

**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**

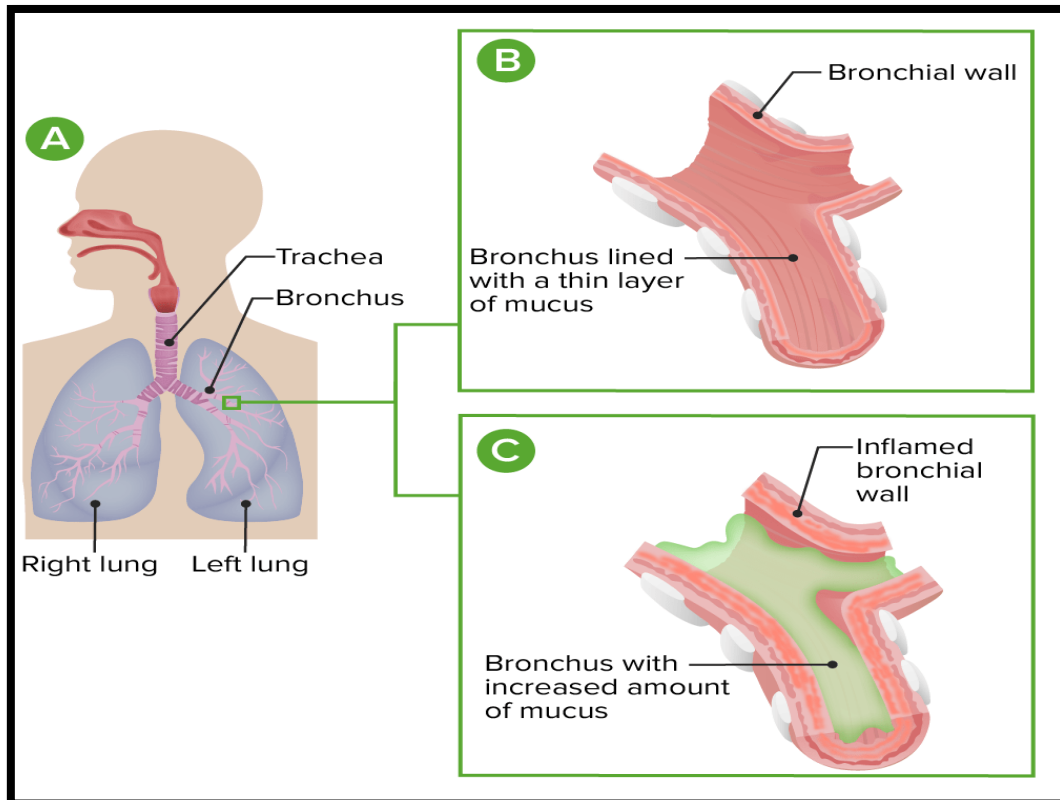
It is a form of **lower respiratory tract infection** occurs due to a **viral or bacterial infection**. Some people develop non-allergic bronchitis after a cold, for instance. Bronchitis can be acute or chronic. **Acute form** leads to **cough**, which may contain **mucus**, while in case of **chronic 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**

- Sneezing
- Fever & chills
- Breathing difficulties
- Extreme fatigue
- Mild headache
- Mild body ache



### Causes

A virus usually causes acute bronchitis. Bacteria can sometimes cause acute bronchitis. But, even in these cases, taking antibiotics is NOT advised and will not help you get better.

### Diagnosis

1. **Spirometry** :- A test that measures lung function as breathe in and out of a mouthpiece that is attached to a device called a spirometer.
2. **Peak expiratory flow** :- A test that measures the force of air breathe out (exhale) into the mouthpiece of a device called a peak expiratory flow meter
3. **Chest X-ray**:- A radiology test that produces images of the chest to look for evidence of other conditions that could be causing your cough and breathing problems.
4. **Complete blood count (CBC) with differential**
5. **Procalcitonin levels** (to distinguish bacterial from nonbacterial infections)
6. **Sputum cytology** (if the cough is persistent)
7. **Blood culture** (if bacterial superinfection is suspected)

8. **Chest radiography** (if the patient is elderly or physical findings suggest pneumonia)
9. **Bronchoscopy** (to exclude foreign body aspiration, tuberculosis, tumors, and other chronic diseases)
10. **Influenza tests**
11. **Laryngoscopy** (to exclude epiglottitis)

## Lecture No. 21-22

### **Hypersensitivity**

**Hypersensitivity**, which is defined as an **exaggerated response** to atypically **harmless antigen** that results in **injury** to the tissue, **disease**, or even **death**. Antigens that trigger allergic reactions are called **allergens**.

### **Classification of hypersensitivity reactions:**

Table 26-1 Classification of Hypersensitivity Reactions				
Parameter	Type of Reaction			
	I	II	III	IV
Reaction	Anaphylactic	Cytotoxic	Immune complex	T cell-dependent
Antibody	IgE*	IgG, possibly other immunoglobulins	Antigen-antibody complexes (IgG, IgM)*	None
Complement involved	No	Yes*	Yes*	No
Cells involved	Mast cells, basophils, granules (histamine)*	Effector cells (macrophages, polymorphonuclear leukocytes)*	Macrophages, mast cells	Antigen-specific T cells
Cytokines involved	Yes*	No	Yes*	Yes (T cell cytokines)*
Comparative description	Antibody mediated, immediate	Antibody dependent; complement or cell mediated	Immune complex mediated (immune complex disease)	T cell-mediated, delayed type
Mechanism of tissue injury	Allergic and anaphylactic reactions	Target cell lysis; cell-mediated cytotoxicity	Immune complex deposition, inflammation	Inflammation, cellular infiltration
Examples	Anaphylaxis Hay fever  Asthma Food allergy	Transfusion reactions Hemolytic disease of newborn Thrombocytopenia	Arthus reaction Serum sickness  Systemic lupus erythematosus	Allergy or infection Contact dermatitis