

DISEASES OF THE RESPIRATORY SYSTEM LECTURE 2

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FRCPATH

- DIFFERENCE BETWEEN OBSTRUCTIVE AND RESTRICTIVE LUNG DISEASES.
- EMPHYSEMA.

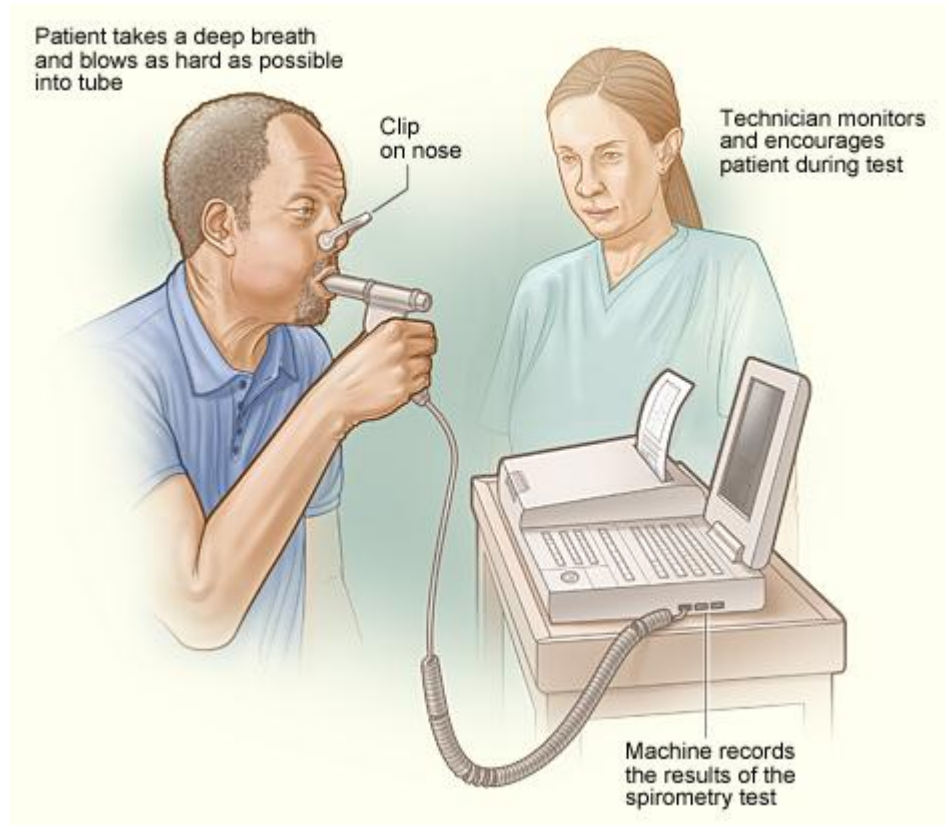
OBSTRUCTIVE VS RESTRICTIVE LUNG DISEASES

- OBSTRUCTIVE: LIMITATION OF AIRFLOW.
- RESTRICTIVE: REDUCED EXPANSION, AND DECREASED TOTAL CAPACITY.

Obstructive vs restrictive lung diseases

Obstructive	restrictive
characterized by limitation of airflow due to partial or complete obstruction	characterized by reduced expansion of lung parenchyma accompanied by decreased total lung capacity.
Eg are emphysema, chronic bronchitis, bronchiectasis, and asthma	Eg are ILD like Fibrosing alveolitis, idiopathic pulmonary fibrosis, interstitial pneumonia, Pneumoconiosis, Sarcoidosis; and chest wall neuromuscular diseases
total lung capacity normal	decreased
forced vital capacity (FVC) normal	reduced
decreased expiratory flow rate, measured as forced expiratory volume at 1 second (FEV ₁)	Normal or reduced
FEV ₁ /FVC ratio < 0.80	normal

SPIROMETER



- **A SPIROMETER IS AN APPARATUS FOR MEASURING THE VOLUME OF AIR INSPIRED AND EXPIRED BY THE LUNGS**

- FEV1: VOLUME THAT HAS BEEN EXHALED AT THE END OF THE FIRST SECOND OF FORCED EXPIRATION.
- FORCED VITAL CAPACITY: THE VOLUME OF AIR BREATHED OUT AFTER A MAXIMALLY FORCED EXPIRATORY EFFORT.

