macrosporing*, *Helminthosporium*, *Hormodendrum* (*cladosporium*),
- *Aspergillus*, *Pencillium mucor*, *Rhizopus*, *Syncephalastrum*, *Curvularia*, *Brachysporium* and *Pullularia*.

# House dust and Dandruff Allergens

Dust is commonly composed of mold spores.

( Eg) Cotton fibres, animal danders (epithelial scales), cat, dog, guinea pigs, chickens, rabbit, human hair, dandruff. Chicken excreta, mice house mites, cockroach excreta, odours & Perfumes.

HOUSE DUST : Acarine mite (*Dermatophagoides*) and its species *D. pteronyssinus*.

DUST MITES : Perennial allergic rhinitis, (symptoms similar to pollen allergy & asthma) Eg. Cotton fibres.

## 2.INGESTANT ALLERGENS(FOOD)

- Allergies which are present in food stuffs are swallowed(Food allergy) causes skin rashes, puffed lips and tongue, Migrane, Rhinitis, severe eczema of hands and feet.
- Food allergens transferred to other organs of the blood.Atopic dermatitis such as tomato rash, Strawberry rash(caused by eating oranges, chocolate or shell fish)
- **Common food allergens:**
- Milk,Egg,Peanut,Tree nut(nalnut,cashew nut etc), fish, Shellfish, Soya,Wheat,Orange juice,Cod liver oil or other vitamins containing fish oils.



## **Food Additives**

- Mannitol, Sorbitol, Polysorbates, citrus, Malt dextrines, bioflavonoids, Artificial colours, Artificial preservatives, Citrus pectin, Talc, Soya lecithin, Gluten, soya flour, rice flour, Alfa alfa, Potato starch and gum acacia.

## **Dairy milk allergy**

- Specific immunological antibody-antigen reaction due to a “lacto albumin” which causes dermatitis, Recurrent Rhinorrhea, bronchitis and asthma.
- Milk allergy can be avoided by using commercial milk substitutes prepared from soya bean isolates.

### 3. INJECTANT ALLERGENS

Symptoms of allergy caused by the intake of antibiotics (injections)

- (eg) : Pencillin, cephalosporin & semi synthetic pencillin etc. Itching of palms, hands, feet, Peeling of skin, Anaphylactic shock etc can occur.
- Other injectables which causes allergy are liver extract, antitoxins and the glandular products.
- The natural sources of injectable allergens are produced by the sting of bees, hornets & wasps which causes death.

## 4. CONTACTANT ALLERGENS

- The plant responsible for contact dermatitis are Poison Ivy, Oak, sumac.
- **Toxicodendron**(Rhus)genus belong to the family(Anacardiaceae)in North America.
- Rag weeds (compositae)
- The allergen compounds of these plants are known as “Urushiols”(a phenolic compound).
- Sesquiterpene lactone-  
Compositae,lauroneae,magnoliaceae
- Liver wort Frullania (jubilaceae)-“Allergic dermatitis”  
***Parthenium hysterophorus*** weed-“Allergic dermatitis”
- *Rutagraveolens,Asparagus,Chrysanthemums,Ginkgo* leaves,*Lobelia,Marigold* etc.

- **Aero allergens** :Burning leaves(smoke)-Contact dermatitis.
- **Hypoallergenic cosmetics**: Brand names of
- Ar-ex,allercrema, almay & marcelle,orris root in talcum powder.
- **Dibromo flurosecein**:Used in lipsticks.
- **Wool fat**: Used in soaps & soap products,Nail polish,hair sprays.

## **5. INFECTANT ALLERGENS**

Allergy caused by metabolic product of living micro organism in the human body.

(Eg) :Bacteria,Protozoa,Molds-Chronic infection,Hook worms,Tape worms,Pin worms,Thread worms&Dermatophytes-Infectant allergens

## **PREPARATION OF HERBAL ALLERGENIC EXTRACTS**

- Allergenic extracts are concentrated solutions of allergens used for the diagnostic and therapeutic purposes.
- Extracts are aqueous (0.9% sodium chloride used as diluent) or glycerinated (50% glycerin as diluent). Most preparations are buffered at pH 8 and contain phenol (< 0.4%) as an anti microbial preservative.

