

Respiratory Diseases II

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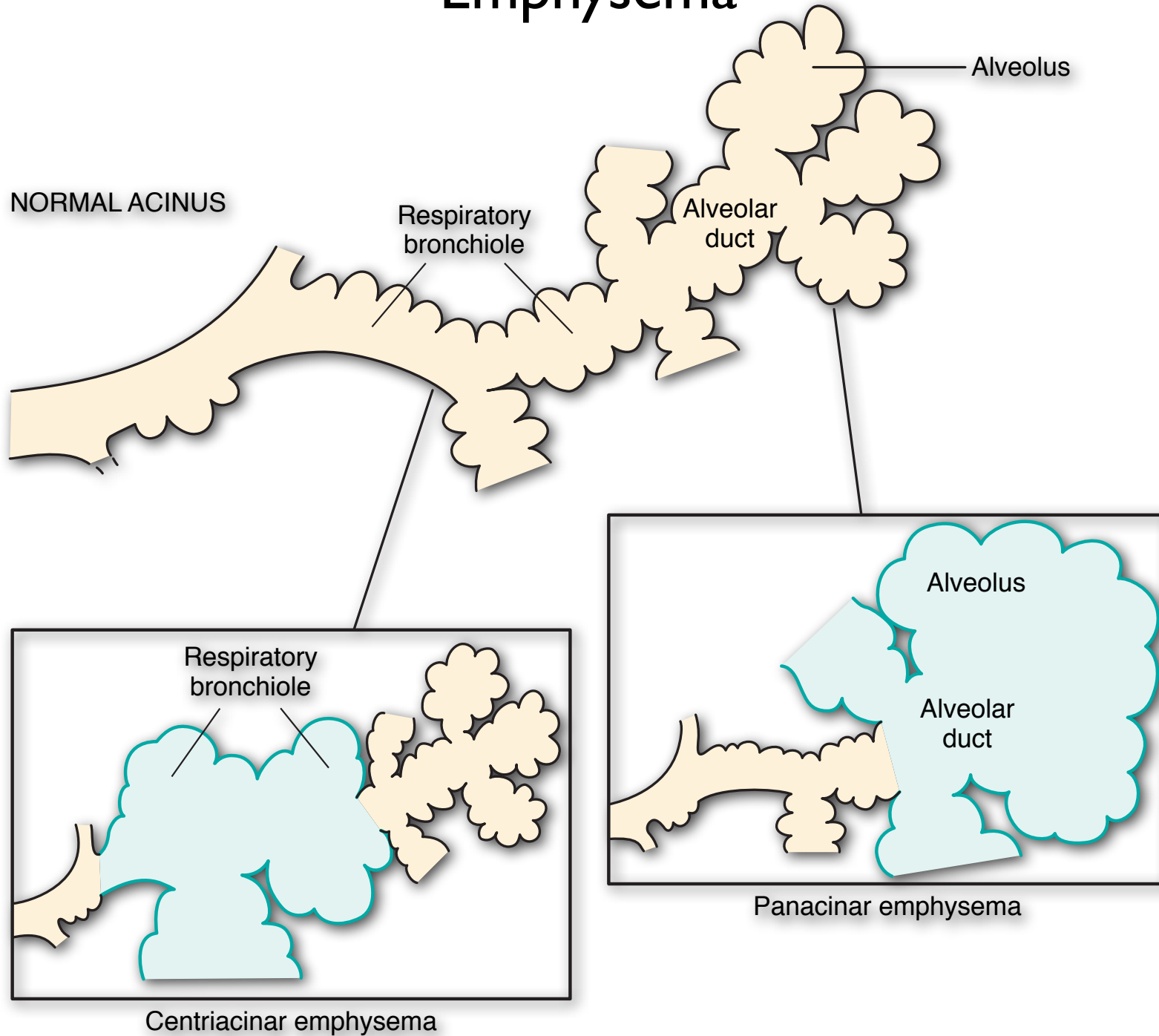
Obstructive Lung Disease

- Definition - a decreased ability to expire
 - Other terms include chronic obstructive lung disease, chronic obstructive pulmonary disease (C.O.P.D.),etc
- Types
 - Emphysema - abnormal enlargement of air spaces distal to the terminal bronchioles
 - Chronic bronchitis - chronic excessive mucus production in the airways
 - Asthma - reactive airway disease
 - Bronchiectasis - chronic necrotizing infection of the bronchi and bronchioles leading to dilatation

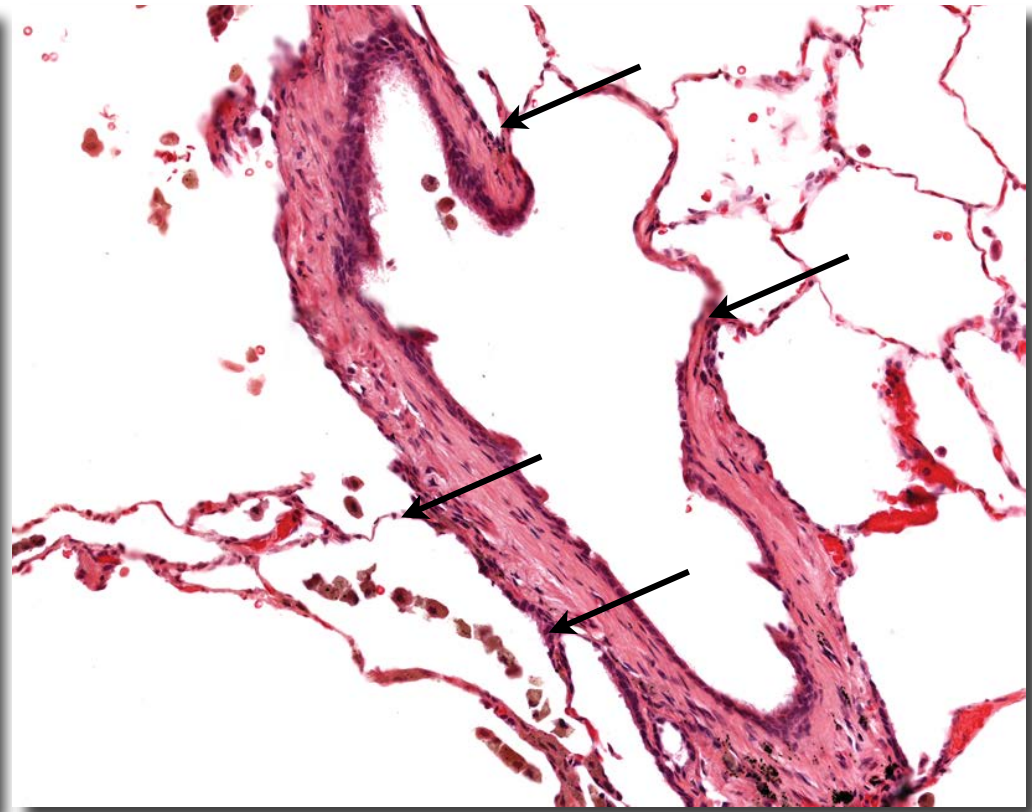
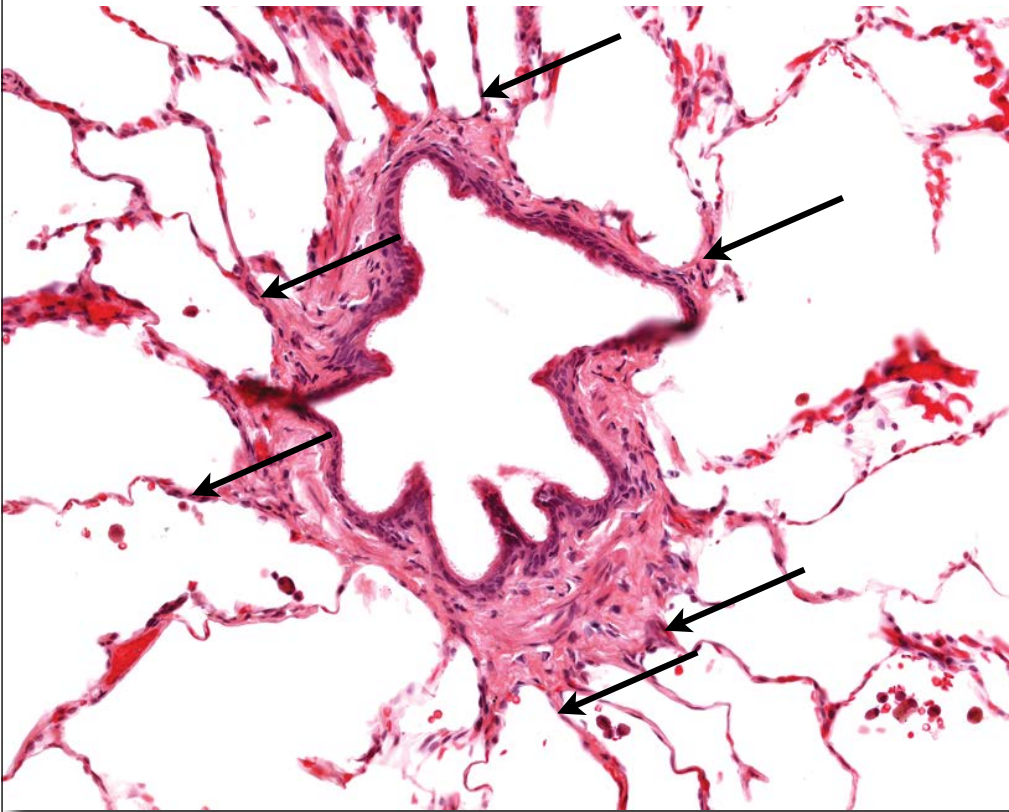
Emphysema

- Classified based upon anatomical distribution within the lung acinus
- Centriacinar (centrilobular emphysema)
- Panacinar (panlobular emphysema)
- Paraseptal