- **Vital capacity** is the maximum amount of air a person can expel from the lungs after a maximum inhalation.
- **FEV1/FVC ratio**, also called Tiffeneau-Pinelli index, is a calculated ratio used in the diagnosis of obstructive and restrictive lung disease. It represents the proportion of a person's vital capacity that they are able to expire in the first second of expiration

- Normal values are approximately 80%.
- Predicted normal values depend on age, sex, height, mass and ethnicity as well as the research study that they are based upon.

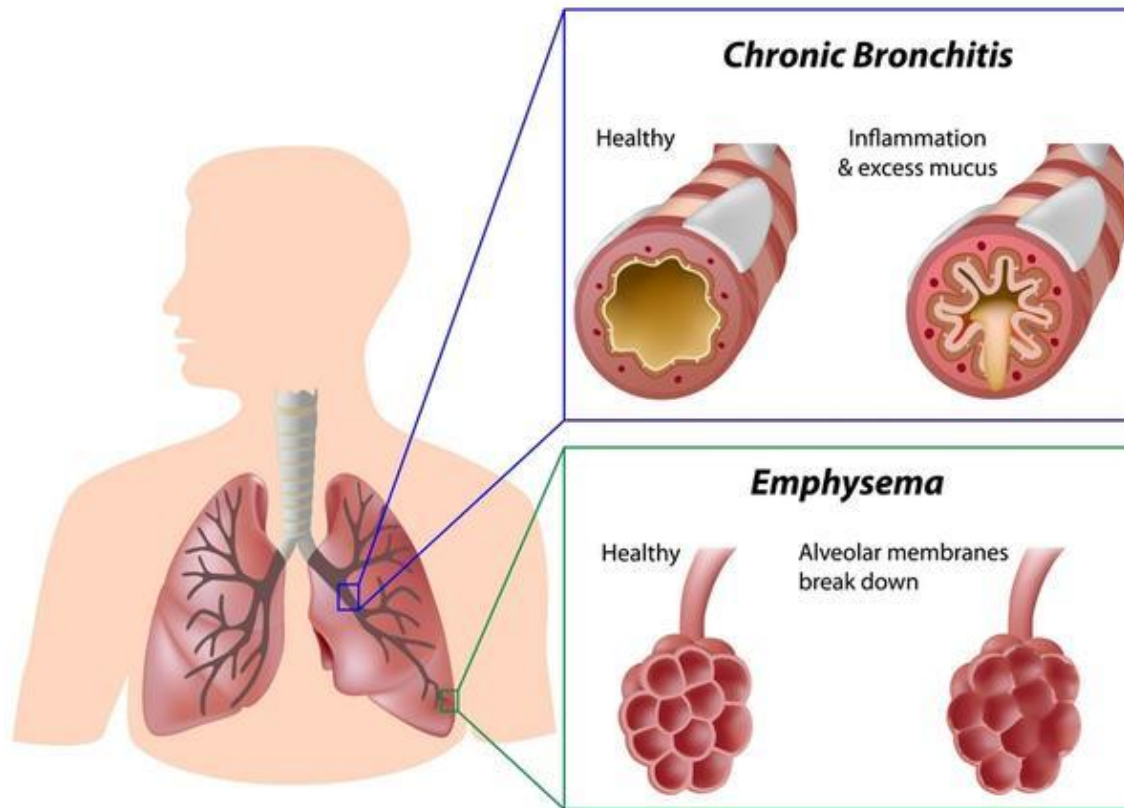
- In obstructive lung disease, the FEV1 is reduced due to an obstruction of air escaping from the lungs. Thus, the FEV1/FVC ratio will be reduced
- In restrictive lung disease, the FEV1 *and* FVC are equally reduced due to fibrosis or other lung pathology

OBSTRUCTIVE LUNG DISEASES

- COPD: EMPHYSEMA AND CHRONIC BRONCHITIS.
- ASTHMA.
- BRONCHIECTASIS.

