

**4. Histoplasmosis** is caused by breathing **fungal spores** from soil that has been contaminated by **bird or bat droppings**. Some occupations that may expose workers to spores are farmers, pest control workers, poultry keepers, construction workers and landscapers.

**5. Asbestosis** is a **naturally** occurring **mineral** used as an insulation material and as a fire retardant. The main group at risk for asbestosis is people who worked in mining, milling, manufacturing, installation, or removal of asbestos products .

**6. Coal workers pneumoconiosis**, commonly known as black lung disease, occurs when coal dust is inhaled. Continued exposure to coal dust causes scarring in the lungs.

**7. Mesothelioma** is a rare type of cancer that occurs in the lining of the lungs and less commonly the lining of the abdomen. Asbestos exposure is the primary risk factor for mesothelioma. Occupations such as mining or milling, electricians, plumbers, pipe-fitters, insulators, or even remodelers of older homes still have a high risk of exposure.

**8. Work-related asthma:**- Men working in forestry and minerals and women working in service industries (waitresses, cleaners, and dental workers) are most likely to develop occupational asthma.

### **Diagnose of an occupational lung disease**

- **Pulmonary function tests:** diagnostic tests that help to measure the lungs' ability to move air into and out of the lungs effectively. The tests are usually performed with special machines into which the person must breathe.
- **Microscopic examination** from biopsy or autopsy of tissue, cells, and fluids from the lungs
- **Measurement of respiratory or gas exchange functions**
- **Examination of airway or bronchial activity**

### **How can occupational lung diseases be prevented?**

The best prevention for occupational lung diseases is avoidance of the inhaled substances that cause lung diseases and Do not smoke. Smoking can actually increase the risk for occupational lung disease.

## **Lecture No. 19**

### **Asthma**

A chronic disease in which the bronchial airways in the lungs become **narrowed** and **swollen**, making it difficult to breathe. **Symptoms** include **wheezing, coughing, tightness in the chest, shortness of breath, and rapid breathing**. An asthma attack may be brought on by pet hair, dust, smoke, pollen, mold, exercise, cold air, or stress.

#### **Asthma signs and symptoms include:**

1. Shortness of breath
2. Chest tightness or pain
3. Wheezing when exhaling, which is a common sign of asthma in children
4. Trouble sleeping caused by shortness of breath, coughing or wheezing
5. Coughing or wheezing attacks that are worsened by a respiratory virus, such as a cold or the flu

#### **Types of asthma**

1. Allergic asthma
2. Seasonal asthma
3. Non allergic asthma
4. Exercise induced asthma
5. Difficult asthma
6. Childhood asthma

#### **Causes**

It isn't clear why some people get asthma and others don't, but it's probably due to a combination of environmental and inherited (genetic) factors. Exposure to various irritants and substances that trigger allergies (allergens) can trigger signs and symptoms of asthma.

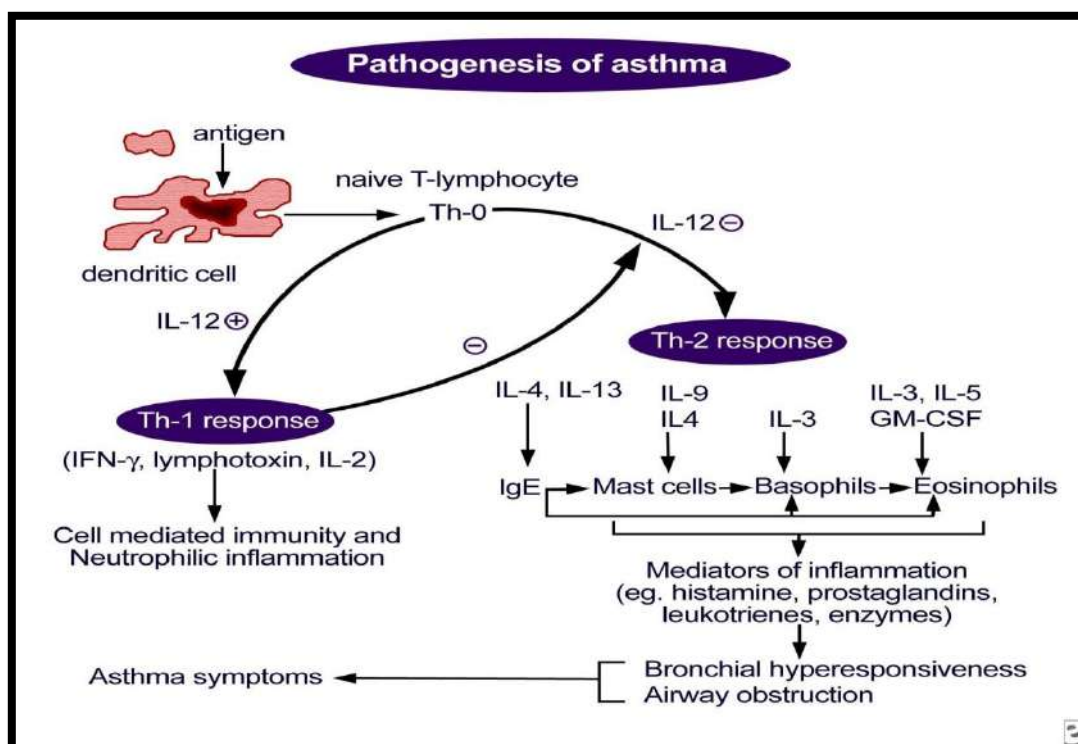
#### **Asthma triggers are different from person to person and can include:**