Emphysema



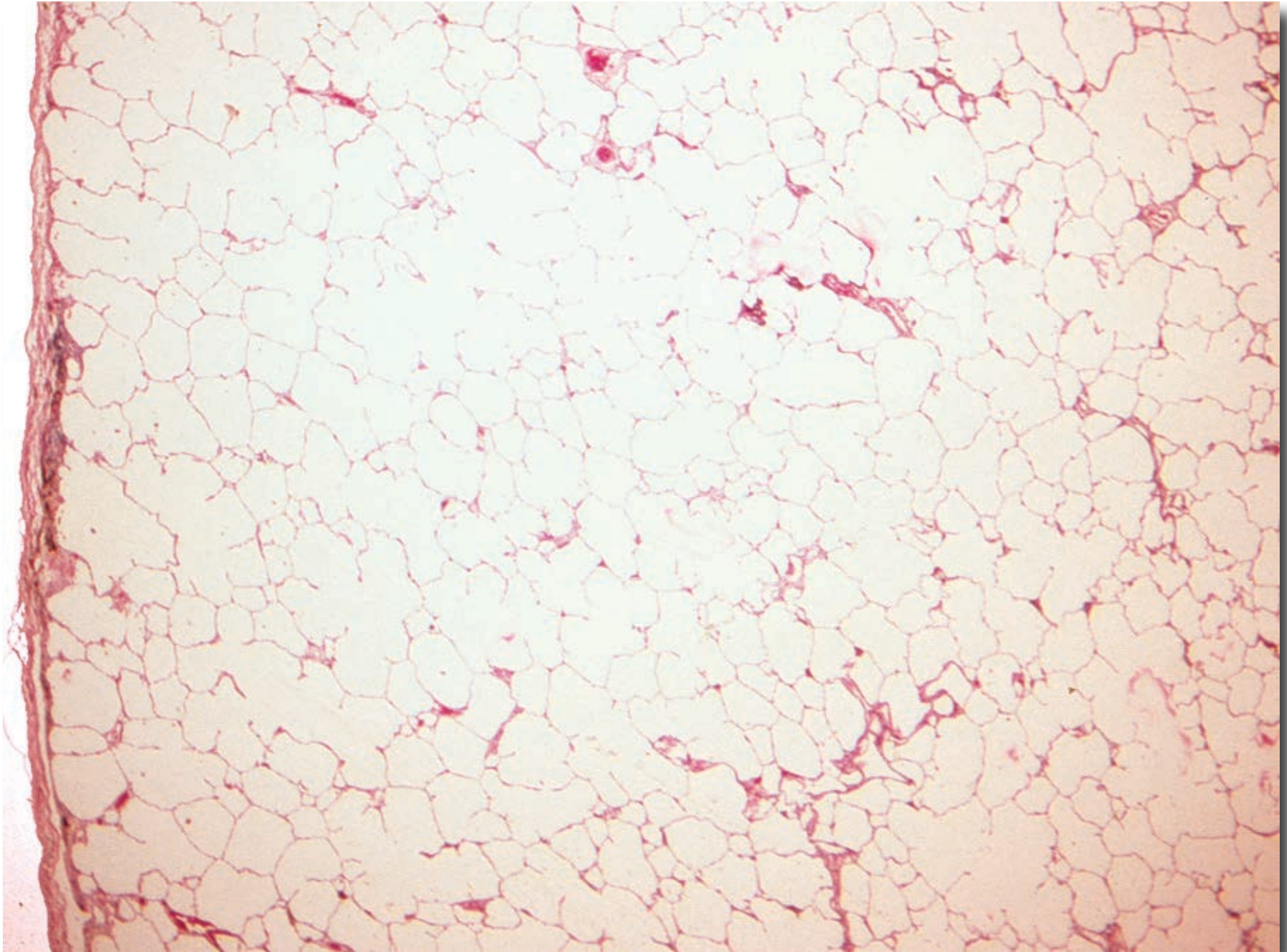
Emphysema: Tethering



Normal Lung



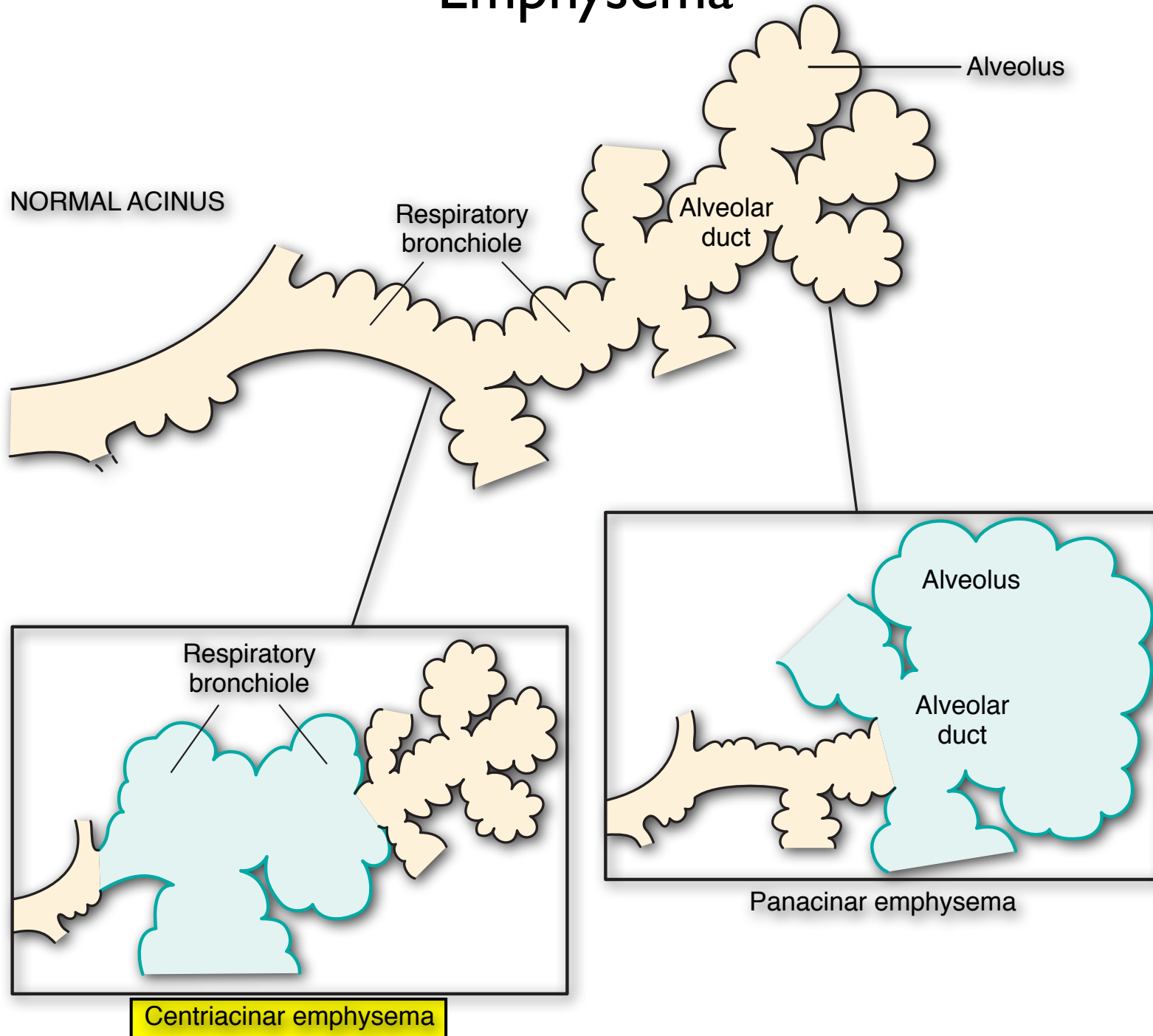
Normal Lung



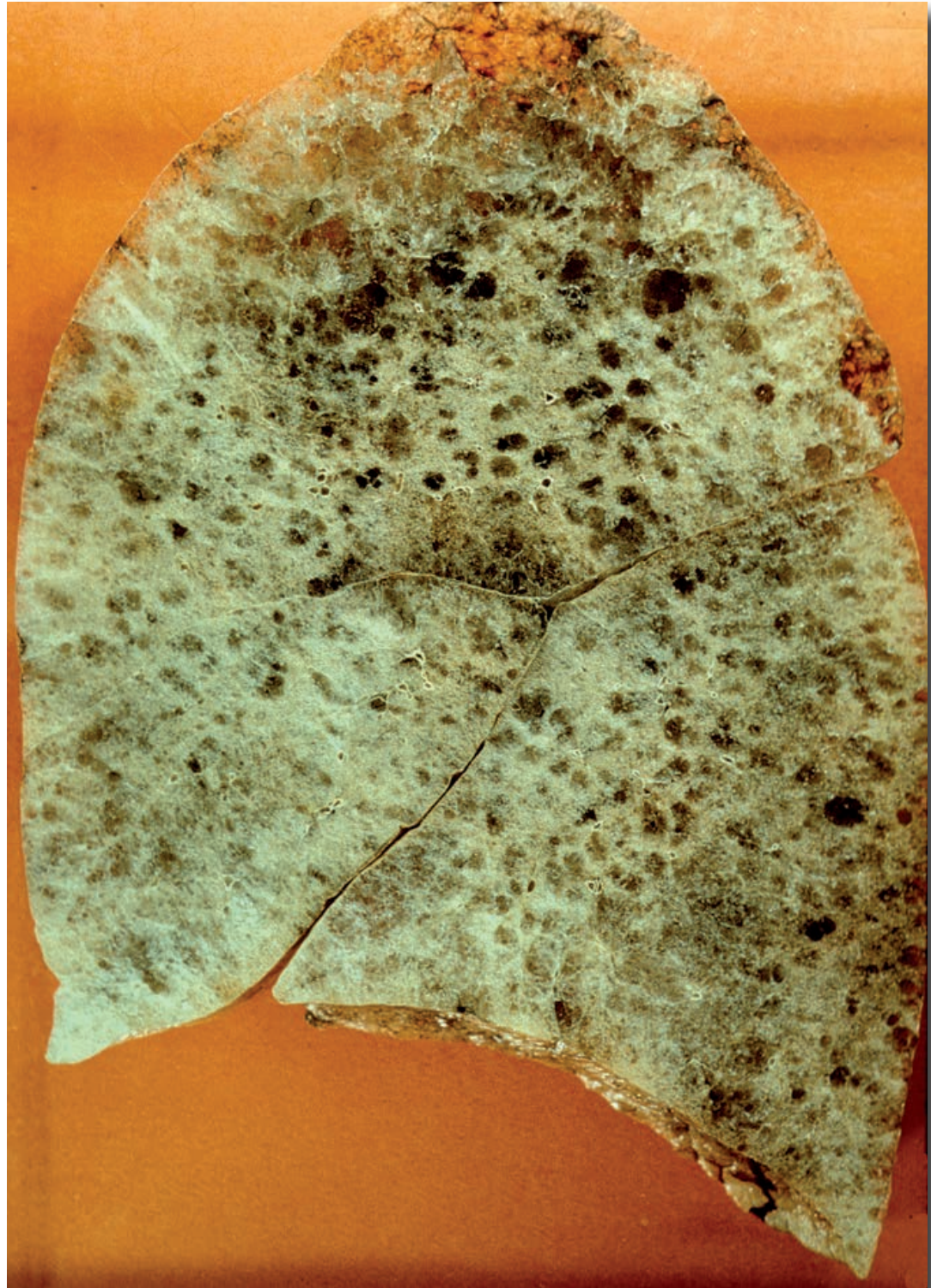
Centriacinar Emphysema

- Definition - dilatation of the proximal portions of the acini (respiratory bronchioles) and distal portions of the acini (alveolar ducts and alveoli) are spared
- Lesions are more common and severe in the upper lobes
- Smoking is the major cause

