



Cihan University/ Sulaymaniyah

College of Health Science

Medical Laboratory Analysis

4th Stage- 1st Semester

Clinical Immunology

Lecture- 8: Anaphylaxis and Allergy- Part-II

2023- 2024

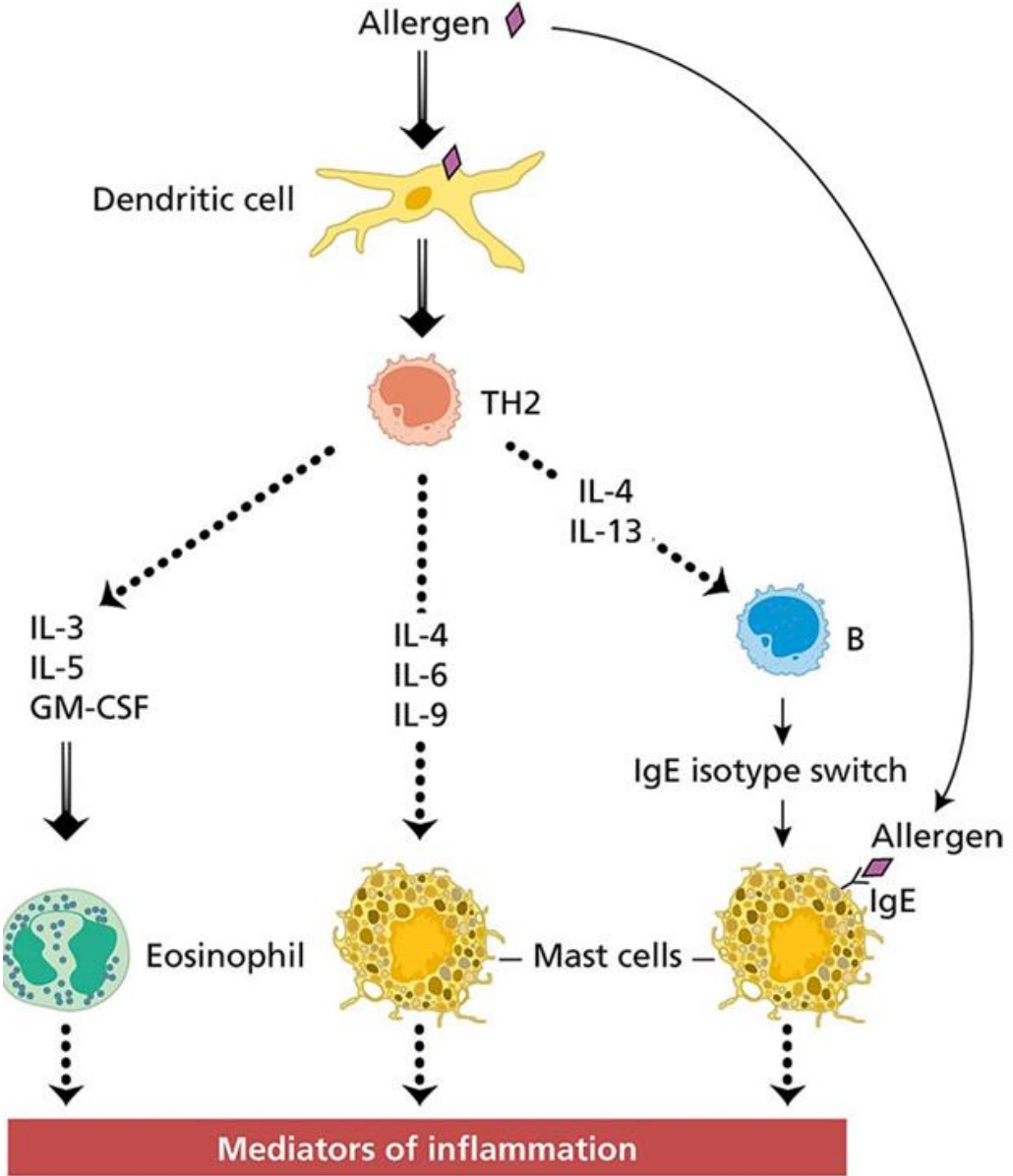
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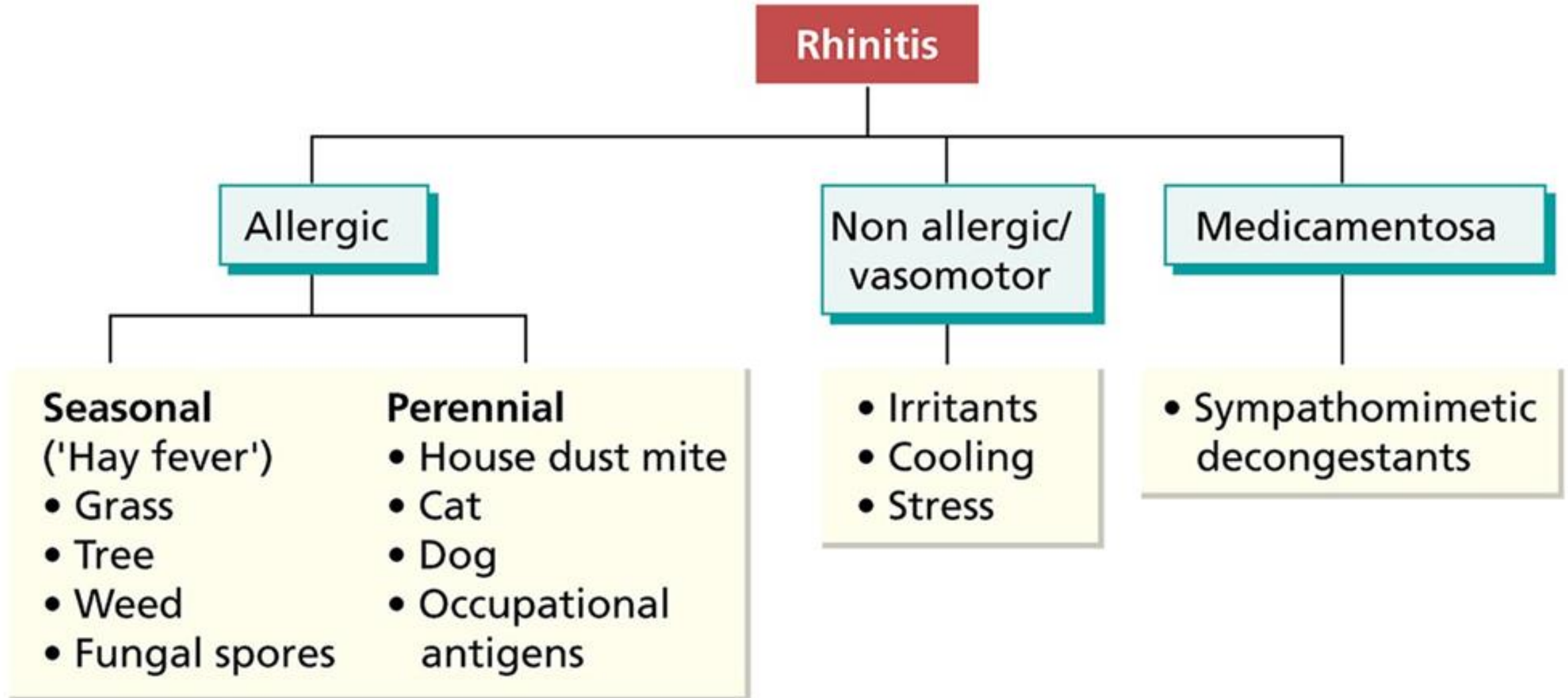
Respiratory Allergy

