

# Infective lung disease

## # Pneumonia

- Community acquired pneumonia (CAP):
  - Lung infection that is acquired from the normal environment
- Hospital acquired pneumonia (HAP):
  - Pneumonia not incubating at the time of hospital admission and occurring > 48 hours after admission
- Ventilator associated pneumonia (VAP):
  - Pneumonia occurring > 48 hours after endotracheal intubation.
- Most common pathogens:
  - Community – Acquired pneumonia: streptococcus pneumonia
  - Hospital acquired pneumonia (HAP): Staphylococcus

## # Tuberculosis

- ❖ Infectious disease caused by *Mycobacterium tuberculosis*.
- ❖ Hallmark is necrotizing granulomatous inflammation, composed of central necrotic zone surrounded by epithelioid histiocytes and Langhans type giant cells.
- ❖ Clinically: Chronic and persistent cough (often productive), weight loss, fever, night sweats and hemoptysis.
- ❖ On radiology: Commonly presents as cavitory lesion in upper lobe in infected immunocompetent hosts.

### Typical pneumonia

X-ray: Shows a dense, lobar consolidation (a whole lobe of the lung is affected).

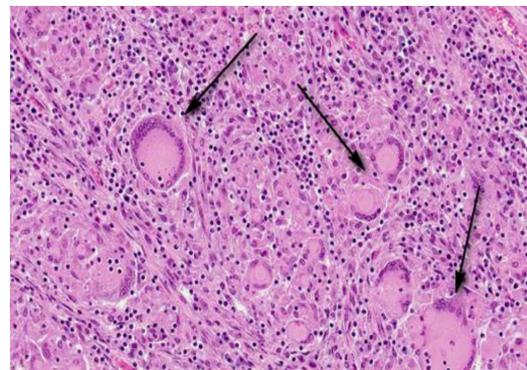
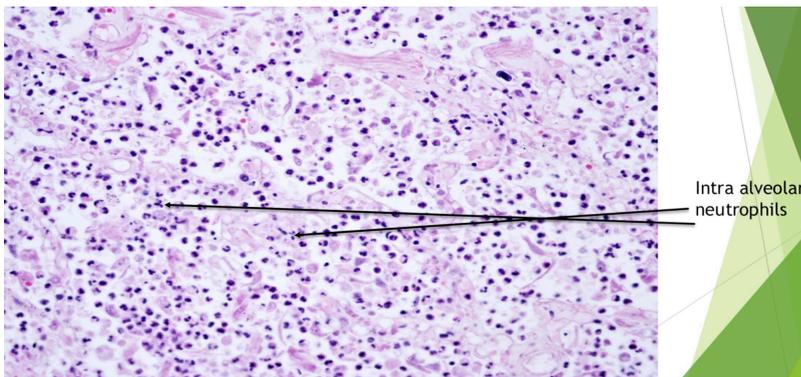
### Atypical pneumonia

Shows patchy or diffuse shadows, known as ground-glass opacities

**Bronchopneumonia**  
Most common pattern of pulmonary infection.

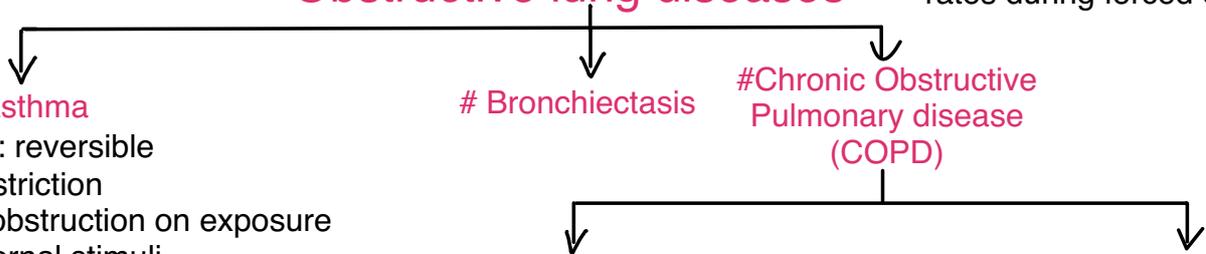
### Lobar pneumonia

| Latent disease   | Active disease  |
|--|---|
| Controlled bacteria within granuloma                       | Uncontrolled bacteria and multiplying                         |
| No symptoms  | Symptoms  |
| Non contagious   | Contagious  |
| Can become active later, especially with weakened immunity | Requires multiple drugs for months to cure and prevent spread |



❖ pulmonary function tests show decreased maximal Chronic bronchitis airflow rates during forced expiration.

# Obstructive lung diseases



## # Asthma

➤ Definition: reversible bronchoconstriction and airflow obstruction on exposure to some external stimuli.

➤ Clinically:

- wheezing, shortness of breath, chest tightness, and cough.
- symptomatic episodes usually at night or in the early morning.

➤ Pathogenesis: Th2-mediated IgE response

## # Bronchiectasis

## #Chronic Obstructive Pulmonary disease (COPD)

### Chronic bronchitis

➤ Diagnosis: persistent cough with sputum for 3 months in 2 consecutive years without other apparent explanation.

➤ The most important causing agent: Smoking

➤ Pathogenesis:

➤ Inflammation: tobacco interferes with ciliary action, directly damages airway epithelium and inhibits ability of white blood cells to clear bacteria

➤ **Mucus hypersecretion.**

The earliest feature of chronic bronchitis is hypersecretion of mucus in the large airways, With time, there is also a **marked increase in goblet cells in small airways** (small bronchi and bronchioles) accompanied with enlargement of submucosal glands.