Emphysema



Centriacinar Emphysema



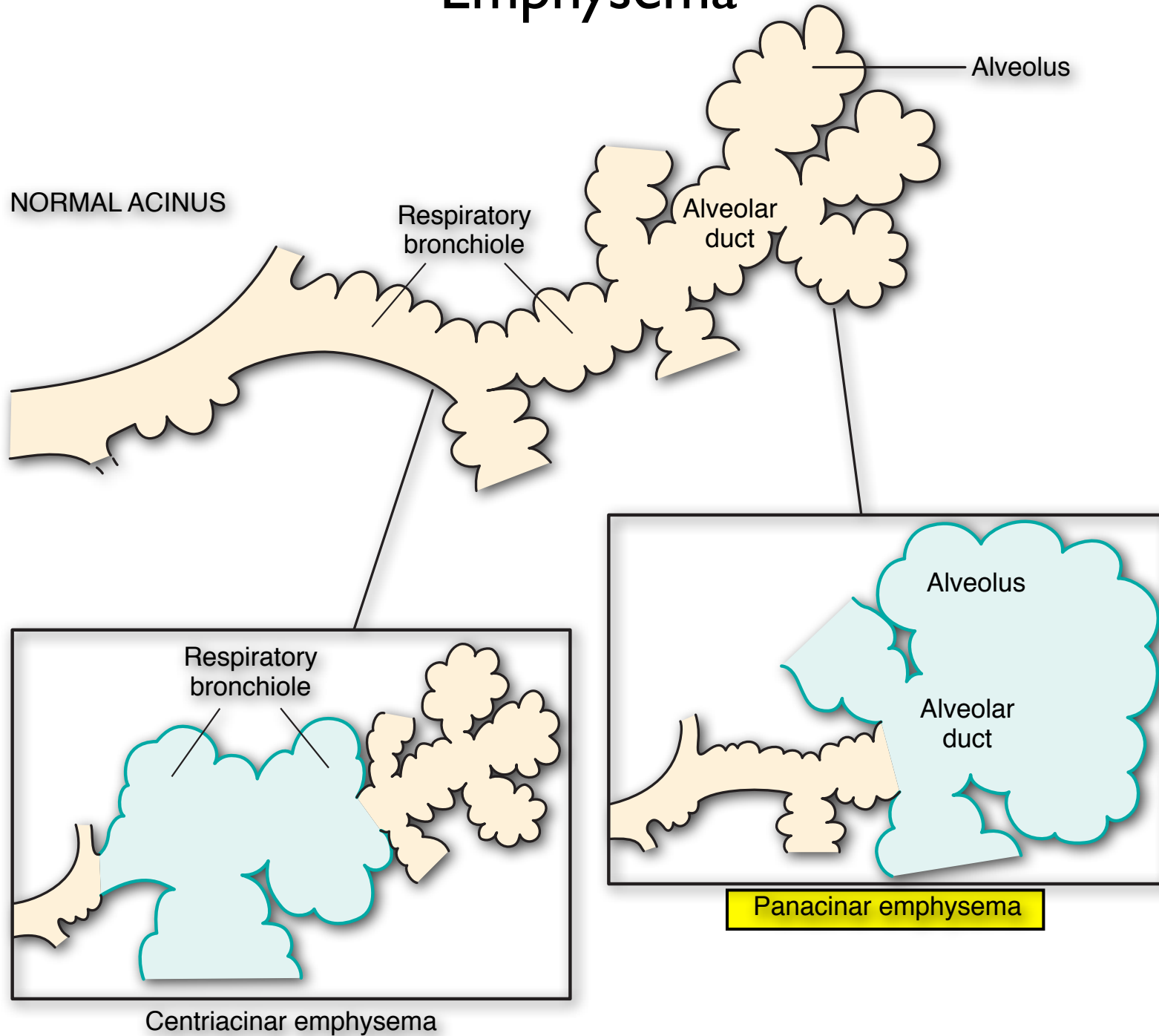
Centriacinar Emphysema



Panacinar Emphysema

- Definition - uniform dilatation of the acini at the level of respiratory bronchioles to the terminal alveoli
- Lesions are more frequent in the lower zones of the lungs
- Associated with alpha-1-antitrypsin deficiency