COPD

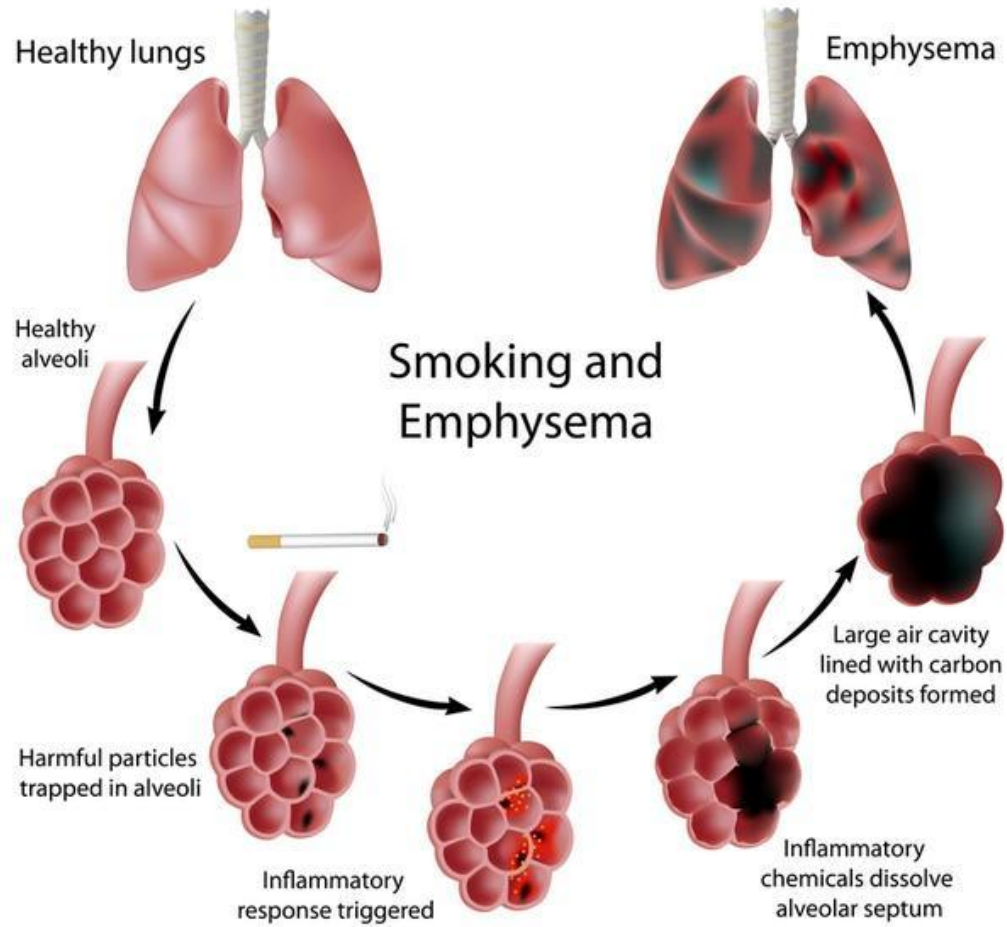
Chronic Obstructive Pulmonary Disease (COPD)



EMPHYSEMA

- ABNORMAL, PERMANENT **ENLARGEMENT** OF AIR SPACES DISTAL TO TERMINAL BRONCHIOLES ALONG WITH **DESTRUCTION** TO THEIR WALLS WITHOUT SIGNIFICANT FIBROSIS.