## **Preparation**

- The preparation of allergenic extracts required same general procedure and precautions required with all parenteral products.
- The extraction process should be carried out in a aseptic condition in a cold room.

## **Materials**

- The allergenic substances to be extracted are obtained from commercial suppliers and only the most reliable sources are selected.
- It should be free from adulteration and should not contain more than 1% of foreign matter and should be prevented from the microbial contamination.

## **Grinding**

- The material to be extracted must be ground or sub divided for the efficient extraction of the allergens.
- Materials such as hair, feathers and textiles should be divided finely with shears.

## **Defatting**

- Before final extraction, all these allergenic substances should be defatted with ether and petroleum ether. It provides a clear final extract free from irritants.
- This defatted extract can be used in the preparation of some patch testing substances.



## **Extraction**

- The extraction procedures are based upon the assumption that allergens are water-soluble proteins or glyco proteins.
- Extraction is carried out normally for 24 – 72 hours in cold room using sterile, pyrogen free buffered saline, coca's solution or similar aqueous menstrum of pH 8.

## **Buffered solution**

- Sodium chloride – 5 gm
- Monobasic potassium phosphate – 0.36 gm
- Dibasic sodium phosphate anhydrous – 7 gm
- Phenol crystals – 4gm
- Water for injection USP to make – 1000 ml

# Coca's solution

- Sodium chloride – 5 gm
- Phenol crystals – 5 gm
- Sodium bicarbonate – 2.5 gm
- Water for injection USP to make – 1000 ml
- After extraction, mixture is clarified by coarse filtration. Some extracts are dialyzed against saline or running tap water to remove irritants or colouring matter.
- The processed extract is sterilized by filtration through cellulose membrane filter.

## **Stability and storage**

- All the allergenic extracts should be refrigerated at 2 – 8°C and freezing should be avoided.

### **List of plant or tree producing pollens (allergens)**

- Alfalfa, Almond, Apple, Acacia, Barley, Blue grass, Cherry, Canary grass,
- Eucalyptus, Mulberry, Mustard, Lemon and related species of Citrus.

## **TYPES OF ALLERGINIC EXTRACTS**

1. Pollen extracts
2. Dust extracts
3. Fungal extracts
4. Insect extracts
5. Miscellaneous inhalation extracts

- **1.POLLEN EXTRACTS:** common pollens obtained from the
- **Ragweed:** Alfalfa, Dahlia, Dandelion, hemp, marigold, mustard, poppy etc.
- **Grasses:** Rye grass, Velvet grass, Wheat grass, corn barley, blue grass etc.
- **Trees:** Acacia, Almond Apple, Apricot, Cherry, Cyprus, Oak, Pine etc.

- **2.DUST EXTRACTS:** Obtained from house cleaning, dust mites
- **Housedusts:**house,mattress,upholstery(textile &Furniture)
- **Dust mites:** *Dermatophagoides species-Dermatofarniae,Dermatopteronyssinus*,cedar,
- Red cedar, cotton gin, oak, wood dust etc.

- **3.FUNGUS EXTRACTS**

- Fungus are omnipresent.

- Home, textiles, leather goods, food & plants.

(Eg) *Altermaria,,Aspergillus,Botrytis,  
Cephalosporium,Pencillium,trichoderma,Trichop  
hyta,Fusarium,Verticillium etc.*



# 4. INSECT EXTRACTS

<b>STINGING INSECT(whole body)</b>	<b>STINGING INSECT(venom part)</b>
<b>Ant black,Ant red,Ant carpenter,Ant mix(black&amp;red), Ant fire.</b>	Honey bee, wasp, yellow hornet, white hornet, Mixed verpid.