1. **Airborne allergens**, such as pollen, dust mites, mold spores, pet dander or particles of cockroach waste
2. **Respiratory infections**, such as the common cold
3. **Physical activity**
4. **Cold air**
5. **Air pollutants and irritants**, such as smoke
6. Certain **medications**, including **beta blockers**, **aspirin**, and **nonsteroidal anti-inflammatory drugs**, such as ibuprofen (Advil, Motrin IB, others) and **naproxen sodium** (Aleve)
7. **Strong emotions and stress**
8. **Sulfites and preservatives added** to some types of foods and beverages, including shrimp, dried fruit, processed potatoes .
9. **Gastroesophageal reflux disease (GERD)**, a condition in which stomach acids back up into your throat

#### **Pathophysiology**

There are **two phases** of an **asthma exacerbation**, which include the **early phase** and **late phase**. The **early phase** is initiated by **IgE antibodies** that are sensitized and released by plasma cells. These antibodies respond to certain triggers in the environment, such as the risk factors listed above. **IgE antibodies** then **bind** to high-affinity **mast cells and basophils**. When a pollutant or risk factor gets inhaled, the **mast cells** release **cytokines** and eventually **de-granulate**. Released from mast cells are **histamine, prostaglandins, and leukotrienes**. Simultaneously, **cytokines** derived from the mast cell will **signal** other **inflammatory cells** and their mediators to the lung. The result is **airway inflammation, increased vascular permeability, mucus secretion, bronchospasm, and wheezing**. These events are referred to as the **early asthmatic response** because they occur **within minutes**. A **major component** of the early response is **bronchospasm**.

The **late asthmatic response** is **delayed by hours**. It is **caused** by a multitude of **inflammatory cells continuing the inflammatory process**. Of the inflammatory cells, the **T cells play an important role**. Antigen presenting cells may present a variety of **allergenic antigens** to chronically activated **T helper cells**. These cells then **secrete** multiple **cytokines** that maintain and intensify the local **inflammatory response**. Many other inflammatory cells, including mast cells and eosinophils, will respond to the T cells' cytokines. These inflammatory cells will produce cytokines, which **amplify** the **cellular response** and the **inflammatory reaction**. There is a migration of inflammatory cells from the circulation into the pulmonary vasculature and the airway submucosa. A **central component** to the **inflammatory process** as well as **treatment** is the **arachidonic acid pathway**, which leads to the **generation of leukotrienes**.



## Diagnosis

### 1- Physical exam

**2-Lung function tests :-** These are also called (pulmonary function tests.) Lung function tests detect how well you **inhale (breathe in)** and **exhale (breathe out)** air from your lungs. These tests measure breathing.

Lung function tests are often done **before and after inhaling a medication** known as a **bronchodilator**. This medicine opens the airways. **If lung function improves** a lot with a bronchodilator, the patient likely has **asthma**.

### **Common Lung function tests used to assess airways include:**

a. **Spirometry:** A type of lung function test that measures how much you **breathe in** and **out** and how **fast you breathe out**.

b. **FeNO test (exhaled nitric oxide):** A test that helps assess **inflammation** in the **airways**.

c. **Bronchial provocation or “trigger” tests:** Tests that measure if lungs are **sensitive** to certain **irritants or triggers** such as **methacholine** or **histamine**.

d. **Diffusion Capacity:** Diffusion capacity measures how well **oxygen flows** from the **lungs into your blood**. Poor diffusion indicates damage to the lung where the oxygen and blood meet in the lungs. Diffusion capacity is usually normal in asthmatics.

### **3- Allergy tests**

**4- Blood tests:** measured the levels of **immunoglobulin E (IgE)** and **Eosinophil** . If the levels are **high**, this could be a sign of **severe asthma**.

**5-Chest X-Ray:-**in asthma, the chest X-ray is likely to show **air trapping** or **hyperexpansion**.

## **Lecture No. 20**

### **Non-allergic bronchitis**

It is a form of **lower respiratory tract infection** occurs due to a **viral or bacterial infection**. Some people develop non-allergic bronchitis after a cold, for instance. Bronchitis can be acute or chronic. **Acute form** leads to **cough**, which may contain **mucus**, while in case of **chronic bronchitis**, **cough last for more than a few months**. **Air pollution and smoking** are **some major causes** of **bronchitis**.

### **Symptoms of Acute Bronchitis**

Each person is different, and symptoms will vary depending on the cause of inflammation. The symptoms associated with **acute bronchitis** are **similar** to those of the **cold and flu** and **last less than 3 weeks** .

- **Coughing with or without mucus**
  - **A runny nose**
  - **A sore throat**