

Disorders of Immune system: Introduction, Allergy, Autoimmune disorders

Self Study Guide

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Keywords:

- Specific / Non specific
- Antigen / Antibody
- Immunoglobulin
- Humoral / cell mediated
- Active & Passive immunity
- Primary / secondary response.
- Vaccine
- Toxoid
- Antisera
- Allergen
- Hypersensitivity
- Autoimmune disease
- Allergy, Allergen
- Complement system
- Agglutination test
- Tuberculin test
- ELISA-Enzyme linked immunosorbent assay.
- Immune Tolerance

Resources:

Pathology Illustrated
4th Edition, Govan et al.

Comprehensive
Radiographic Pathology.

Tortora and Grabowski, 8th
Edition

FSM Share drive/pathology
lectures-
shashi/inflammation.ppt

Web:
www.fsm.ac.fj/bulletinboard
www.geocities.com/learnpath

Pathology webpage on
FSM website, click on
Diploma link.

Introduction: (over view of the topic)

Immune system is body's defence system. Immunity is ability to defend against foreign tissues and organisms. During embryonic stage body learns what is self, later it differentiates and responds to foreign substance(antigen) by producing appropriate immune response.

Familiarise yourself to the following: (important points in the topic).

Foreign substances which produce a immune response is known as "**Antigen**" and the resulting in development of Immunity, this is known as **active immunity** such as infection or vaccine. (**Vaccine** is dead or deactivated pathogen in suspension, **toxoid** is a suspension of inactivated toxins). Immunity can also be artificially induced by injecting prepared antibodies (**antisera**) known as **passive immunity**. E.g. Tetanus antisera.

Depending on type of antigen, developed immunity can be two types.

1. **Humoral** immunity – by stimulation of **B** lymphocytes which secrete antibody
Depending on the structure, antibodies are of five types IgG, IgA, IgM, IgE & IgD. Most common is IgG (longterm) and IgM (shortterm). IgE is typically seen in allergic reactions. Two types of immune response can result depending on the type of antigen.
2. **Cell-mediated** immunity – Stimulation of **T** lymphocytes which activate macrophages to engulf parasites and cancer cells.

On first exposure to antigen body tries to learn and then slowly produces appropriate antibody, this is known as **primary** response, and this information is stored in memory lymphocytes.

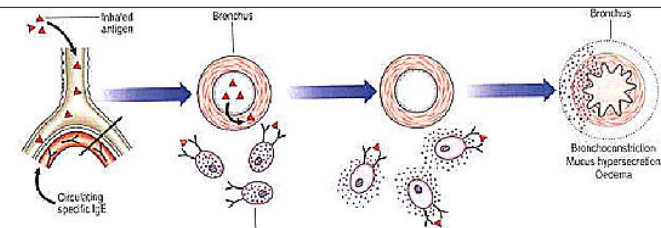
When body is attacked by same pathogen second time, the immune response is fast and strong due to stored memory, this is known as **secondary** response.

When a antigen combines with antibody the resulting product is called '**immune complex**' which activates '**complements**', highly toxic enzymes which kills the antigen and surrounding cells.

Disorders of Immune system:

abnormality in recognising self antigens leads to development of **Autoimmune disorders** such as **Rheumatoid arthritis**, **Systemic Lupus Erythematoses** where auto-antibodies are produced against own connective tissue proteins and cause chronic inflammatory damage to collagen tissue in joints, heart & Blood vessels. These patients are managed by drugs which inhibit immune system such as **steroids**, and anti-inflammatory drugs.

Hypersensitivity is a condition of excess immune response to certain antigens causing damage, commonly known as "**Allergy**" and such antigens are known as "**Allergens**" Four major types of hypersensitivity reactions Types I, II & III are of humoral type, type IV is cell mediated. Type I is common mediated by IgE, e.g. Anaphylaxis, atopy & allergy such as **Asthma**. Asthma is a disorder of airways of lungs **Bronchial asthma**. 'Allergens' in air initiate immune reaction causing **inflammation** and damage to mucosa with excess mucous



production which block the airways causing difficulty in breathing "**wheezing**". These patients are managed by drugs which dilate bronchi (Bronchodilators) and immuno suppressive drugs such as steroids.

Self Assessment Questions: (to know how much you have understood)

1. Define immunity? What are the two major types of immune responses? Mention two difference between each?
2. What is Primary & secondary immune response?
3. What is active and passive immunity? Give an example each.
4. What is an Antigen? What is an antibody? What are the major types of antibody?
5. What is a vaccine?" what are the two major types? Give an example each?
6. What is Antisera? How is it different from vaccine?
7. What are autoimmune disorders? Give two examples?
8. What is Allergy? What is an allergen? Give an example?
9. Briefly describe pathogenesis in Asthma?
10. Briefly describe humoral & cell mediated immunity?