EMPHYSEMA



TYPES OF EMPHYSEMA

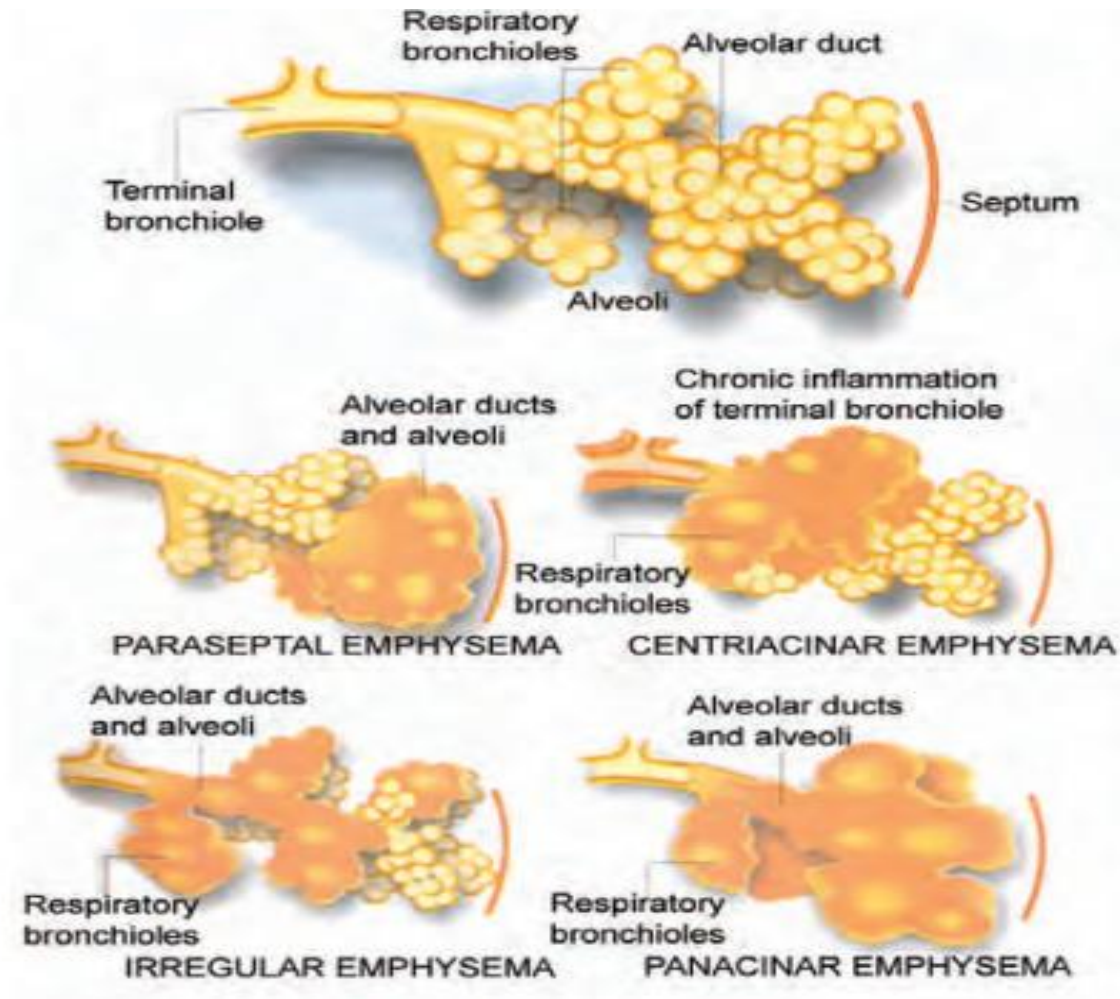
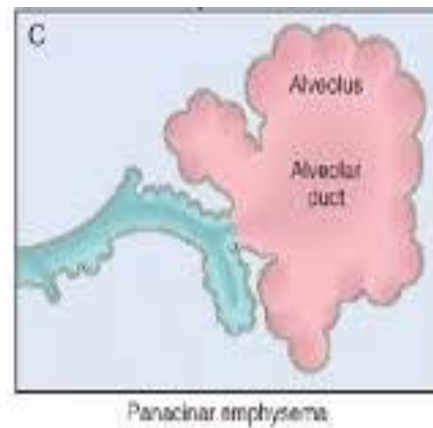
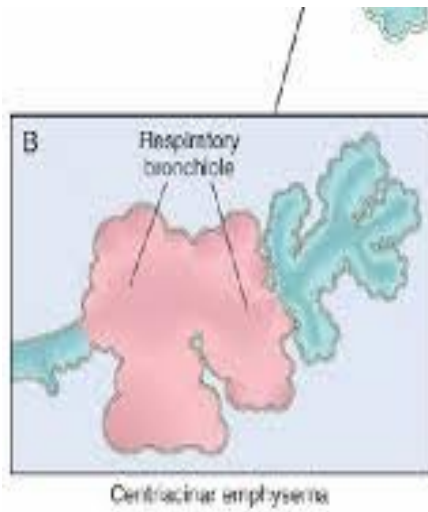


Fig. 4.30: Types of emphysema

CENTRIACINAR VS PANACINAR



CENTRIACINAR = CENTRILOBULAR

- MORE SEVERE IN THE UPPER LOBES OF LUNGS.
- SMOKING ASSOCIATED.

