

Short Communication

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Obstructive Pulmonary Diseases

Daniel Benharroch

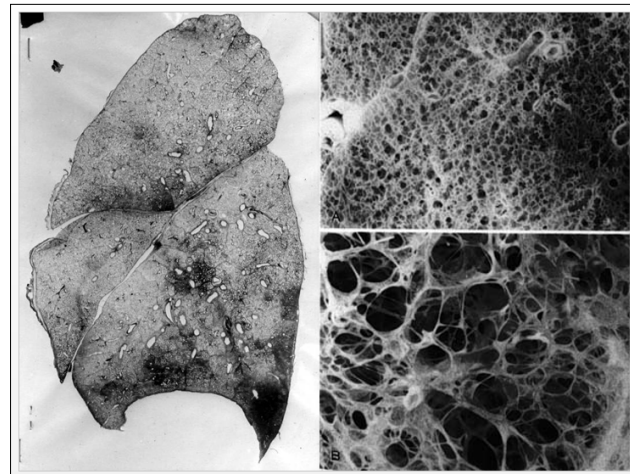
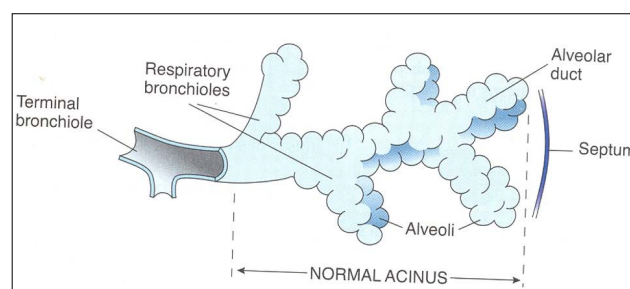
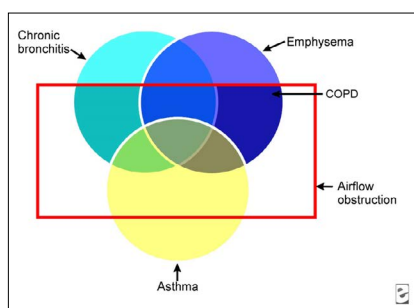
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- EMPHYSEMA
- CHRONIC BRONCHITIS
- BRONCHIAL ASTHMA



Chronic obstructive pulmonary disease COPD

(Emphysema and chronic bronchitis)

Clinically grouped together

Overlapping features of damage

One common extrinsic trigger:

cigarette smoking

Environmental pollutants increase the incidence of morbidity

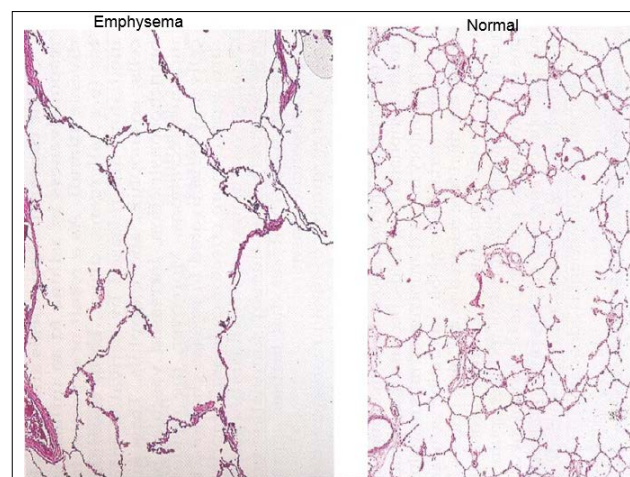
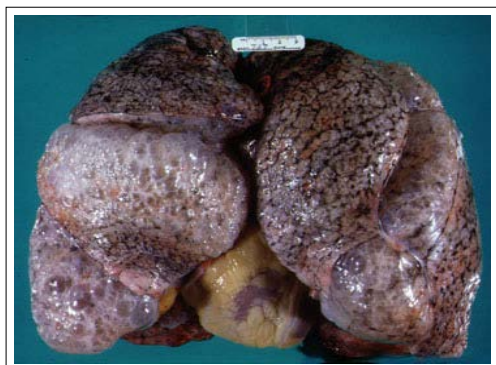
EMPHYSEMA

Abnormal enlargement of the alveoli and/or respiratory bronchioles.