- Allergic rhinitis may be **seasonal** or **perennial**.
- Seasonal allergic rhinitis is often referred to as hay fever and its prevalence is rising.
- Patients present with rhinorrhoea, sneezing and nasal obstruction following antigen exposure.
- Those with chronic symptoms develop sinusitis, serous otitis media and conjunctivitis, and lose their senses of taste and smell.
- Positive skin tests help to distinguish allergic rhinitis from non-allergic rhinitis.
- The pathogenesis is similar to asthma, with mediators of inflammation liberated from mast cells.
- Topical sodium cromoglycate and intranasal corticosteroids are effective prophylactic treatment for most patients with allergic rhinitis.

Major Cytokines Implicated in Airways Inflammation

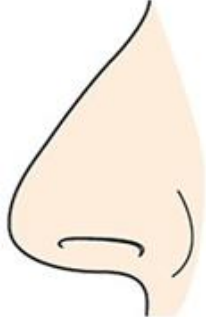

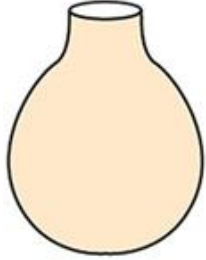


Causes of Rhinitis



Relationship Between Antigen Size and the Site of Major Symptomatology.



Size of antigen (diameter)		Associated disease
>15 μ m	Nose 	Allergic rhinitis
5-15 μ m	Bronchi 	Asthma
<5 μ m	Alveoli 	Alveolitis

Asthma

- Asthma is a syndrome with three cardinal features:
 1. Generalized but reversible airways obstruction;
 2. Bronchial hyper-responsiveness;
 3. Airways inflammation.

	Allergic	Idiopathic	Others