PANACINAR EMPHYSEMAM

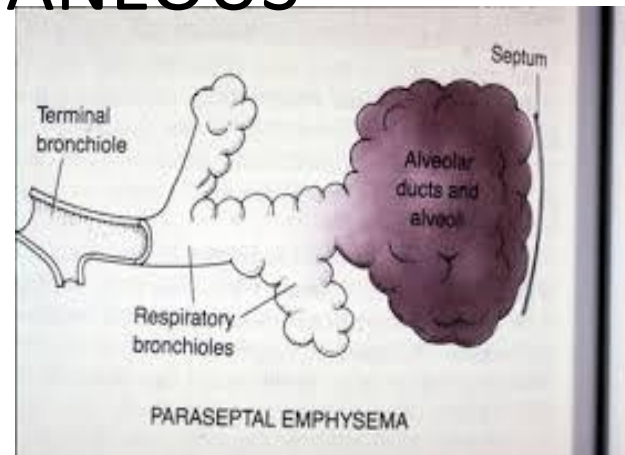
- MOSTLY AFFECTS LOWER LUNG ZONES.
- ASSOCIATED WITH ALPHA 1 ANTITRYPSIN DIFICIENCY.

IRREGULAR EMPHYSEMA

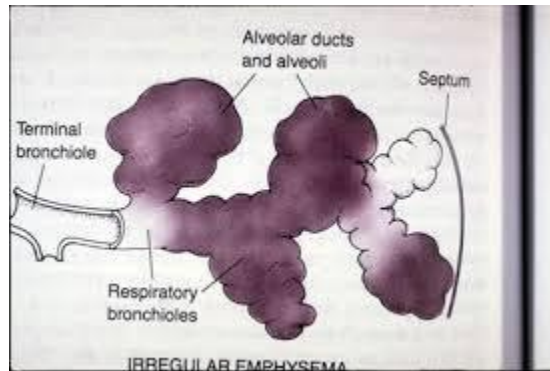
- ASSOCIATED WITH SCARRING.
- ASYMPTOMATIC.
- THE MOST COMMON FORM OF EMPHYSEMA.

PARASEPTAL EMPHYSEMA

- CAN OCCUR ADJACENT TO FIBROSIS, SCARRING OR ATELECTASIS.
- BULLAE: ENLARGES AIRSPACES UP TO 2CM. THESE CAN CAUSE SPONTANEOUS PNUMOTHORAX.



