


ALLERGIC REACTION

SALWA HASSAN TEAMA

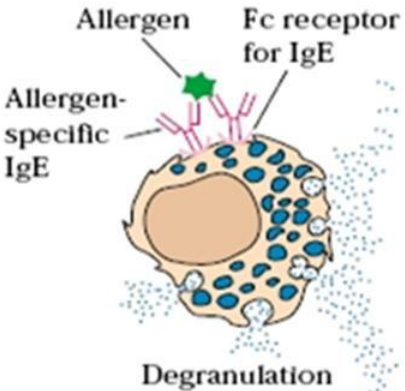
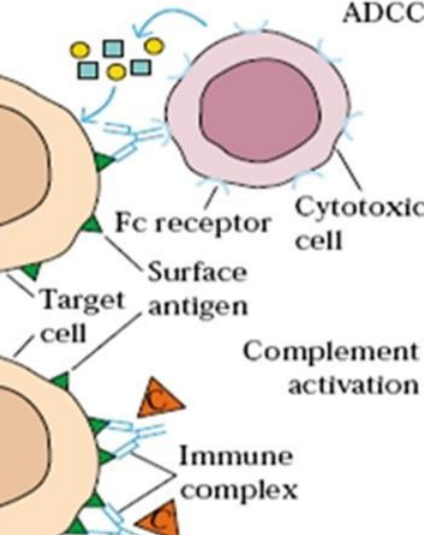
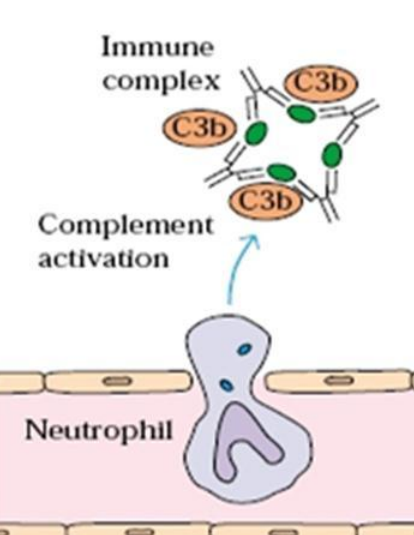
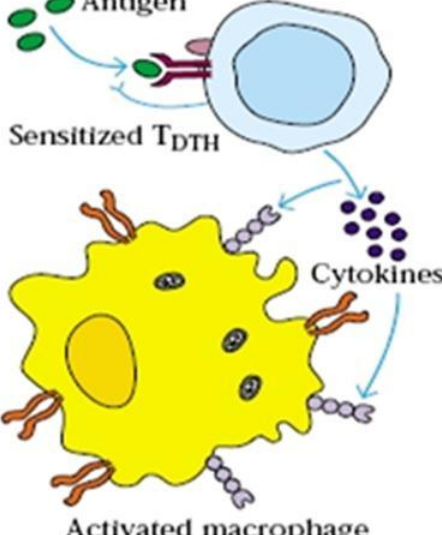
ALLERGIC REACTION



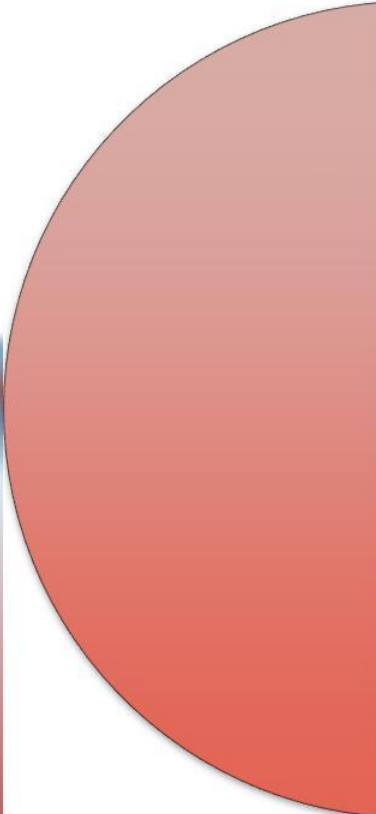
Hypersensitivity and allergy
are synonyms.