Proportion of total asthmatics	60%	30%	10%
Age of onset	Childhood	>40 years	Variable
Other atopic diseases	Common	Unusual	Unusual
Family history	Yes	No	No
Causes	Seasonal	Unclear.	Aspergillus
	Perennial		Carcinoid
	Occupational		Carcinoma, aspirin
Prognosis	May persist into adult life (30%)	Many become chronic	Churg–Strauss syndrome
	Deaths do occur particularly in non-compliant patients	Deaths very rare	Variable



Asthma

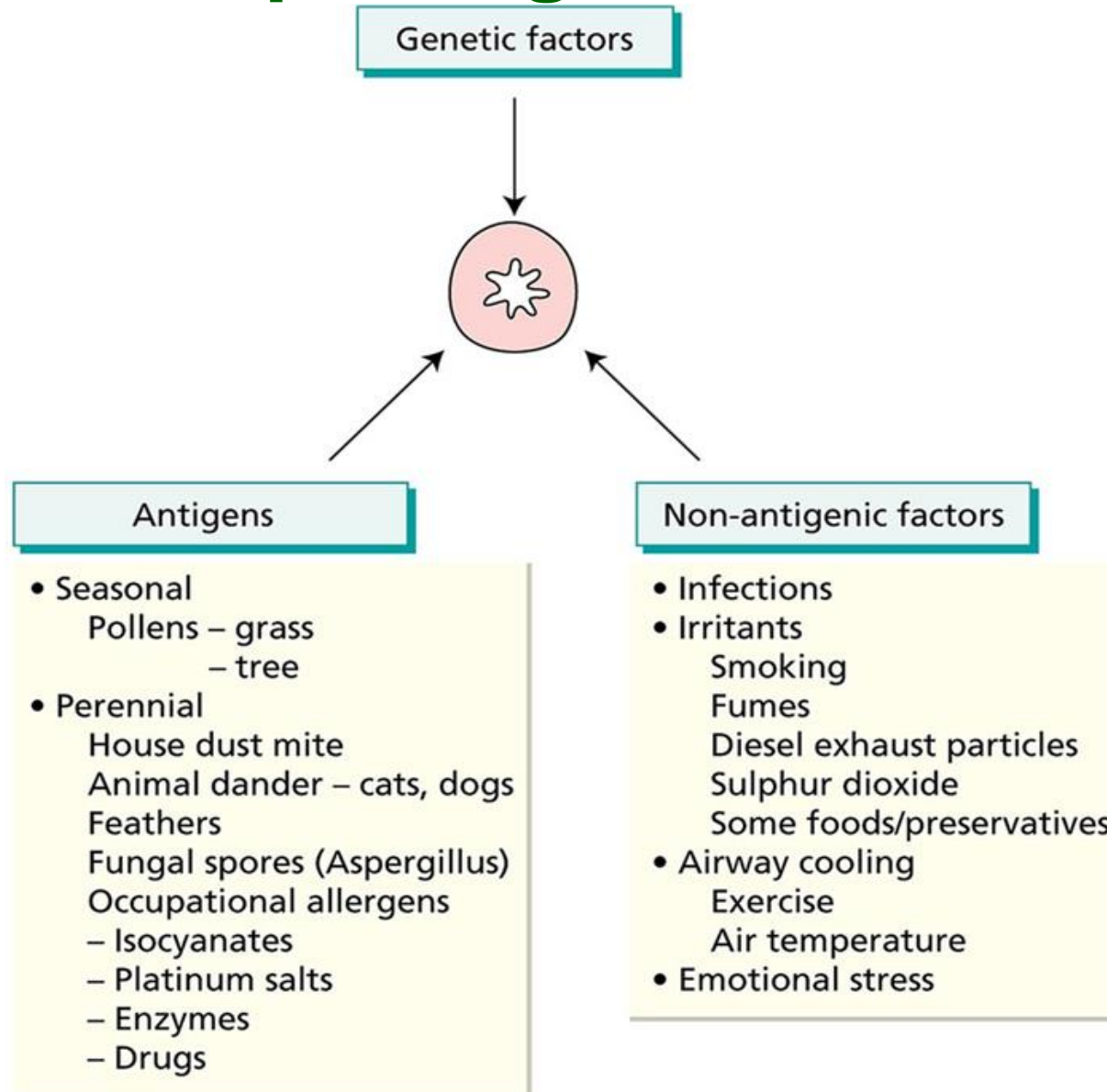
- It arises as a result of complex interactions between multiple genes and environmental factors and cannot be explained solely on the basis of IgE-mediated triggering of mast cells.
- Although not all cases are allergic in origin, most cases occur in younger patients who also show immediate hypersensitivity to defined environmental allergen.
- The initiation of asthma depends on epithelial cells and dendritic cells within the airways.
- In asthma, the epithelium is defective due to incomplete tight junctions that enable penetration of inhaled allergens.
- Activation of epithelial cells can result in the release of chemokines (CCL20, CCL19 and CCL27, the ligands for CCR6, CCR7 and CCR10) that attract immature DCs that then differentiate and activate inflammation and adaptive immunity.