IRREGULAR EMPHYSEMA



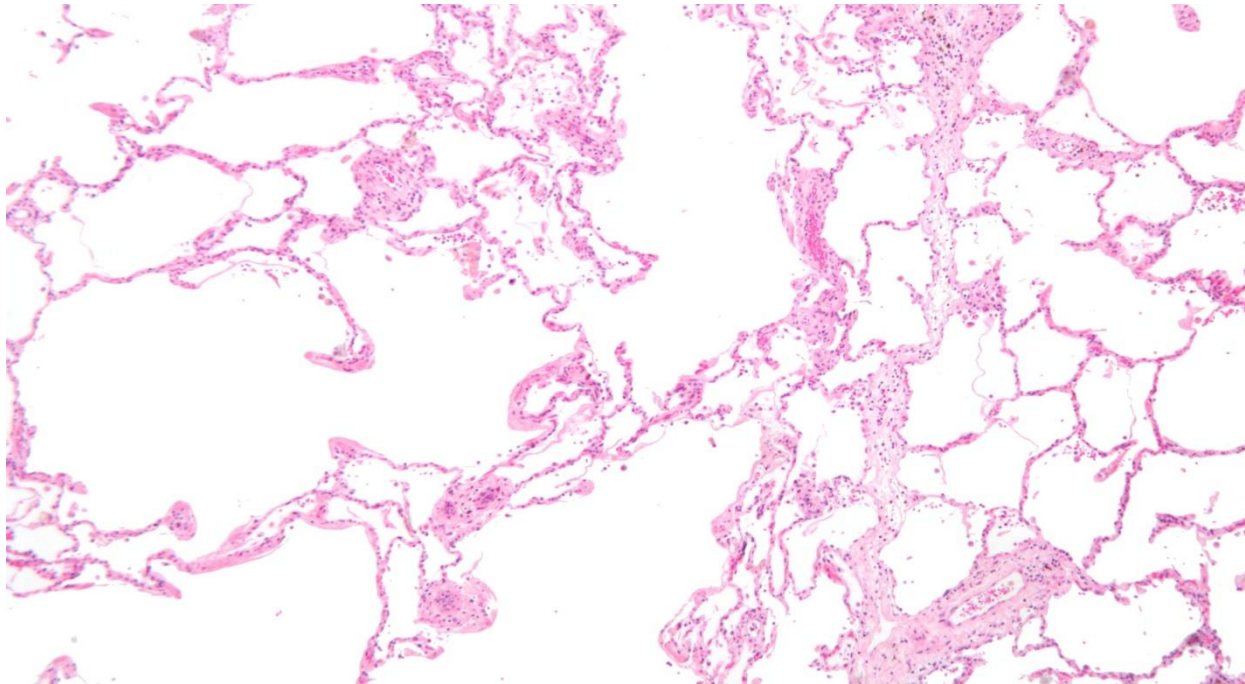
MORPHOLOGY



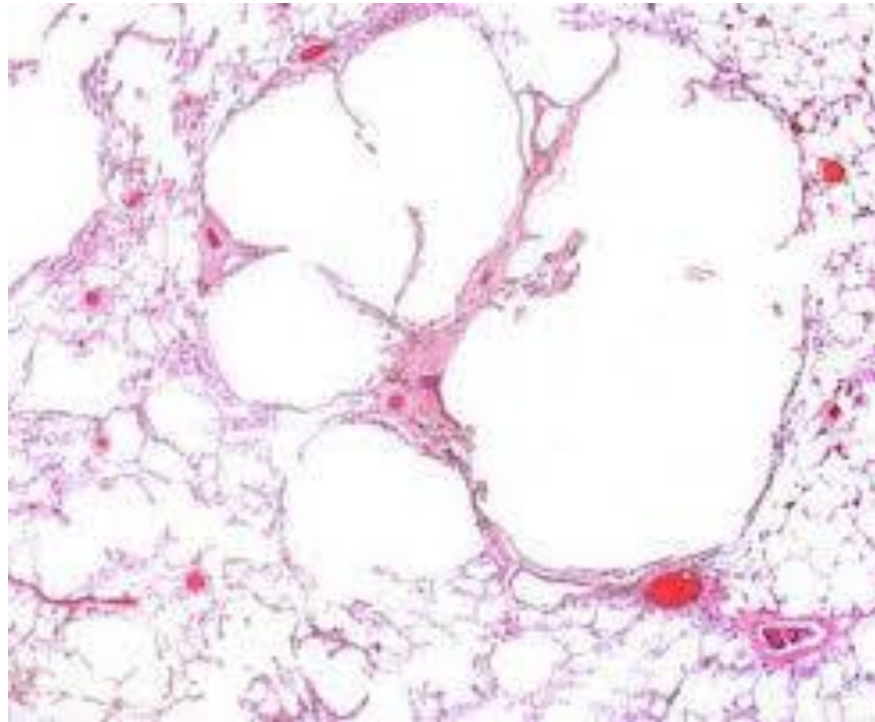
MORPHOLOGY



HISTOPATHOLOGY

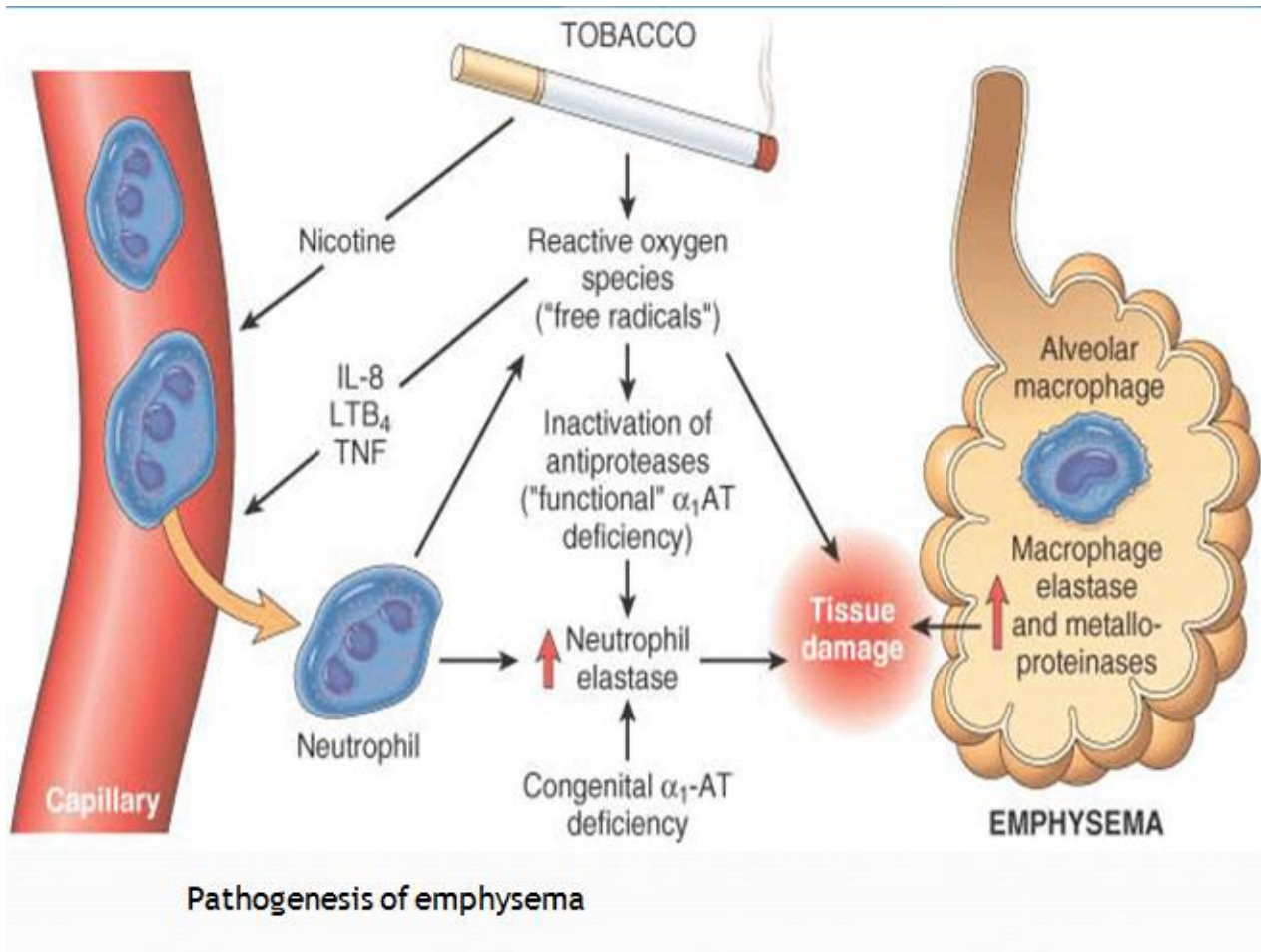


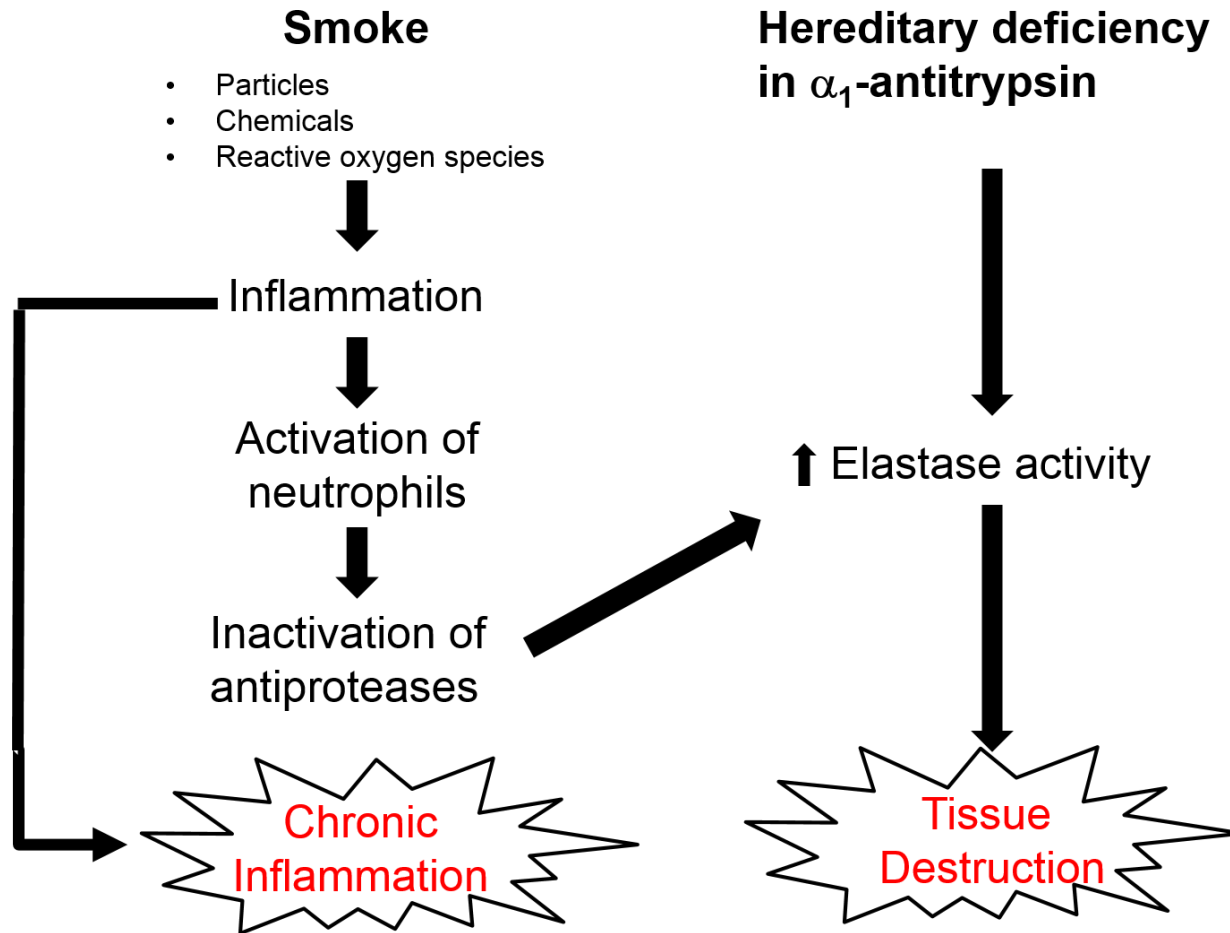