Allergy refers to undesirable
immune reactions produced by
the normal immune system.

Hypersensitivity Reactions

 <p>Type I</p>	 <p>Type II</p>	 <p>Type III</p>	 <p>Type IV</p>
<p>IgE-Mediated Hypersensitivity</p>	<p>IgG-Mediated Cytotoxic Hypersensitivity</p>	<p>Immune Complex-Mediated Hypersensitivity</p>	<p>Cell-Mediated Hypersensitivity</p>
<p>Ag induces crosslinking of IgE bound to mast cells and basophils with release of vasoactive mediators</p>	<p>Ab directed against cell surface antigens mediates cell destruction via complement activation or ADCC</p>	<p>Ag-Ab complexes deposited in various tissues induce complement activation and an ensuing inflammatory response mediated by massive infiltration of neutrophils</p>	<p>Sensitized T_H1 cells release cytokines that activate macrophages or T_C cells which mediate direct cellular damage</p>
<p>Typical manifestations include systemic anaphylaxis and localized anaphylaxis such as hay fever, asthma, hives, food allergies, and eczema</p> <p>Dr.Salwa Teama</p>	<p>Typical manifestations include blood transfusion reactions, erythroblastosis fetalis, and autoimmune hemolytic anemia</p>	<p>Typical manifestations include localized Arthus reaction and generalized reactions such as serum sickness, necrotizing vasculitis, glomerulonephritis, rheumatoid arthritis, and systemic lupus erythematosus</p>	<p>Typical manifestations include contact dermatitis, tubercular lesions and graft rejection</p> <p>4/5/2023</p>

IgE MEDIATED: TYPE I



Overreaction to an allergen that is contact through skin, inhaled through lung, swallowed or injected.

Atopy: clinical condition with certain specific immunologic and clinical features.

Atopy: Clinical disease requires either genetic predisposition and environmental exposure.

Atopy is the genetic predisposition to make IgE antibodies in response to allergen exposure.

Allergic rhinitis, allergic asthma, atopic dermatitis are the most common manifestation of atopy. Allergic gastroenteropathy is rare. These manifestations may coexist in the same patients at different times. Atopy can be asymptomatic.

GENE IDENTIFIED TO DATE IN ATOPY

Chromosome

Candidate Gene

1p
2q
3p24

IL-12
CD28

Bcl-6,IL3,IL4,IL5,IL13,GM—CSF,LTC4
synthase; receptor for macrophage-
CSF, β 2- adrenergic agonists,
corticosteroids

6p21-23

MHC,TNF,TAP-1,TAP-2, 5

12q14-24

Lipoxygenase,FcR1 $\Sigma\beta$ chain

14q11-13

INF γ , stem cell factor, NFKB, LAT4
hydrolase

16p11-12

TCR α/β chains, NF kappa B inhibitor
IL4 receptor



ATOPIC ALLERGIES

ATOPIC ALLERGENS

- ❑ Pollen allergens
- ❑ Mold allergens
- ❑ Arthropod allergens
- ❑ Animal allergens
- ❑ Food allergens
- ❑ Allergen extract

Common allergens associated with type I hypersensitivity

■ Proteins

- Vaccines

■ Plant pollens

- Rye grass
- Ragweed

■ Drugs

- Penicillin
- Sulfonamides
- Local anesthetics
- Salicylates

■ Foods

- Nuts
- Seafood
- Eggs
- Peas, beans
- Milk

■ Insect products

- Bee venom
- Ant venom
- Cockroach calyx
- Dust mites

■ Mold spores

■ Animal hair and dander

ALLERGIC RHINITIS

- ❑ Allergic rhinitis (allergic rhino conjunctivitis)(Hay fever)
- ❑ The most common manifestation of an atopic reaction to inhaled antigen
- ❑ IgE mediated allergy
- ❑ Allergen; Pollens, fungal spores, dust , animal danders are usual atmospheric allergens
- ❑ Localized in the nasal mucosa and conjunctiva
- ❑ Symptoms; Rhinorrhea, itching nose, postnasal mucus discharge redness and itching of eyes