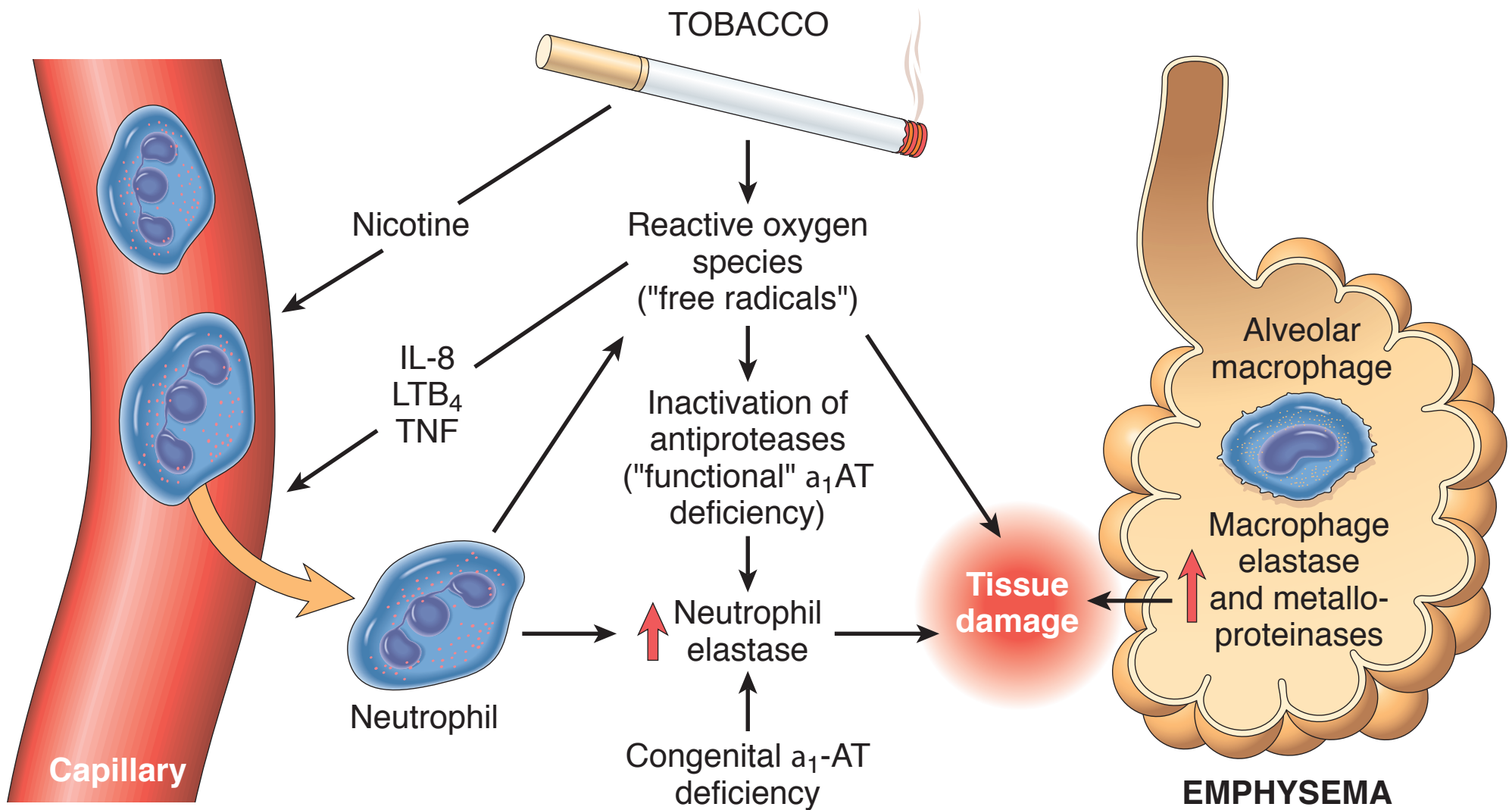
Emphysema



Panacinar Emphysema



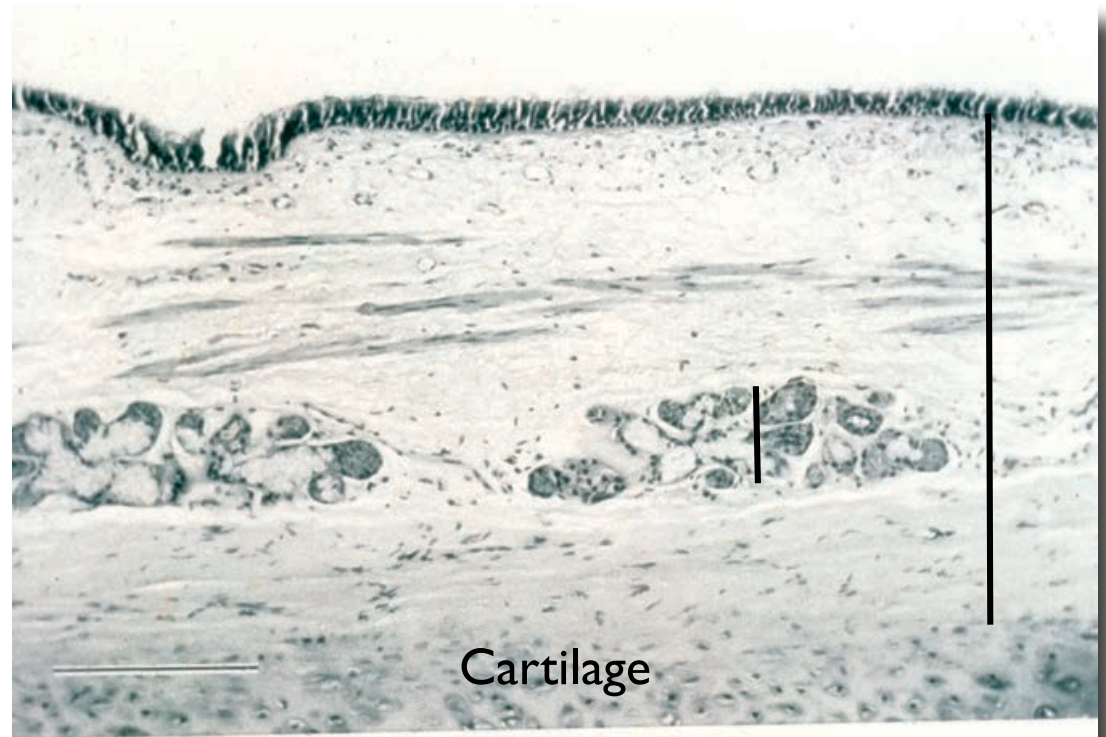
Pathogenesis of Emphysema



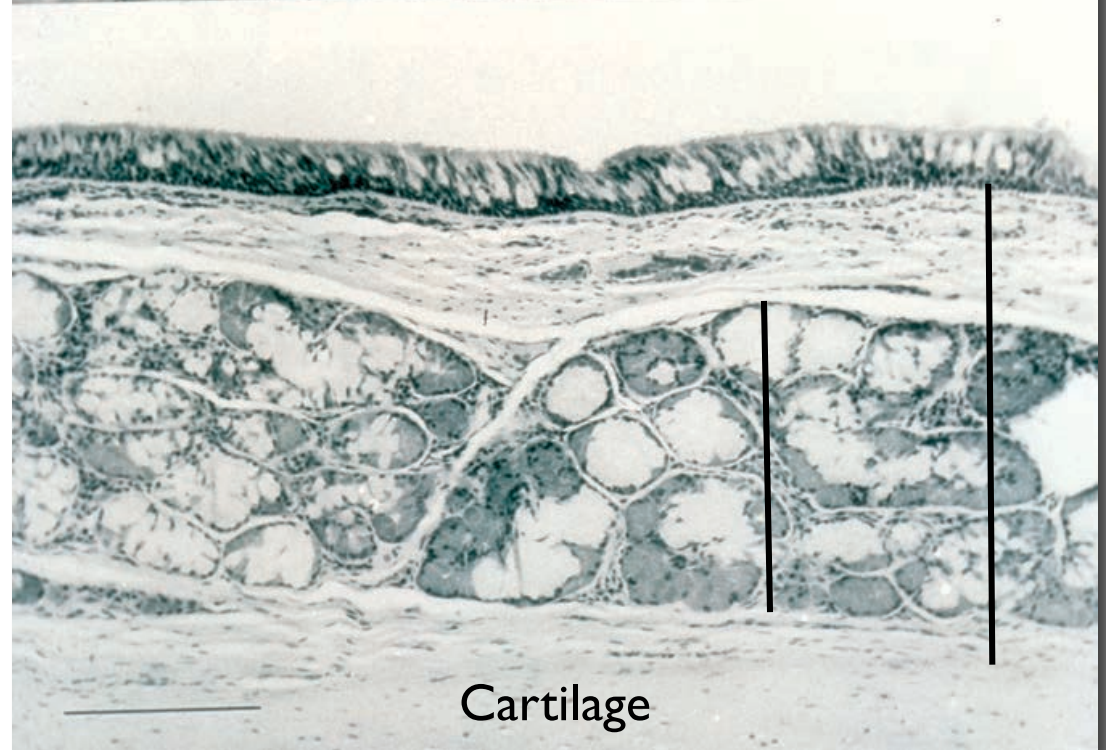
Chronic Bronchitis

- Definition - productive cough for 3 consecutive months for 2 or more years
- Common among smokers and dwellers living in smog
- Pathogenesis
 - Chronic irritation of the airways by inhalation of substances leads to activation of neurohormonal pathways that stimulate airway secretory cells to release chemical mediators
 - Attracts inflammatory cells and stimulate airway mucous secretion

Normal Bronchus



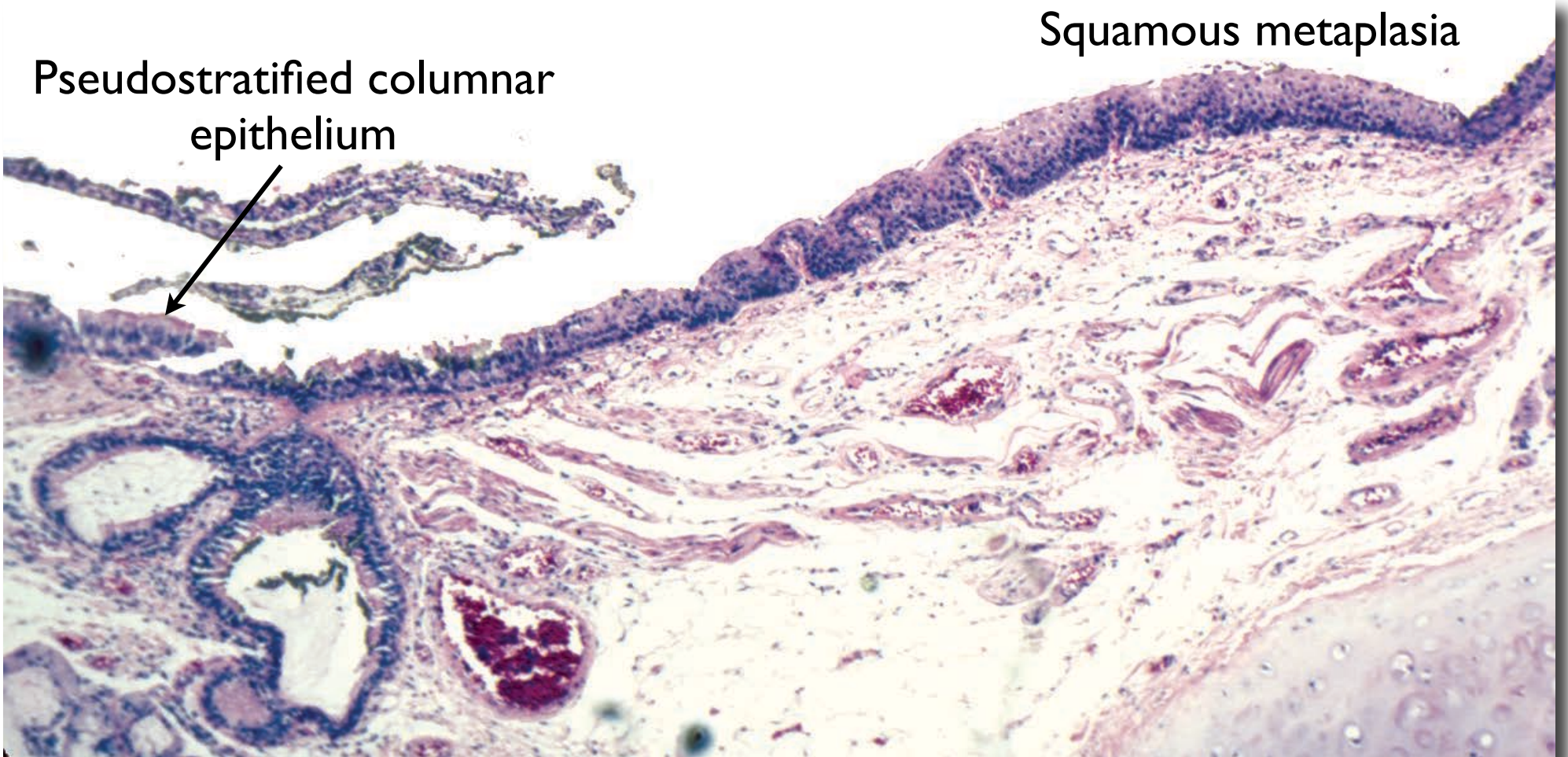
Chronic Bronchitis



Chronic Bronchitis

Pseudostratified columnar
epithelium

Squamous metaplasia



Chronic Bronchitis vs Emphysema

	Predominant Bronchitis	Predominant Emphysema
Appearance	“blue bloater”	“pink puffer”
Age	40-50	50-75
Dyspnea	mild; late	severe; early
Cough	early; copious sputum	late; scanty sputum
Infections	common	occasional
Respiratory insufficiency	repeated	terminal
Cor pulmonale	common	rare; terminal
Airway resistance	increased	normal or slightly increased
Elastic recoil	normal	low
Chest radiograph	prominent vessels; large heart	hyperinflation; small heart