Asthma- cont.

- Asthma is an inflammatory condition with sensitized CD4 T2 cells identified readily in bronchial biopsies and bronchoalveolar lavage fluid.
- On subsequent exposure, the T-cell receptor on T2 cells and IgE bound to mast cells react with the allergen.
- The frequency of antigen exposure determines whether the response is **acute reversible airways obstruction alone** or a **chronic allergic response with bronchial hyper-responsiveness**.
- In the case of single antigen exposure, the symptoms are due to the release of preformed and newly generated mediators released by mast cells,
- **Acute inflammation** usually resolves as repair processes restore normal structure and function.

Some Precipitating Factors in Asthma

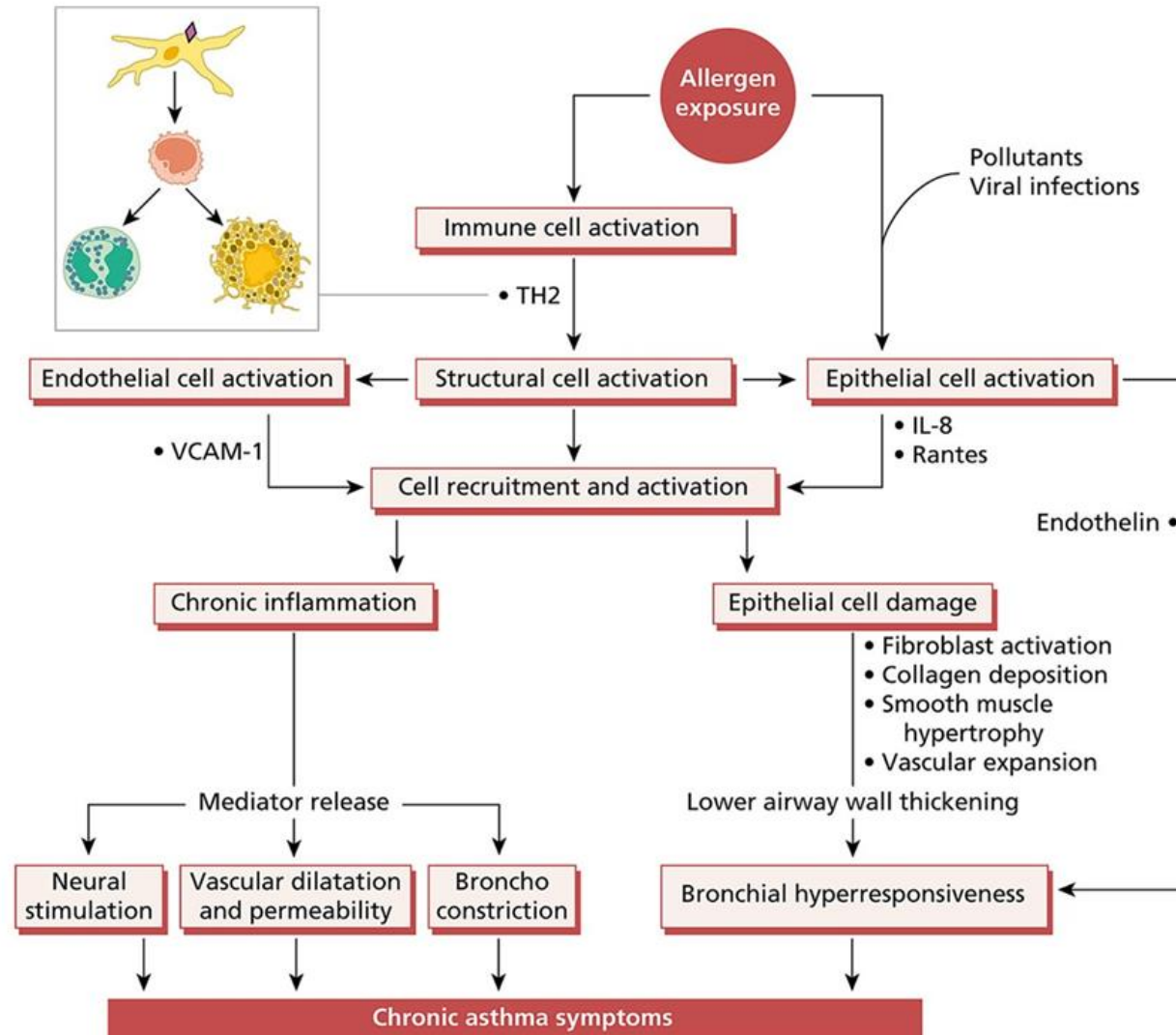




Chronic asthma

- This process is disturbed and **inflammation persists** that in turn leads to airways hyper-responsiveness.
- Some patients with chronic asthma have a progressive decline in lung function that reflects the pathological changes of angiogenesis, proliferation of smooth muscle, basement membrane thickening, a cellular infiltrate of eosinophils and mononuclear cells, and fibrosis.