ALLERGIC ASTHMA

- ❑ Allergic asthma (reversible obstructive pulmonary diseases)
- ❑ IgE mediated allergy
- ❑ Allergen; Pollens, house dust, animal danders
- ❑ Localized in bronchial mucosa
- ❑ Symptoms; Wheezing, dyspnea, chest tightness, cough

ATOPIC DERMATITIS

- ❑ Atopic dermatitis (eczema, neurodermatitis, atopic eczema)
- ❑ Often accompanies atopic respiratory allergies
- ❑ Clinical course independent of allergen exposure
- ❑ Possible very high IgE
- ❑ Symptoms; pruritic dermal inflammatory response , erythma, scaling

ALLERGIC GASTROENTEROPATHY

- ❑ Allergic Gastroenteropathy (eosinophilic Gastroenteropathy)
- ❑ IgE mediated allergy
- ❑ Localized in the gut to an ingested food
- ❑ Symptoms; Vomiting diarrhea. Continuous exposure to food produces chronic inflammation.

ATOPIC ALLERGENS

Allergic rhinitis, allergic asthma, eczematous dermatitis occur in significant number of patients without IgE mediated allergy.

NON SPECIFIC TRIGGERS OF ASTHMA

Infection

Viral respiratory infection

Physiologic factors

Exercise

Hyperventilation

Deep breathing

Psychologic factors

Atmospheric factors

Cold air

O₂

Water vapor

Drug

Aspirin

Non steroidal anti-inflammatory

ANAPHYLAXIS

- ❑ Non atopic allergic diseases
- ❑ An acute generalized IgE mediated reaction with involvement of several organ system; reaction can be evoked within minutes; cardiovascular, respiratory, cutaneous, gastrointestinal,.....
- ❑ Usual allergen is a drug, insect, venom and food
- ❑ Symptoms; generalized systemic reaction; vasodilatation ,Vascular collapse, acute air way obstruction , edema gastrointestinal muscle spasm anaphylactic shock

The allergen responsible for anaphylaxis are different with those associated with atopy. They are usually food , drugs, insect venom

Some allergen associated with anaphylaxis

Food

Lobster

Shrimp

Crab

Fish

Peanuts

Beans

Pea

Egg white

Milk

Drug

Corticosteroids

Phentoin

Antibiotics

Penicillin

Tetracycline

Diagnostic agent

Sodium

dihydrocholate

Vitamin

Thymine

Folic acid

ANAPHYLACTOID REACTION

Anaphylactic shock; condition occur in absence of allergy mediated mechanisms

- ❑ Exercise induced anaphylaxis
- ❑ Cholinergic anaphylactoid reaction
- ❑ Aggregate anaphylaxis
- ❑ Non IgE Anaphylaxis
- ❑ Anaphylactoid reaction with ionic compounds