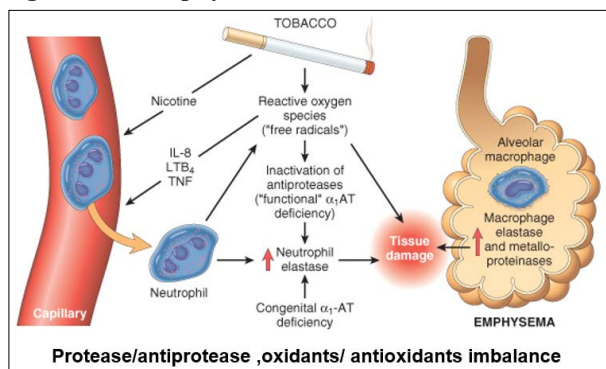
Destruction of alveolar septa.

Absence of significant fibrosis

Emphysema: the lungs cover-up the heart

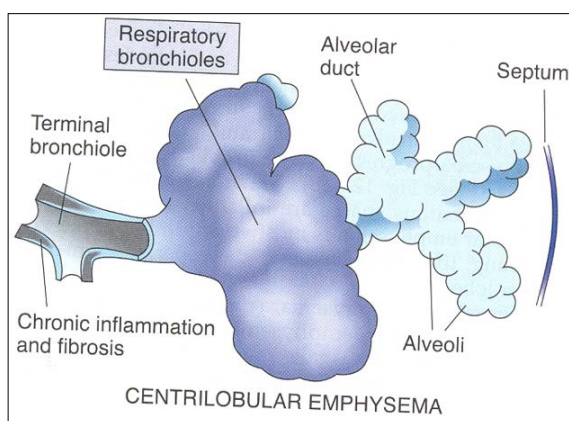


Pathogenesis of Emphysema



Types of emphysema

- Centriacinar (centrilobular)
- Panacinar (panlobular)
- Distal acinar (paraseptal)
- Irregular
- Main causes of morbidity (in red).
- 6.5% of the patients die of lung disease.



Centriacinar Emphysema

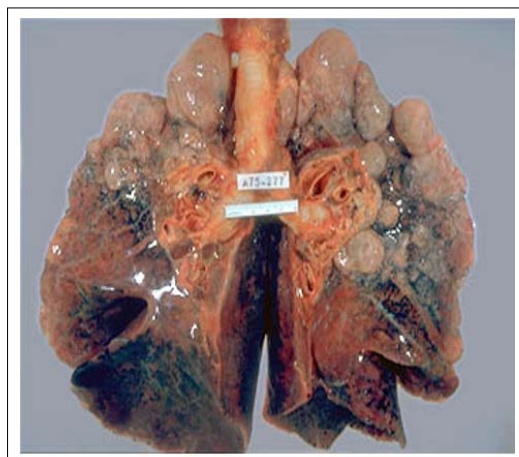
Upper lobes (apical segments) are mainly damaged, in frequency and severity.

Mainly in heavy smokers.

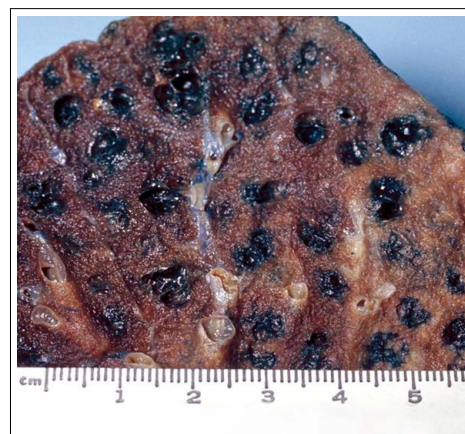
Often together with chronic bronchitis.

In severe cases, if includes distal aspect of the acinus: panacinar emphysema.