Immune Disorders

'Asthma'

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Introduction:

- **Humoral Immunity**
 - B lymphocytes - Antibody
- **Cell mediated Immunity**
 - T lymphocytes – Macrophages
- **Non-Specific immunity**
 - Neutrophils, Macrophages

- **Immunity is not inherited.**
- **Antigen / Antibody**
- **Active / Passive immunity.**
- **Vaccine, Toxoid, Live/Killed**
- **Primary response – slow, weak.**
 - Learning period, memory cells.
- **Secondary response – rapid, strong**

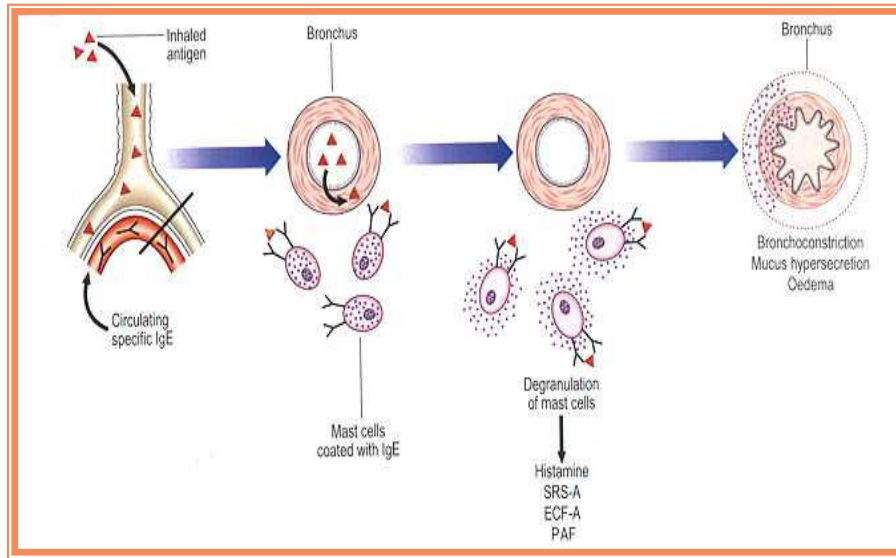
Immune Disorders:

- **Immunodeficiency disorders**
 - AIDS, antibody deficiency
- **Hypersensitivity Disorders (allergy)**
 - Type-I (IgE), II-IgG, III-Immune complex, IV-Cell mediated.
- **Autoimmune disorders**
 - SLE, Rheumatoid, Rheumatic fever.

What is Asthma?

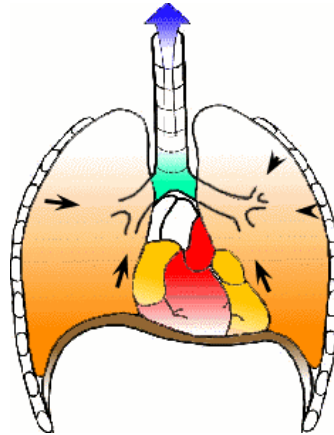
- **Hypersensitivity – Allergy , Type I**
- **of airways of lungs - Bronchi**
- **Allergens – in the air, mast cell - IgE ab.**
- **Inflammation of airways – Bronchitis.**
- **Genetic, Environmental, Race, Age.**
- **High in industrial cities**
- **Increasing incidence ...!**