Asthma

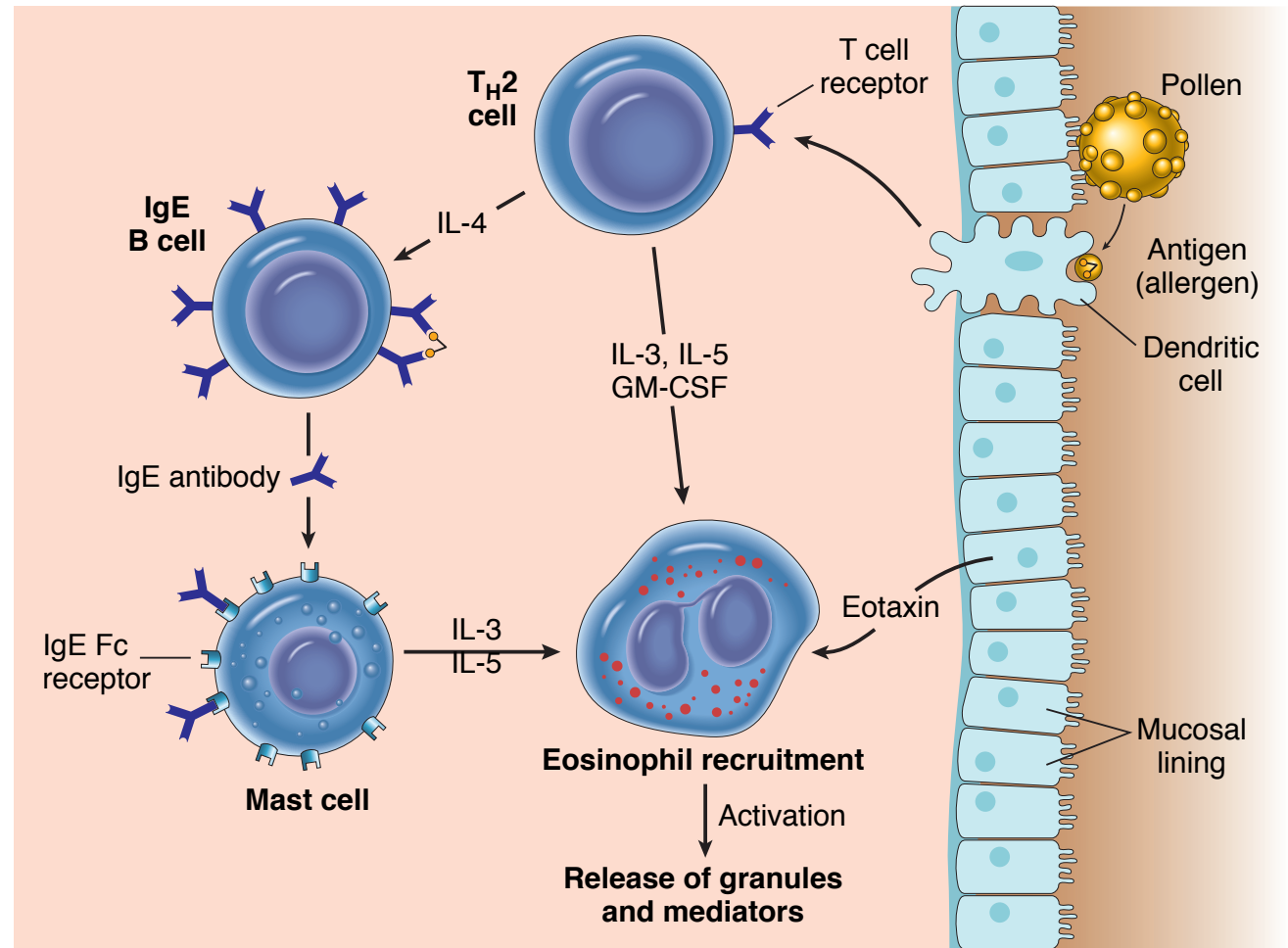
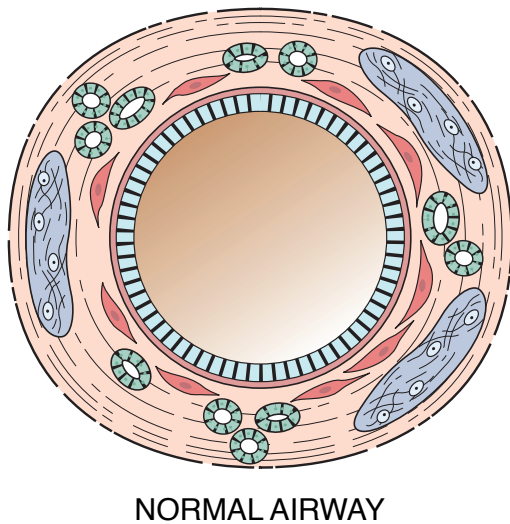
- Definition - reversible bronchoconstriction in response to varied stimuli
- Incidence - 4% in the US
- Classification
 - Extrinsic (immunologic or allergic)
 - Intrinsic (non-immunologic or idiosyncratic)

Asthma

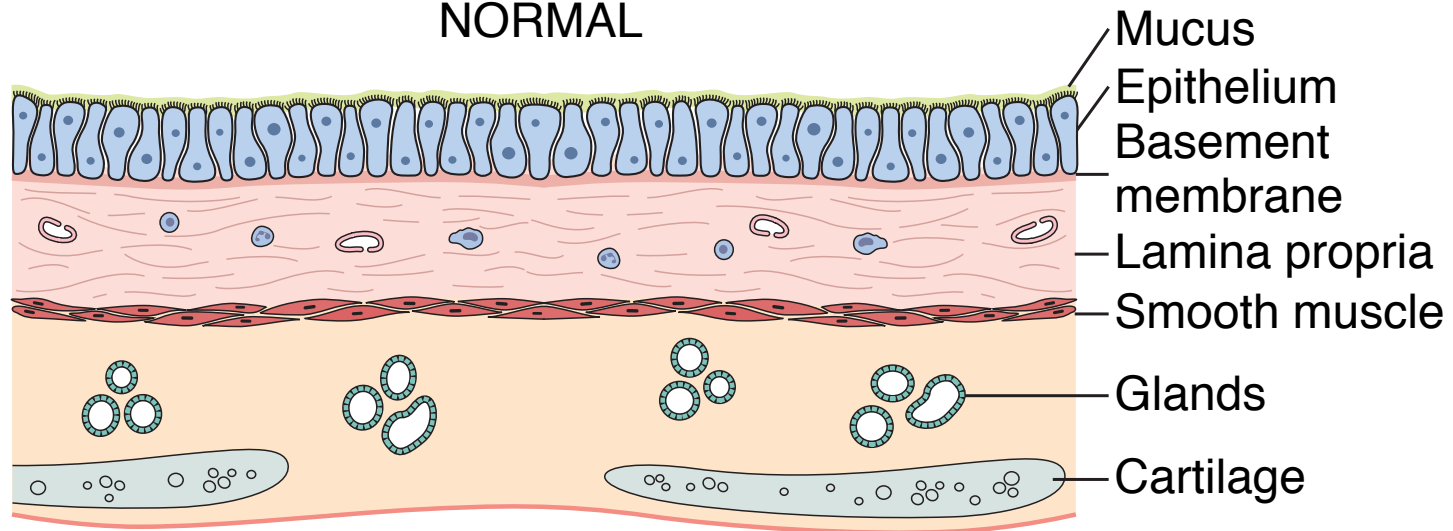
<u>Types of Asthma</u>	<u>Stimuli</u>	<u>Pathogenic Mechanism</u>
Extrinsic		
Atopic (allergic)	specific allergens (dusts, pollens, etc)	type I (IgE) immune reaction
Intrinsic		
Nonreaginic	respiratory tract infection	unknown; hyperreactive airways
Aspirin sensitivity	aspirin	decreased prostaglandins; increased leukotrienes
Occupational/air pollution	chemicals	types I & III immune reactions
Allergic bronchopulmonary aspergillosis	antigen (fungal spore) challenge	types I & III immune reactions
Exercise	increased ventilation; low temperature	unknown
Psychogenic	emotional factors	activator of vagal efferent pathways