URTICARIA AND ANGIOEDEMA

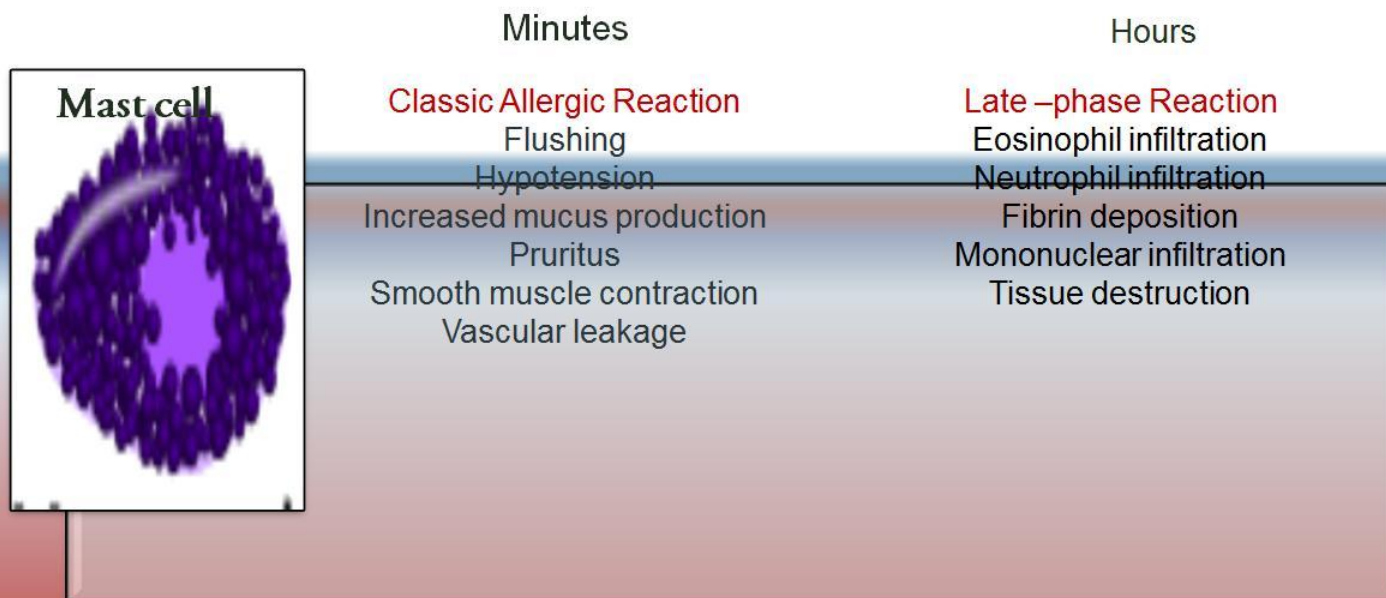
- ❑ Non atopic allergic diseases
- ❑ Acute form usually from IgE mediated allergies
- ❑ Allergen; food and drug
- ❑ Symptoms; multiple edematous plaques
 - Pruritic, vesicular lesions
 - Pruritic, bullous lesions

**Urticaria and
angioedema**

Mast cells and basophils are involved in immunopathogenesis of IgE mediated diseases. Mast cells and basophils have a high affinity IgE cell membrane receptors for IgE.

Immediate hypersensitivity reactions are mediated by IgE, but T and B cells play important roles in the development of these antibodies

Most occur within seconds or minutes after exposure to the allergen, but some can occur after several hours, particularly if the allergen causes a reaction after it is partially digested. In very rare cases, reactions develop after 24 hours.



Principal mediators involved in type I hypersensitivity

Mediator	Effects
PRIMARY	
Histamine, heparin	Increased vascular permeability; smooth-muscle contraction
Serotonin	Increased vascular permeability; smooth-muscle contraction
Eosinophil chemotactic factor (ECF-A)	Eosinophil chemotaxis
Neutrophil chemotactic factor (NCF-A)	Neutrophil chemotaxis
Proteases	Bronchial mucus secretion; degradation of blood-vessel basement membrane; generation of complement split products
SECONDARY	
Platelet-activating factor	Platelet aggregation and degranulation; contraction of pulmonary smooth muscles
Leukotrienes (slow reactive substance of anaphylaxis, SRS-A)	Increased vascular permeability; contraction of pulmonary smooth muscles
Prostaglandins	Vasodilation; contraction of pulmonary smooth muscles; platelet aggregation
Bradykinin	Increased vascular permeability; smooth-muscle contraction
Cytokines	
IL-1 and TNF- α	Systemic anaphylaxis; increased expression of CAMs on venular endothelial cells
IL-2, IL-3, IL-4, IL-5, IL-6, TGF- β , and GM-CSF	Various effects (see Table 12-1)