- Epithelial cells release epidermal growth factor, and eosinophils and myofibroblasts produce transforming growth factor (TGF- β) to promote synthesis of extracellular matrix components and collagen.
- There is also an increase in the number of **goblet cells**, resulting in more mucus production and resulting in the non-productive cough that may be a presenting symptom.

The Development of Airways Inflammation and Bronchial Hyperresponsiveness in Chronic Asthma





The Diagnosis of Asthma

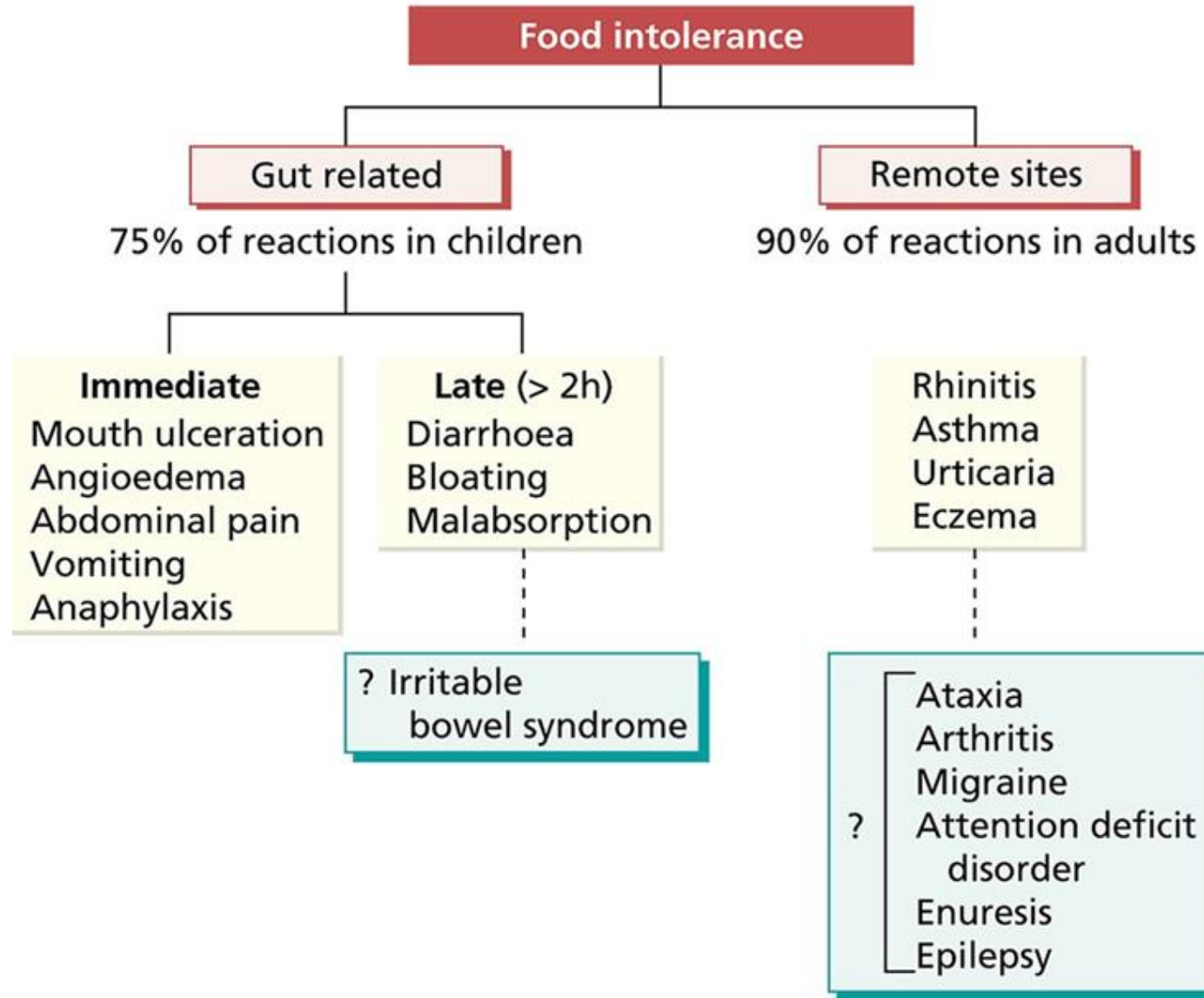
- Clinically supported by spirometry, as symptoms may not always be obvious.
- Any sputum can be examined for cells (particularly eosinophils) and pathogens, as many attacks are precipitated by infection; blood eosinophilia may be present.
- Lung function tests show a reduced forced expiratory volume (FEV1), reversible with bronchodilators – this is the essential diagnostic test.
- Monitoring the response to a trial of treatment with bronchodilators (+/- inhaled corticosteroids) also serves as a useful diagnostic tool.
- Exhaled nitric oxide (FeNO) is another non-invasive surrogate marker of eosinophilic airway inflammation.
- Laboratory tests, such as the total serum IgE level, and RASTs are unhelpful.