Pathogenesis of Asthma Step I

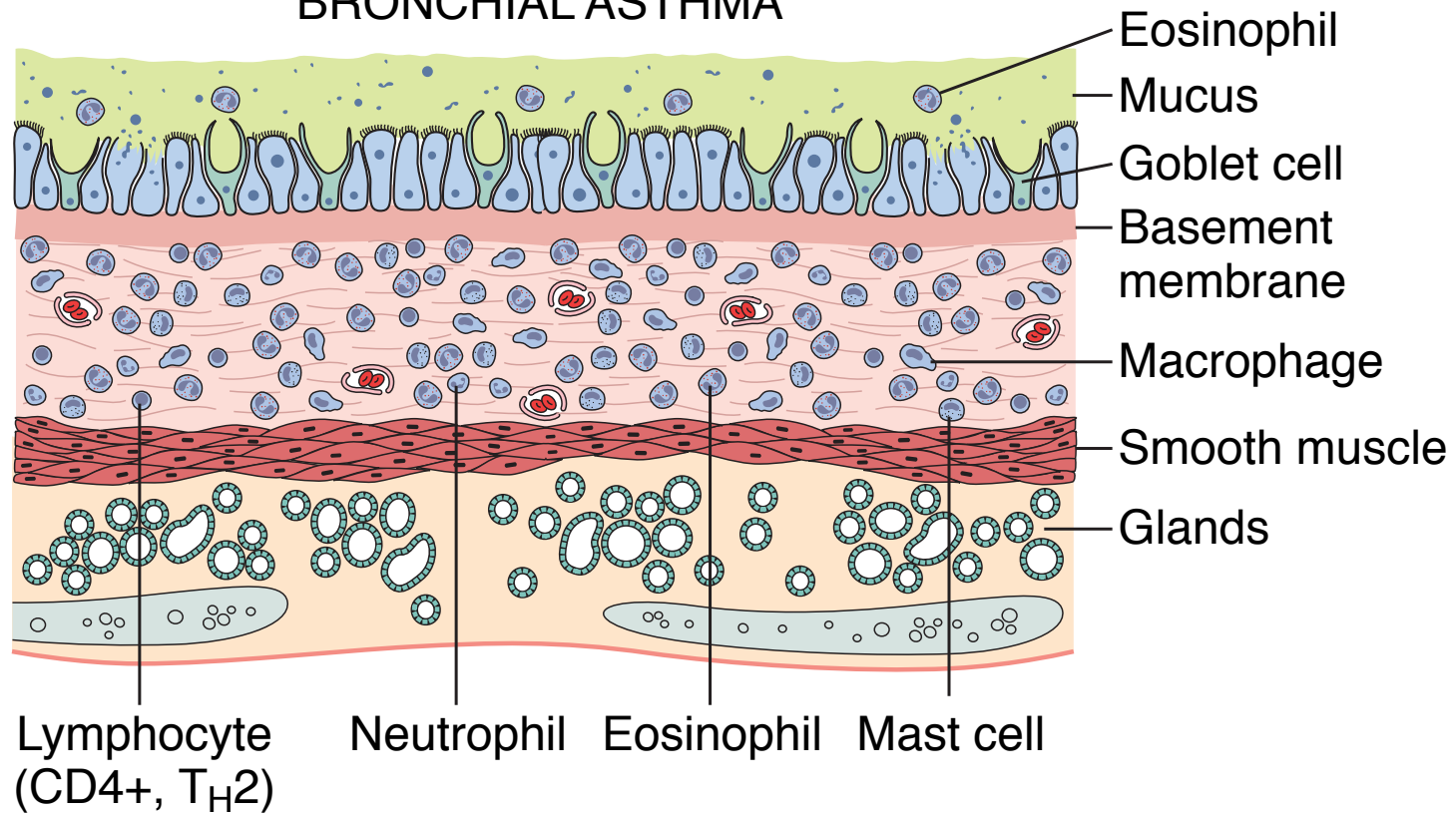
SENSITIZATION TO ALLERGEN



NORMAL



BRONCHIAL ASTHMA



Bronchiectasis

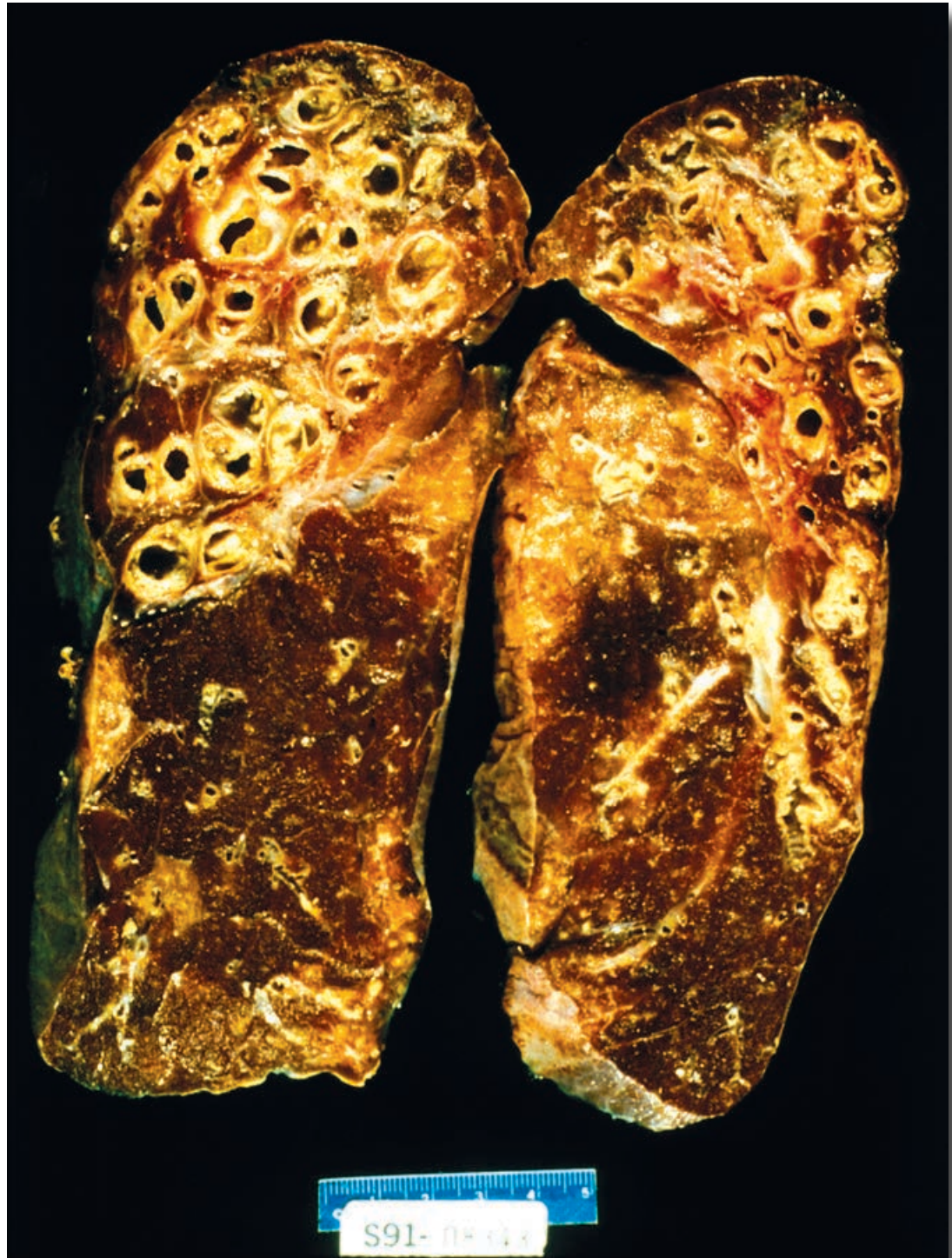
- Definition - obstruction of airways, impaired mucociliary clearance and persistent infection due to dilated airways
- Causes
 - Infection (most common cause in the past)
 - Congenital abnormalities - intralobar sequestration
 - Hereditary conditions
 - Cystic fibrosis
 - Immotile cilia syndrome (Kartagener)
 - Immunodeficiency states - infection
 - Congenital bronchiectasis - defect in bronchial wall cartilage

Bronchiectasis

- Clinical manifestations

- Chronic cough
- Production of copious, purulent sputum
- Hemoptysis
- Lung abscesses
- Pneumonias
- Long-standing, severe bronchiectasis - lead to severe obstructive ventilatory insufficiency, dyspnea, cyanosis and digital clubbing

Bronchiectasis



Lung Cancer

- Epidemiology
- Etiology
 - Tobacco smoking
 - Industrial hazards
 - Air pollution
 - “Scar cancer”

Lung Cancer

- Classification of major types of lung cancer
 - Adenocarcinoma
 - Squamous cell carcinoma
 - Small cell carcinoma
- Classification by site
 - Central - majority are squamous or small cell carcinomas
 - Peripheral (25%) - arise in relation to small bronchi, bronchioles, or alveoli - adenocarcinomas
- Spread of lung cancer - local invasion, lymphatic metastasis, or hematogenous metastasis