HISTOPATHOLOGY



- LOSS OF ELASTIC TISSUE , RADIAL TRACTION ON SMALL AIRWAYS IS REDUCED SO THEY COLLAPSE DURING EXPIRATION

PATHOGENESIS





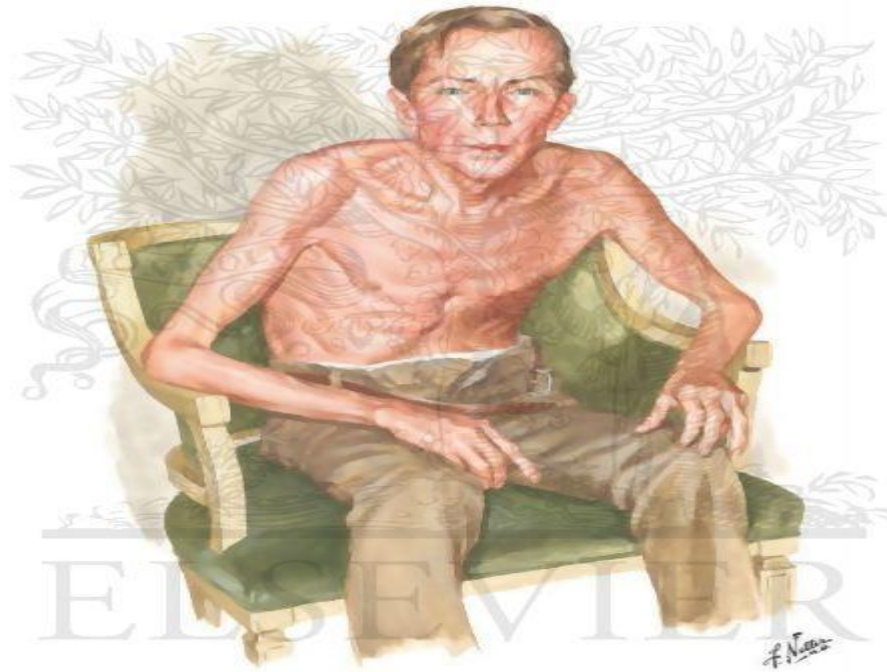
- TISSUE DESTRUCTION.....SO WHY NO FIBROSIS???????

- LOSS OF MESENCHYMAL CELLS ...NO EXTRACELLULAR MATRIX.

CLINICAL FEATURES

- DYSPNEA .
- WEIGHT LOSS.
- PROLONGED EXPIRATION.
- BLOOD GASES RELATIVELY NORMAL.
- PINK PUFFERS

Pink puffers



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