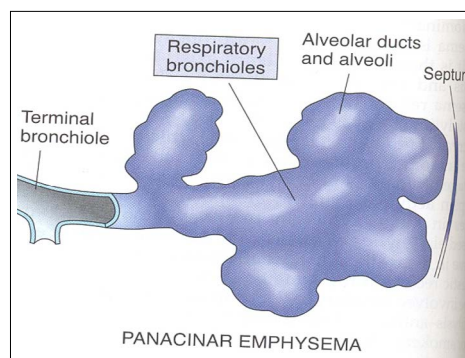
Centriacinar Emphysema Involves Mainly the Upper Lobes



Centriacinar Emphysema Emphasized by Anthracosis and Inflammation



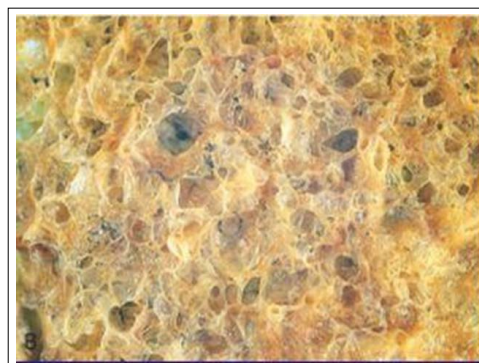
Centriacinar Emphysema



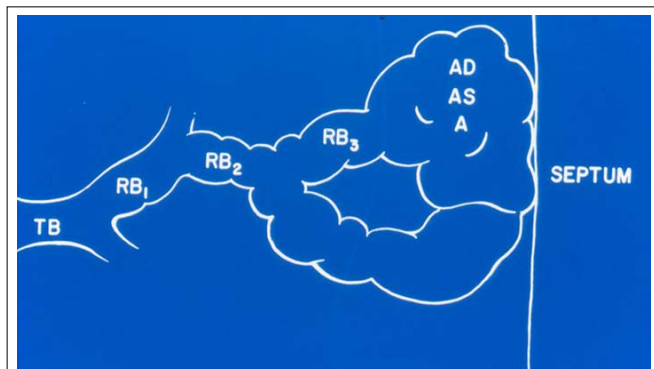
Panacinar Emphysema

The prefix "pan" concerns the whole acinus. Involves mainly the anterior-lower aspect of the lung. Type associated with alpha1-antitrypsin deficiency.

Panacinar emphysema



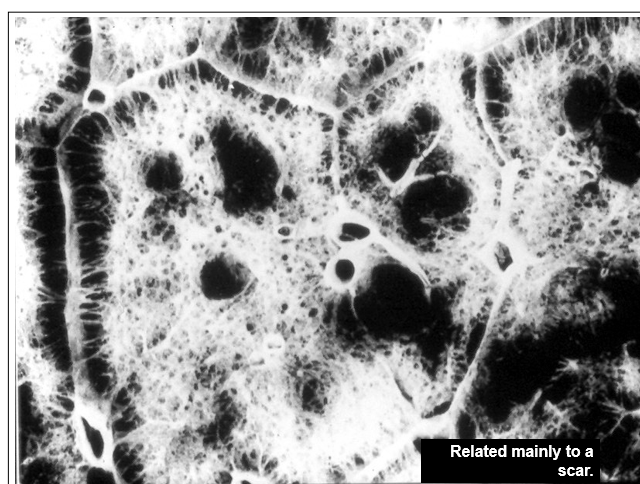
Paraseptal (Distal) Emphysema



Distal Acinar Emphysema



Irregular Emphysema



Other types of “emphysema”

- Compensatory hyperinflation “emphysema”
- Obstructive overinflation “emphysema”
- Bullous “emphysema” (>1cm)
- Interstitial “emphysema”
- Senile “emphysema”

Chronic Bronchitis

- The definition is clinical: productive cough for two consecutive years -
- At least three months each year.
- In advanced stages (heavy smokers): chronic airway obstruction and emphysema.

Chronic bronchitis (pathogenesis)

- Chronic irritation by inhaled substances (90% are smokers).
- Bacterial and viral infection – triggering acute exacerbation.

Chronic bronchitis

Hypersecretion of mucus in large airways

Microscopical features:

Major increase in size of mucous glands

Measured by Reid index

Airflow obstruction of small airways

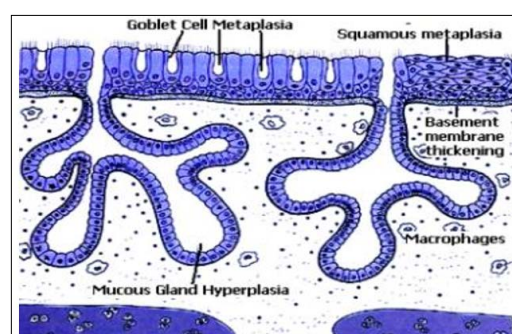
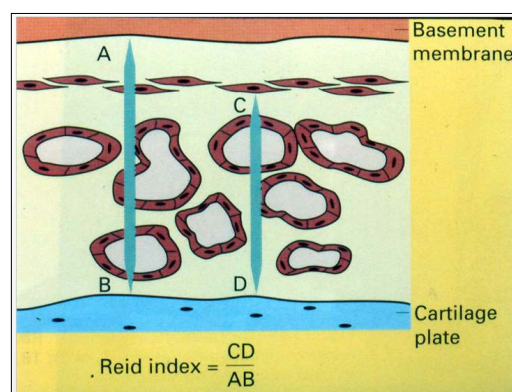
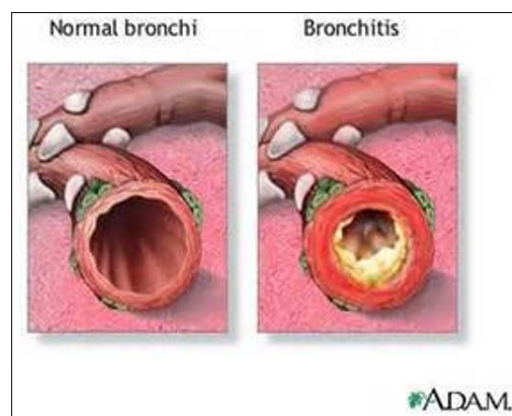
Microscopical features:

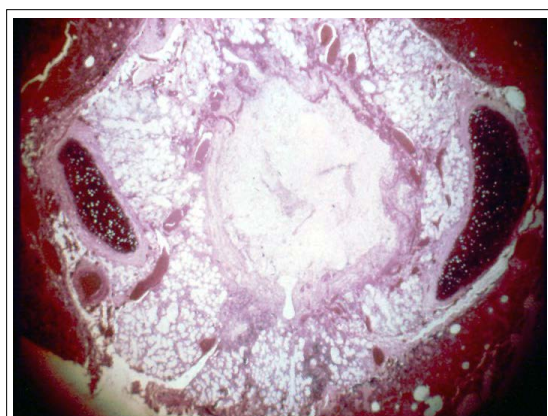
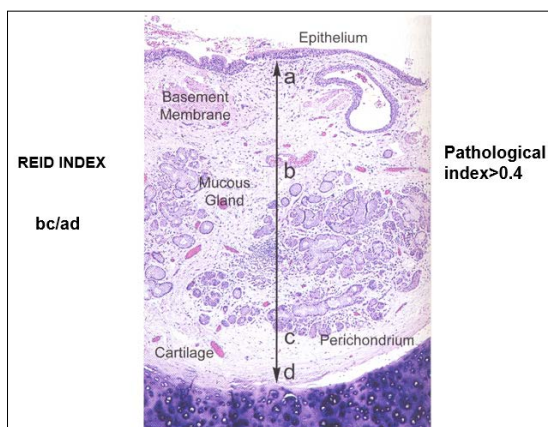
Goblet cell metaplasia

Mucous plugging

Inflammatory infiltrate

Fibrosis (bronchiolitis obliterans)

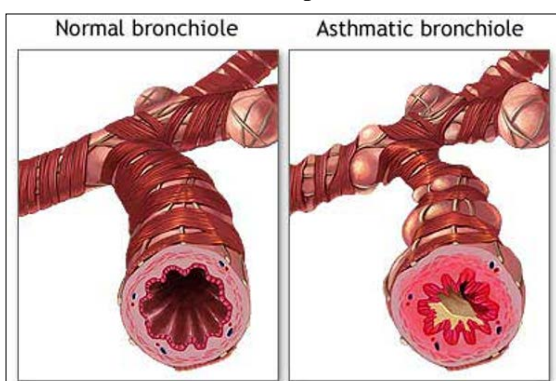




Bronchial Asthma

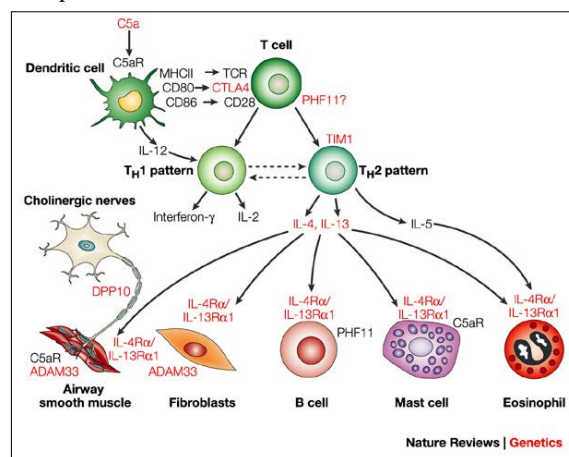
Variable bronchoconstriction and airflow limitation that is at least partly reversible, either spontaneously or with treatment