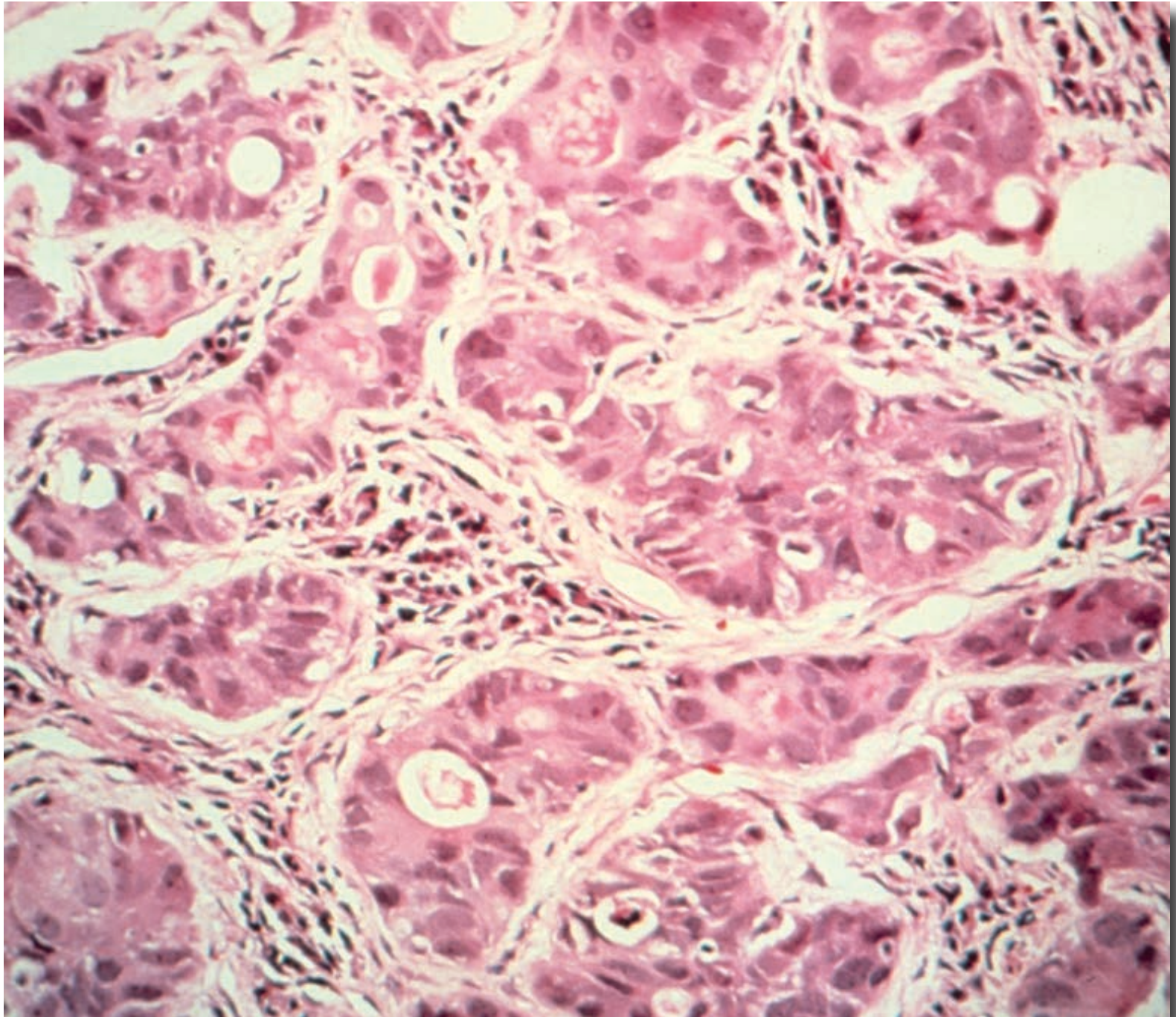
Adenocarcinoma



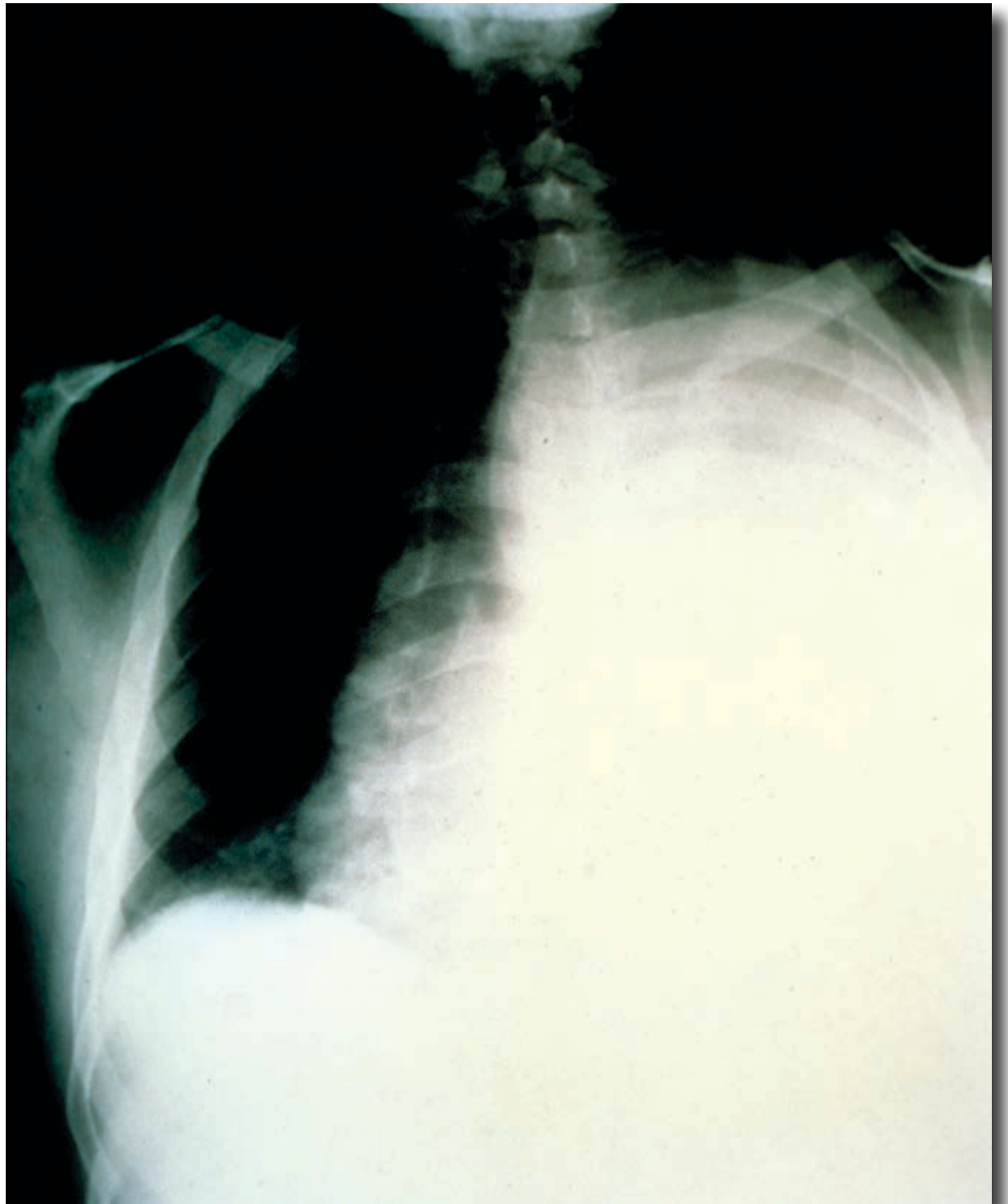
Adenocarcinoma



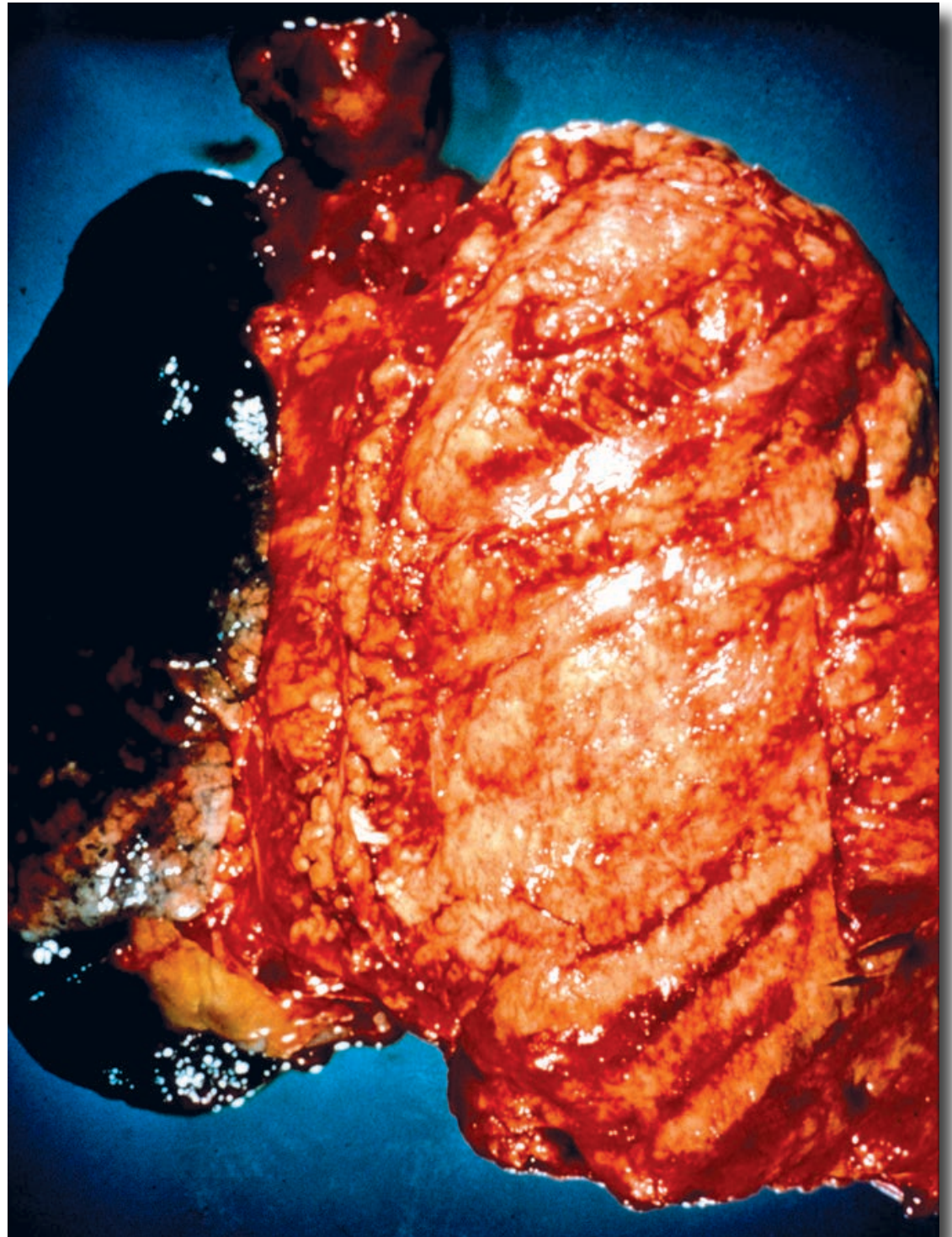
Adenocarcinoma



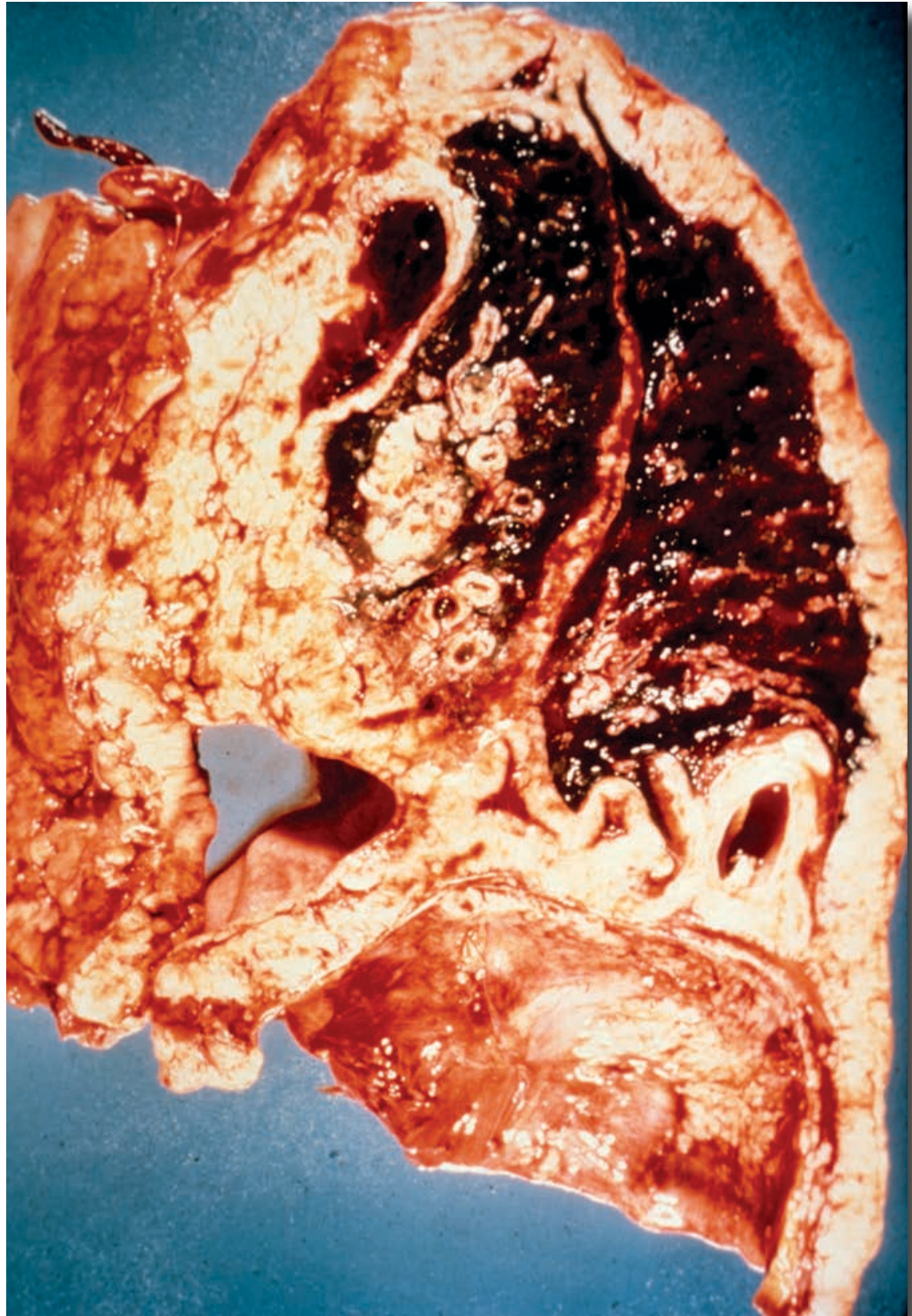
Adenocarcinoma



Adenocarcinoma



Adenocarcinoma