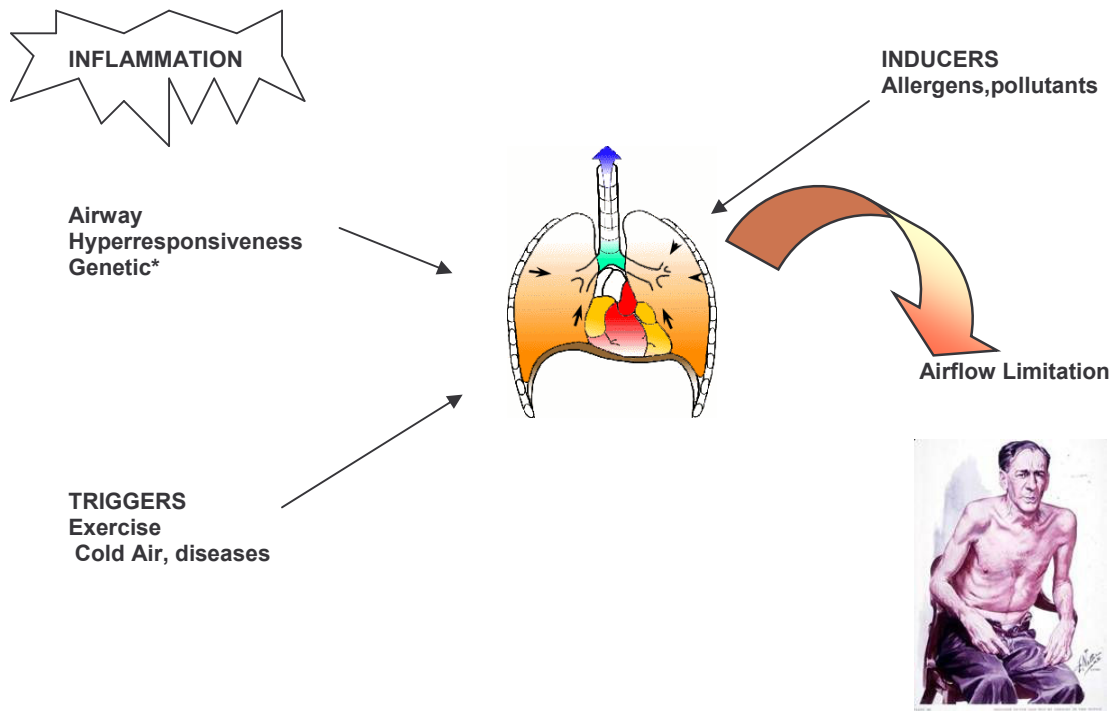
Pathogenesis - Atopic Asthma:



Asthma Mechanism:

- **Allergy**
- **Inflammation Of Bronchi**
- **Obstruction**
- **Mucous Plugs**





Epidemiology/pathology

Normal

Asthma

Barnes PJ

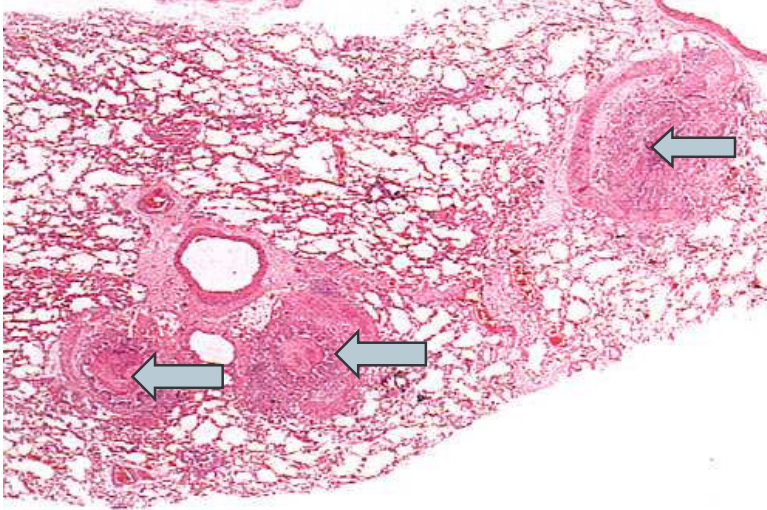
Lung in Asthma with Mucous plugs



Mucous plug in asthma:

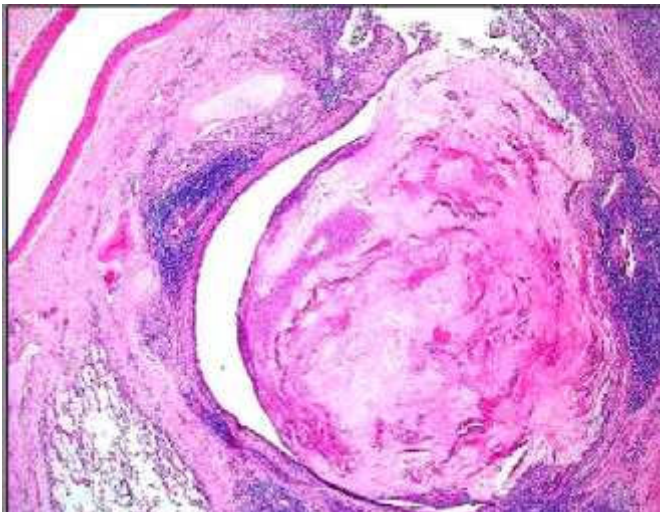


Asthma Microscopic Pathology



**Obstructed
Inflamed
Bronchi**

Asthma - Bronchial morphology



- inflammation
- Eosinophils
- Gland hyperplasia
- Mucous plug in lumen
- Hypertrophy of muscle layer