Bronchospasm



Bronchial asthma

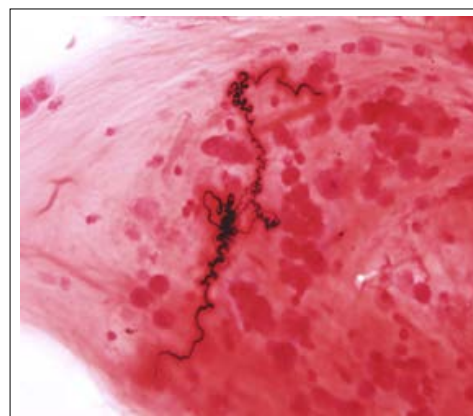
- Atopic asthma
 - Genetic predisposition to type I hypersensitivity.
- Non-atopic asthma
 - Virus induced inflammation, lowering the threshold of the sub-epithelial vagal receptors to irritants
- Drug induced asthma.
- Occupational asthma



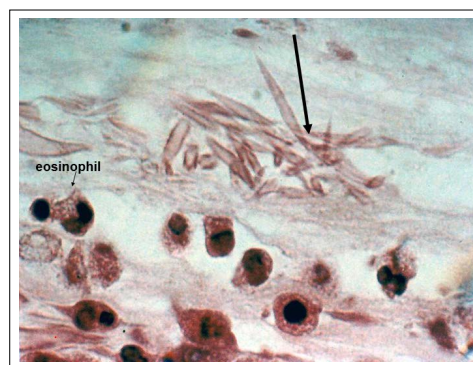
Bronchial asthma

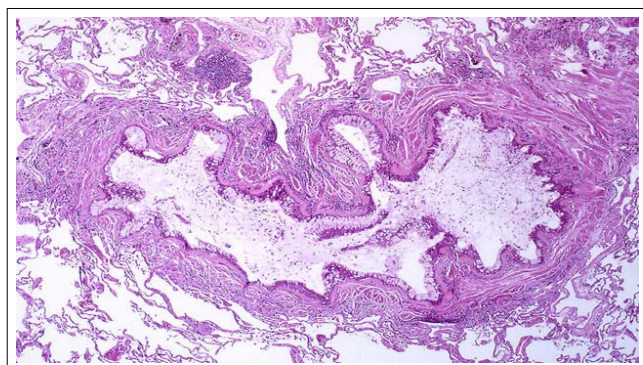
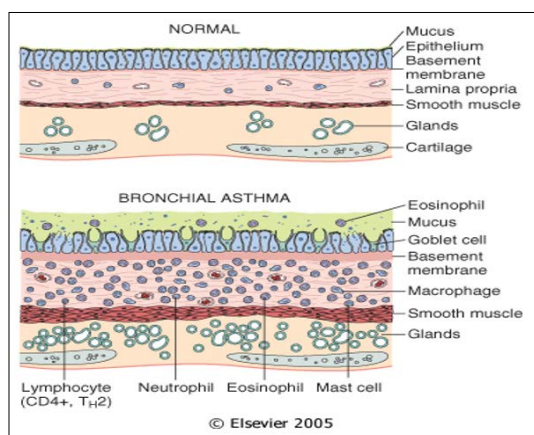
(morphological changes)

- Tenacious mucous plugs containing:
 - Curschmann spirals (whorls of shed epithelium)
 - Numerous eosinophils
 - Charcot-Leyden crystals (eosinophil membrane protein)
- “Airway remodeling”:
 - Thickening of the basement membrane of the bronchial epithelium
 - Edema and inflammation in bronchial wall
 - Hypertrophy of bronchial wall muscle



Charcot-Leyden Crystals





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