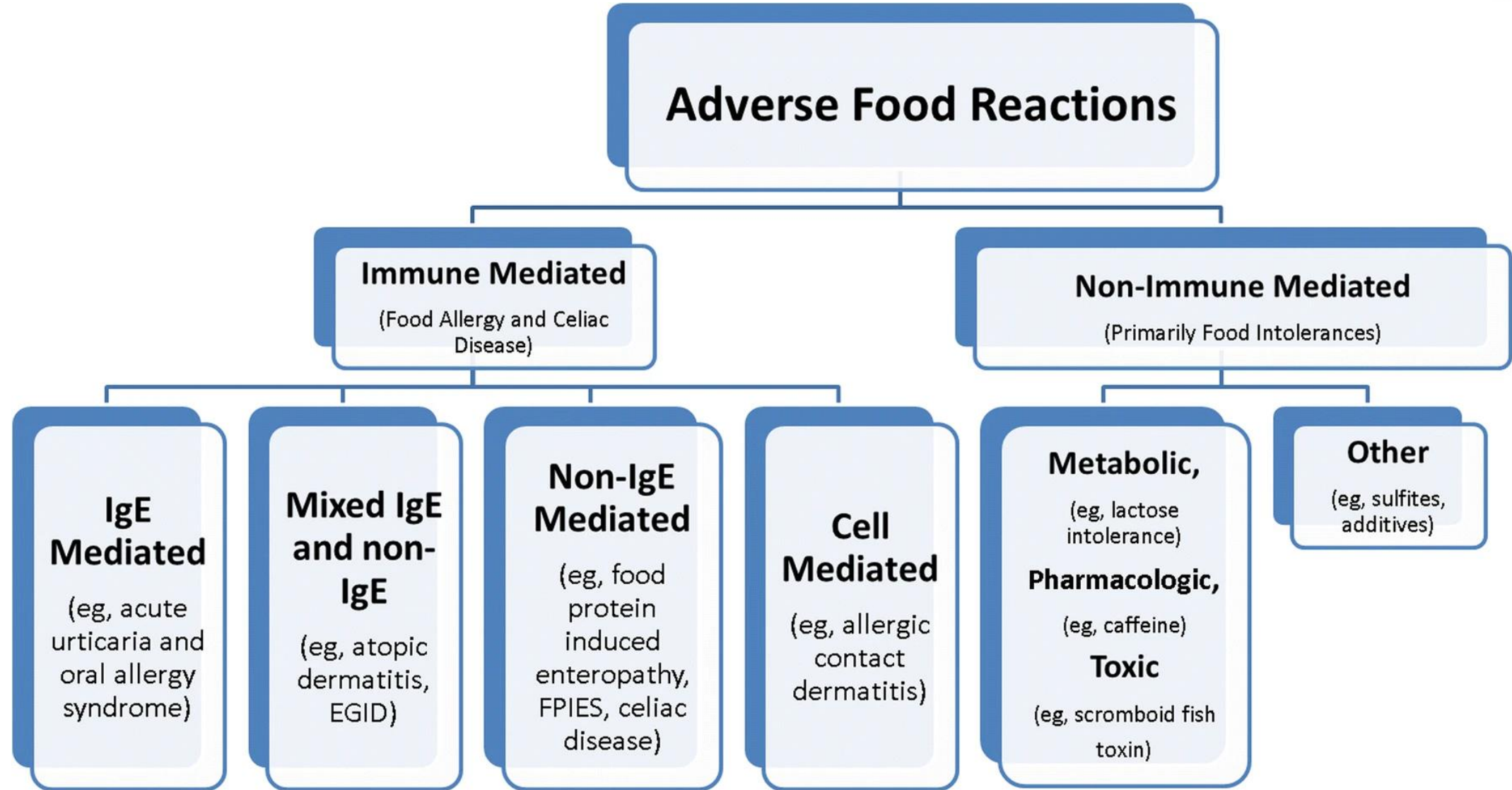
Food Allergy and Intolerance

- Food intolerance of some sort is a relatively common problem in childhood, especially in the first year of life.
- In food intolerance proven by blind challenge, a single food (most commonly cow's milk) is responsible in just under half of the cases.
- It must be considered to be a rare/unproven cause of symptoms that occur remote from gut (such as attention deficit disorders, arthritis or enuresis); patients apparently benefiting from dietary manipulation have been from highly selected groups.
- Most reports of proven food intolerance in adults incriminate nuts, milk, eggs, fish, wheat and chocolate, where a direct nonimmunological mechanism is suspected.
- On the other hand allergy to peanuts is IgE mediated and is becoming more common, most patients are atopic.

Putative clinical spectrum of food intolerance



Classification of Adverse Reactions to Food



Skin Diseases



Urticaria and Angioedema:

- Urticaria is a **physical sign, not a disease**.
- **Urticaria** results from sudden localized accumulation of fluid in the dermis.
- It refers to transient episodes of demarcated, oedematous, erythematous, pruritic lesions with a raised edge.
- **Angioedema** is a similar process occurring in the deep dermis, subcutaneous tissues or mucous membrane.
- **Urticaria and angioedema** commonly coexist.
- A variety of mechanisms may be responsible some are immune but many are not.
- Mast cells in the dermis are an important source of the vasoactive mediators and since a number of mediators are involved in the pathogenesis of urticaria, antihistamines are not always effective.
- Spontaneous urticaria can be classified into acute and chronic