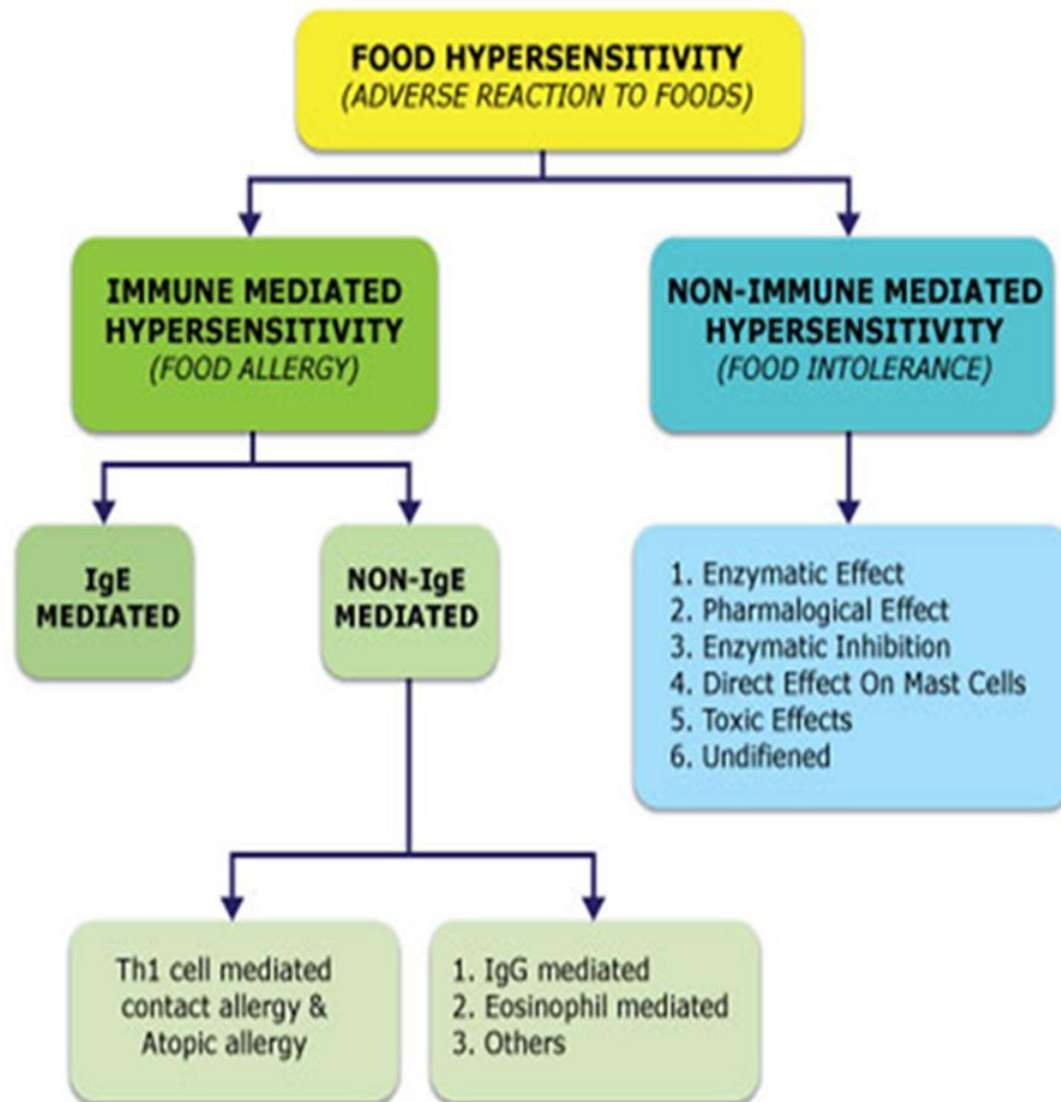
Histamine: This mediator acts on histamine 1 (H1) and histamine 2 (H2) receptors to cause: contraction of smooth muscles of the airway and GI tract, increased vascular permeability and vasodilation, nasal mucus production, airway mucus production, pruritus, cutaneous vasodilation, and gastric acid secretion.

Serotonin: increased vascular permeability and contraction of smooth muscles.

Tryptase: is a major protease released by mast cells; its exact role is uncertain, but it can cleave C3 and C3a. Tryptase is found in all human mast cells but in few other cells and thus is a good marker of mast cell activation.

Proteoglycans: include heparin and chondroitin sulfate.