## 5.MISCELLANEOUS INHALATION EXTRACTS

Other than pollen,dust&molds-Atopic allergies

Mammalian epidermal feathers	Miscellaneous inhalants
Camel,cat hair,deer,dog,goat, chicken,hog,guinea pig, pigeon,goose,duck,parakeal .	Acacia,algae,cotton seed,derris root, grain dust,hemp fiber,henna, jute, silk, guargum,leather, lycopodium, orris root,tobacco leaf,tragacanth,wood dust.

# HALLUCINOGENS

- Hallucination-The apparent perception of an object not actually present(produce illusions in mind of a person)
- Drugs causing hallucinogens-Narcotic drugs.Hallucinogens are often derived from plants. Eg.Indian hemp,Lysergic acid derivatives,cannabis etc.
- PROF.R.E.SCHULTES(1915-2001)-“Narcotic Plants”
- **Fungi**-Some of the poisonous fungi taken orally causes hallucinations(Genera-*Amanita,Psilocybe&conocybe* Fly agaric-*Amanita muscaria*).

- **Mushrooms-***Psilocybe Mexicana, canocybe cynopus, Stropharia*-contains tryptamine derivatives psilocybin, psilocin, compounds related to serotonin.
- Highest % of Psilocin(3.3%)-“*Psilocybe cubensis*”
- Other “*psilocybe species*” -  
*P.semilanceata*

*P.subaeruginosa*

- **Lycoperda species(puff balls)**-Hallucination & sleep after 30mins.
- **Lysergic acis(Diethyl amide derivatives)**-Hallucinations eg. Ergot alkaloids,*Ipomoea, Rivea&Argyreia* species

- **Morning glory seeds**-Hallucinogenic seeds(OLOLIUQVI) obtained from *Rivea corymbosa*,*Ipomea tricolor*(Morning glory),*I.violacea*,*Ipomoea hederacea*(kaladana).
- **Peyote**: certain cacti-proto alkaloids causes hallucination
  - Eg:cactus”*Lophophora williamsii*”(Peytl,anhalonium or mescal buttons)contains alkaloid mescaline,anhalonine.
- **Indian hemp(Ganja)**:variety of *cannabis sativa*,*c.indica*,*c.ruderalis*.*Bhang* (hindusthan),*Hashish*(Arabica),*Charas* or *churrus*.

- **Other Plants:** Nutmeg (myristicin&elemicin)and mace, Apiol of parsley, Dillapiol of dill
- *Virola* spp-*V.sebifera*,*V.multinerva*(myristicaceae)
- *Anadenanthera peregrine*,*Mimosa hostiles*,*M.opthalmocentra*(Leguminosae)
- *Banisteriopsis* spp-*B.caapi*(Malpighiaceae)
- *Tabernanthe iboga*(*Ipoga* root) it is a african narcotic which comes under indole alkaloids-(Apocynaceae)
- *Salvia divinorum*-(*Labiatae*)-Leaves are chewed or infused.
- *Calea zacatechichi*-(*compositae*)-infusion or smoked.
- *Peganum harmala*-(*Zygophyllaceae*)
- *Genera alchornea*,*Monadenium*,*Mostuea*&*voacanga*-african hallucinogen.

## TOXIC PLANTS

- *Senecio* spp (compositae)-Pyrrolizidine alkaloids, lasiocarpine, retrorsine.
- *Indigofera spicata* (Leguminosae)-indospicine.
- *Nicotiana* spp (solanaceae)-Pyridine alkaloids
- *Blighia sapida* (akee) Fruits & seeds (sapindaceae)-Hypoglycin A
- *Leucaena leucocephala*, *Mimosa* spp (leguminosae)-Mimosine
- (Locoplants) *Astragalus lentiginosus* (Leguminosae)-unknown
- (Lupins)-*Lupinus sericeus* (Leguminosae)-Quinolizidine alkaloids eg. cystine, anagyrine.
- *Veratrum californicum* (Liliaceae)-Steroidal alkaloids-cyclopamine.