➤ Clinically:

- Blue bloaters: Their cardinal symptom is a persistent cough productive of sputum, coupled with hypercapnia, hypoxemia, and mild cyanosis.

### Emphysema

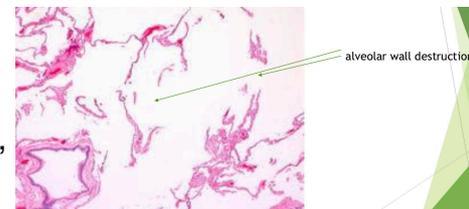
➤ Definition: irreversible enlargement of the airspaces distal to the terminal bronchiole, accompanied by destruction of their walls

➤ The most common causing agents: smoking and patients with  $\alpha$ 1-antitrypsin deficiency.

➤ Clinically:

- Pink Puffers: Skinny/ Take short, fast breaths and use their accessory muscles to exhale/ pursed-lip breathing/ Cheeks and face may appear temporarily pink due to the fast, labored breathing/ barrel-chested due to trapped air.

| Features                                   | Extrinsic asthma                                      | Intrinsic asthma   |
|--|---|--|
| Pathogenesis                               | Type 1 hypersensitivity reaction to extrinsic antigen | Initiated by non-immune mechanisms with intrinsic body stimuli |
| Age of presentation                        | Child   | Adult  |
| Family history                             | Present   | Absent   |
| Prior allergic reaction/ allergen exposure | Positive history of rhinitis, urticaria, eczema       | Absent   |
| Serum IgE level                            | Increased   | Normal   |
| Skin test                                  | Positive  | Negative   |
| Examples                                   | Atopic asthma, occupational asthma                    | Drug (aspirin), viral infection, cold, exercise                |



# Restrictive lung disease

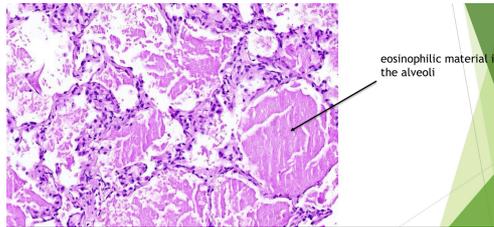


## # Idiopathic pulmonary fibrosis (IPF)

- Poor prognosis, Median survival is 2 to 3 years.
- honeycombing cysts.

## # Pulmonary alveolar proteinosis

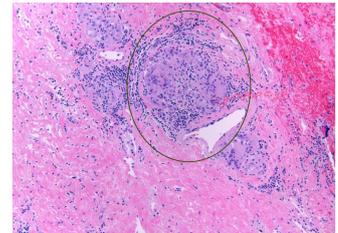
- Pathogenesis: Abnormal accumulation of acellular alveolar surfactant due to impaired surfactant clearance or abnormal surfactant production
- Morphology: Histology will show acellular and coarsely granular eosinophilic material in the alveoli.



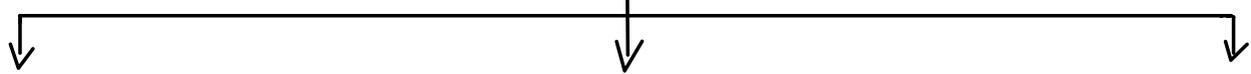
## # Pneumoconiosis

## # Sarcoidosis

- Systemic disease characterized by non-necrotizing granulomatous inflammation, with 90% of overall cases showing involvement of the lungs and hilar lymph nodes.



# Vascular lung disease



## # Pulmonary emboli and Pulmonary infarction

- Acquired risk factors include but are not limited to pregnancy, hospitalization, obesity, oral contraceptive use, malignancy, long bone fracture.
- 90-95% of pulmonary emboli arise for Deep Vein Thrombosis (DVT) in the leg.
- Only 10% of emboli cause infarction.
- Morphology of infarction: wedge shaped hemorrhagic infarction.

## # Pulmonary hypertension

- Definition: increased pulmonary artery pressure > 20 mm Hg.

## # Pulmonary edema

- ❖ Definition: fluid accumulation within the lungs.
- ❖ Morphology:
  - Lungs are wet and heavy, fluid initially at base of lower lobes because hydrostatic pressure is greater here
  - Congestion, fluid and hemosiderin laden macrophages (heart failure cells) are present.



# Neoplastic lung disease # Carcinomas

## > Adenocarcinoma

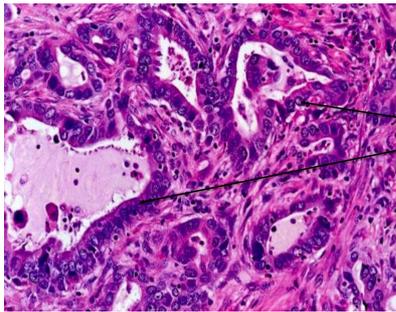
- ✓ the most common type of lung cancer
- ✓ the most common type of non-smokers and females.
- ✓ Morphology: glandular pattern of growth of tumor cell.

## > Squamous cell carcinoma

- ✓ The most common type of lung cancer in smokers.
- ✓ Most common type in males.
- ✓ Has the best prognosis.
- ✓ Morphology: presence of keratinization and intercellular

## > Small cell cancer

- ✓ Morphology: Salt and pepper nucleus.
- ✓ Has the worst prognosis.



Adenocarcinoma  
Malignant glands