Chemotactic factors



FOOD HYPERSENSITIVITY

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graph TD; A[FOOD HYPERSENSITIVITY] --> B[FOOD ALLERGY SYMPTOMS]; A --> C[FOOD INTOLERANCE SYMPTOMS];
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FOOD ALLERGY SYMPTOMS

- Allergic rhinitis
- Atopic dermatitis / eczema
- Asthma / wheezing
- Diarrhoea
- Stomach cramps
- Vomiting
- Anaphylaxis
- Itchiness
- Urticaria
- Conjunctivitis

FOOD INTOLERANCE SYMPTOMS

- Migraine, Headaches
- Joint pains, non-specific aches
- Stomach aches, constipation
- Intestinal problems (gas, diarrhoea)
- Hyperactivity
- Aggression, Temper, tantrums
- Sound sensitivity
- Ear infection
- Fatigue, depression

FOOD ALLERGY SYMPTOMS

- ❑ Allergic rhinitis
- ❑ Allergic asthma
- ❑ Atopic dermatitis
- ❑ Gastrointestinal symptoms
- ❑ Urticaria and angioedema
- ❑ Interstitial cystitis
- ❑ Anaphylaxis

- IgE levels may be elevated in patients who are atopic, but the level does not necessarily correlate with clinical symptoms. Normal IgE levels does not rule out atopy.
- An elevated eosinophil count may be observed in patients with atopic disease.
- RAST/CAP RAST/CAP FEIA measures antigen-specific IgE
- Cutaneous prick test
- Nasal smear/spirometry

HYPERSENSITIVITY TYPE II

- ❑ IgG directed cytotoxic hypersensitivity
- ❑ Antibody directed against cell surface antigen
- ❑ Mechanism through complement activation or antibody dependent cell
- ❑ Blood transfusion reaction, erythroblastosis fetalis
cytotoxicity, autoimmune hemolytic anemia

HYPERSENSITIVITY TYPE III

- ❑ Allergic diseases mediated by immune complexes of allergen with IgE and IgM antibodies
- ❑ Antigen antibodies complex in various tissues lead to complement activation generated chemotactic and vasoactive mediators.
- ❑ The classic immune complex allergic diseases are cutaneous Arthus reaction and systemic serum sickness

HYPERSENSITIVITY TYPE III

Serum Sickness

- ❑ Acute self limiting allergic disease caused by immune complexes activated complement generated inflammation
- ❑ Systemic immune complex complement dependent inflammatory reaction to external antigen
- ❑ Severity antigen dose dependent
- ❑ Reaction produced by heterogeneous serum can occur in milder form from other drugs

HYPERSENSITIVITY TYPE IV

- ❑ Allergic diseases are mediated with specific sensitized effector T Lymphocytes and not with sensitized antibodies (Cell-mediated hypersensitivity)
- ❑ It is a delayed hypersensitivity reaction
- ❑ T cell mediated allergic diseases include; atopic contact dermatitis and hypersensitivity pneumonitis

HYPERSENSITIVITY TYPE IV

Allergic Contact Dermatitis

- ❑ Allergic contact dermatitis (eczematous contact allergy)
- ❑ Allergic contact dermatitis mediated with sensitized T cells
- ❑ Caused by contact with haptenic chemicals
- ❑ Allergens include natural and synthetic chemicals; Benzocaine 5% Lanoline alcohol 30%.
- ❑ Symptoms; eczematous skin disease caused with hypersensitivity to environmental antigens. The skin eruption ; erythema, blistering, scaling, weeping

HYPERSENSITIVITY TYPE IV

Hypersensitivity Pneumonitis

- ❑ Hypersensitivity pneumonitis (extrinsic allergic alveolitis)
- ❑ Allergic disease in lung parenchyma with inflammation in the alveoli and interstitial space induced immunologically with either acute or chronic inflammation
- ❑ Complex immunopathogenesis with primary role with effector T cells
- ❑ Allergen usually airborne components of biological organisms or their products
- ❑ Allergen include; Bacteria, fungi, insects, organic chemicals

A bouquet of red roses with green leaves and a red ribbon is arranged on a dark, textured surface. The roses are in various stages of bloom, and the ribbon is tied in a decorative loop. The background is dark and speckled, creating a high-contrast effect with the vibrant red of the flowers.

THANK YOU

4/5/2023