Acute urticaria

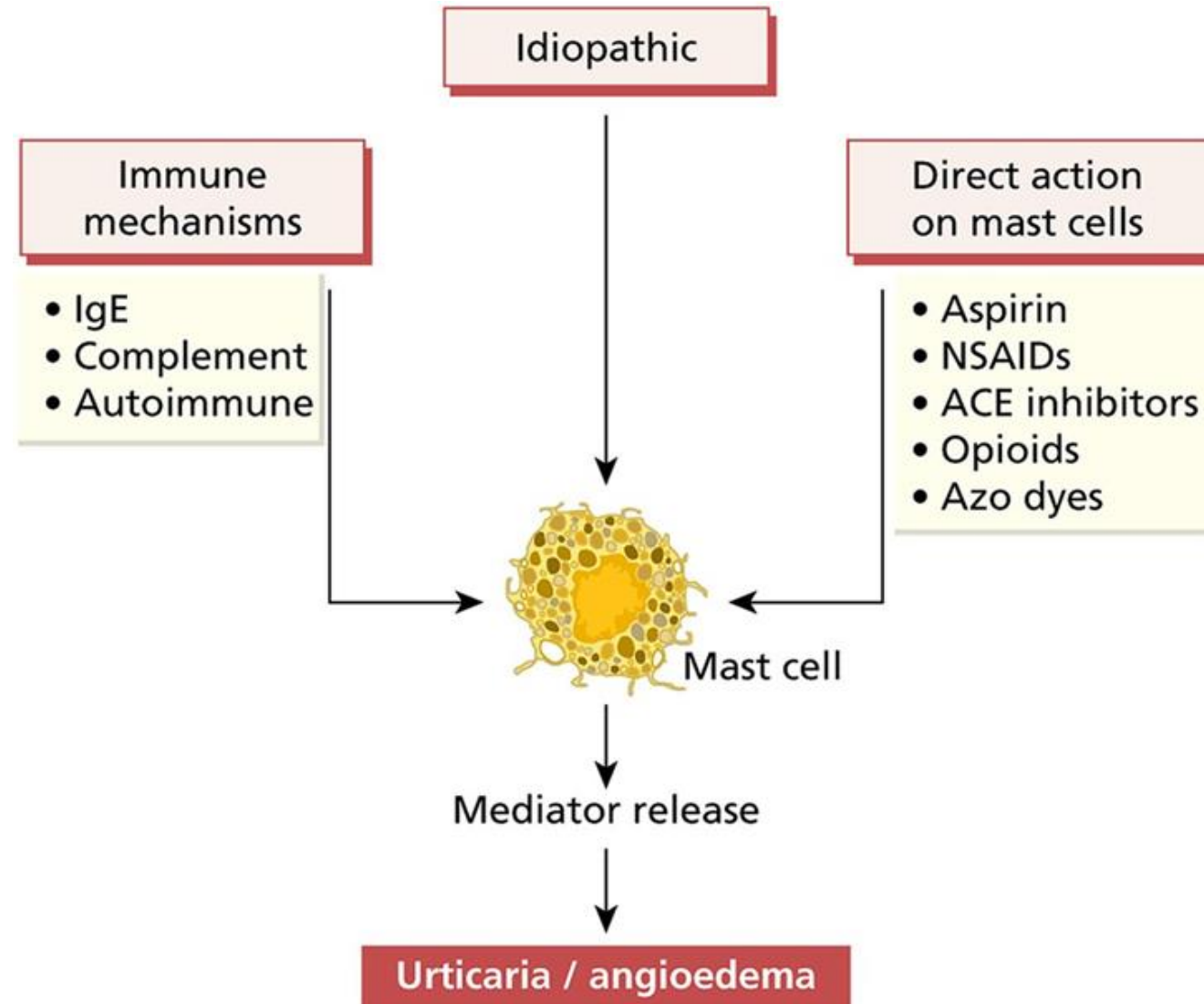
- Acute urticaria is short-lived, although the cause is identified in only 50% of cases.
- Episodes caused by an IgE-mediated reaction to extrinsic antigens, such as foods, are usually obvious from the history and can be confirmed by skin-prick testing.
- Attacks can also be related to drug ingestion or to acute viral infections.



Angioedema of the lower lip



Mechanisms of urticaria production



Clinical identification of urticarial vasculitis

- The weal's are usually tender and painful rather than itchy.
- They generally last longer than 24 hours.
- They fade to leave purpura or bruising.
- They are often accompanied by systemic features such as fever and arthralgia.





Atopic Eczema

- Atopic eczema (also referred to as ‘atopic dermatitis’) is a common, chronic, severely pruritic, eczematous skin disease, usually occurring in individuals with a hereditary predisposition to all atopic disorders and often in association with a high serum IgE level.
- The prevalence of atopic eczema is increasing. It affects about 10–20% of children worldwide and some 2% of adults.
- Over half of children present during the first year of life. In infants, the dermatitis often appears on the face first, followed by the flexural aspects of the arms and legs.
- In older children and adults, the flexures are frequently involved, with thickening, lichenification and scaling of the epidermis, which tends to crack and weep.



Atopic Eczema- cont.

- Spontaneous resolution occurs in many patients; about half clear by the age of 7 years and 90% by their late teens but, in the remainder, eczema persists into adult life.
- The commonest complication is superadded **bacterial infection**, but some children may develop **ocular complications**, such as **cataracts**, **psychological problems** or side effects from prolonged treatment (particularly with corticosteroids).
- Although atopic children handle most viruses normally, superadded infection with herpes simplex virus is life threatening.
- The diagnosis of atopic eczema is based on the clinical features, usually with a personal or family history of atopy.

Childhood eczema



Childhood eczema presents as a rash on the face and in the flexural aspects of arms and legs.



Contact Dermatitis

- Contact dermatitis is an **inflammatory skin disease** caused by **T-cell-mediated (type IV) hypersensitivity** to external agents that come into contact with the skin rather than an IgE (type I) hypersensitivity.
- It is an important cause of **occupational skin disease**.
- Contact dermatitis is quite distinct from atopic dermatitis, both clinically and in immunopathogenesis.



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