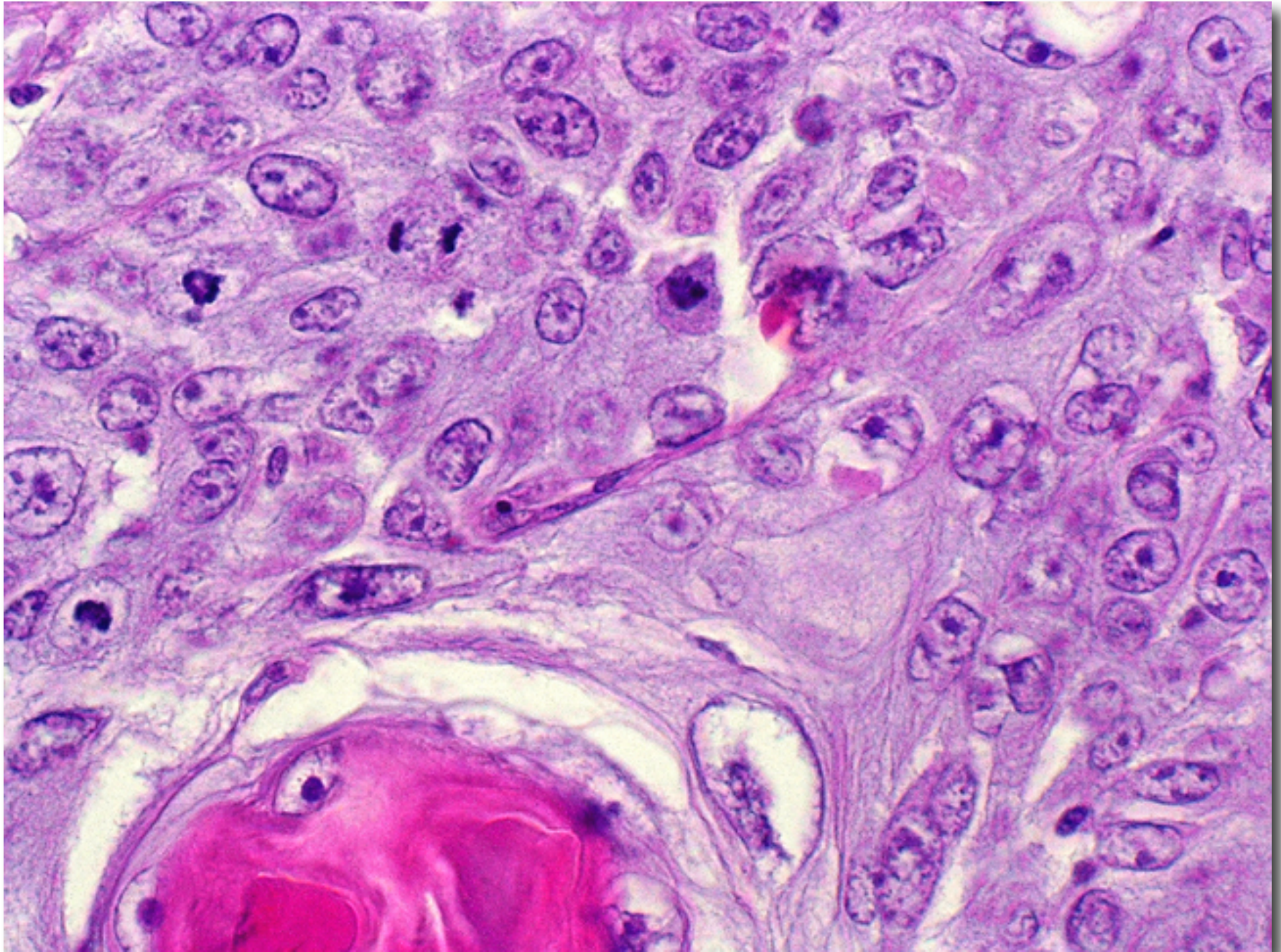
Squamous Cell Carcinoma



Squamous Cell Carcinoma



Squamous Cell Carcinoma



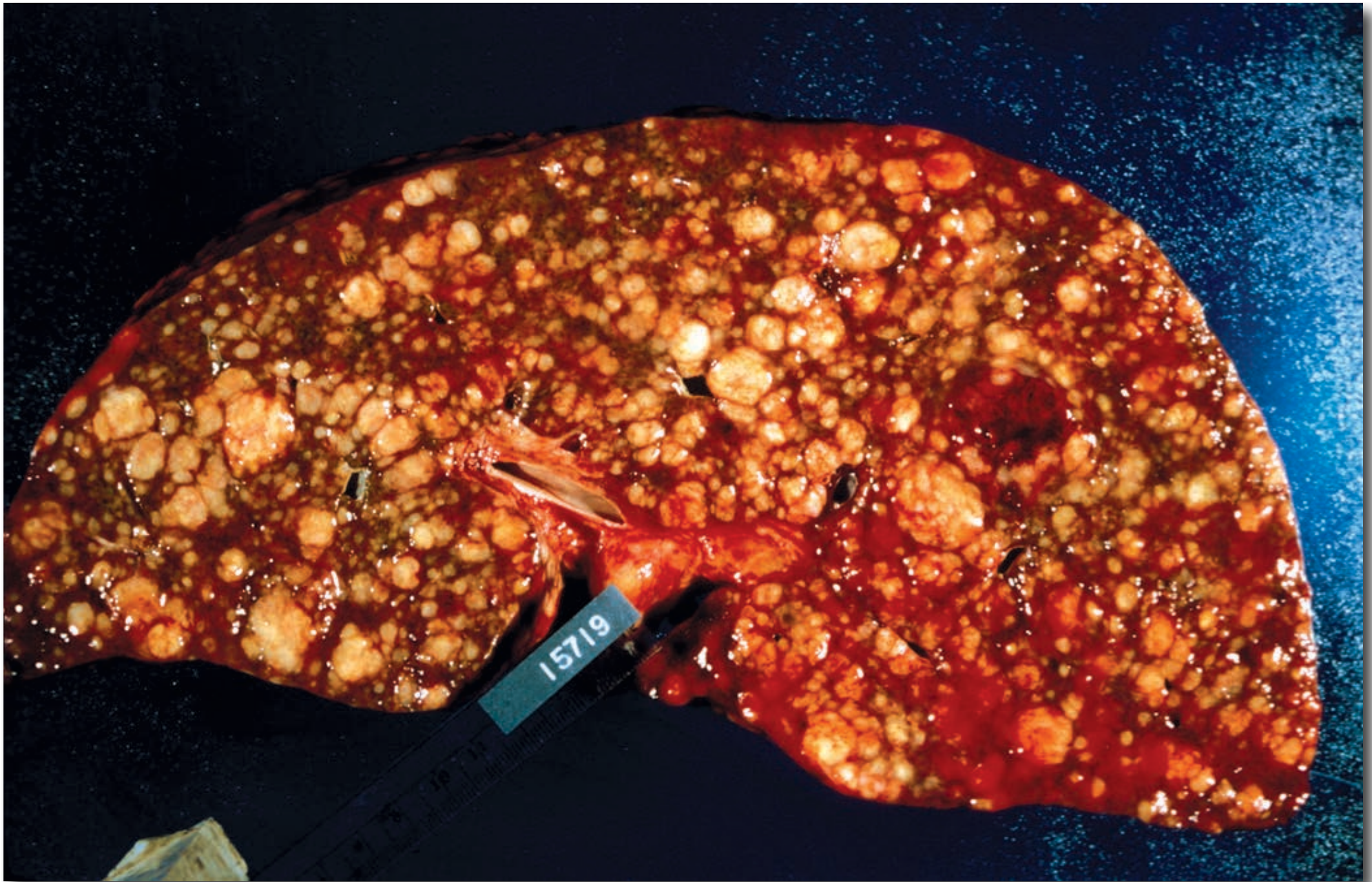
Lymphangitic Spread of Squamous Cell Carcinoma



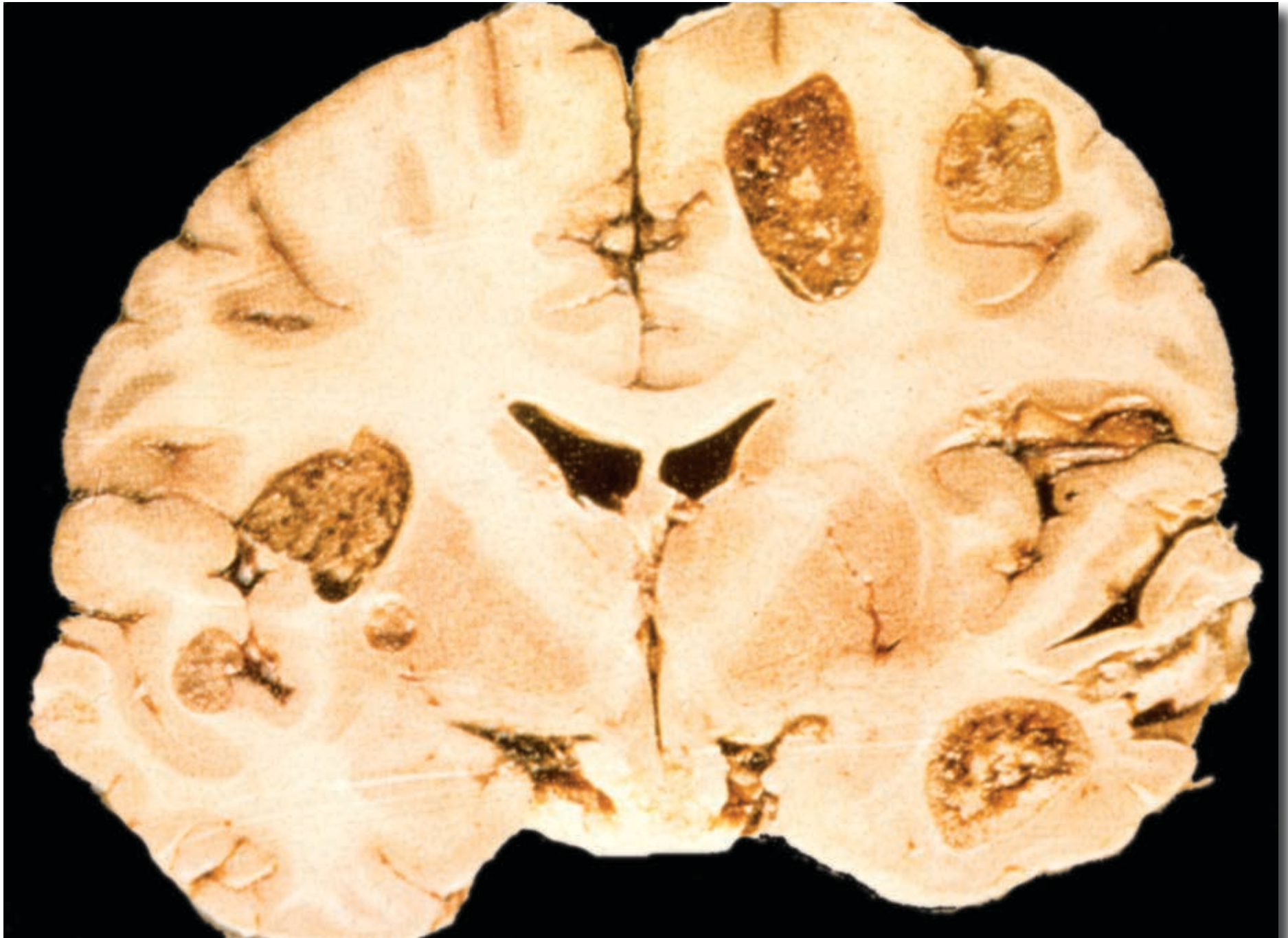
Metastatic Bronchogenic Carcinoma



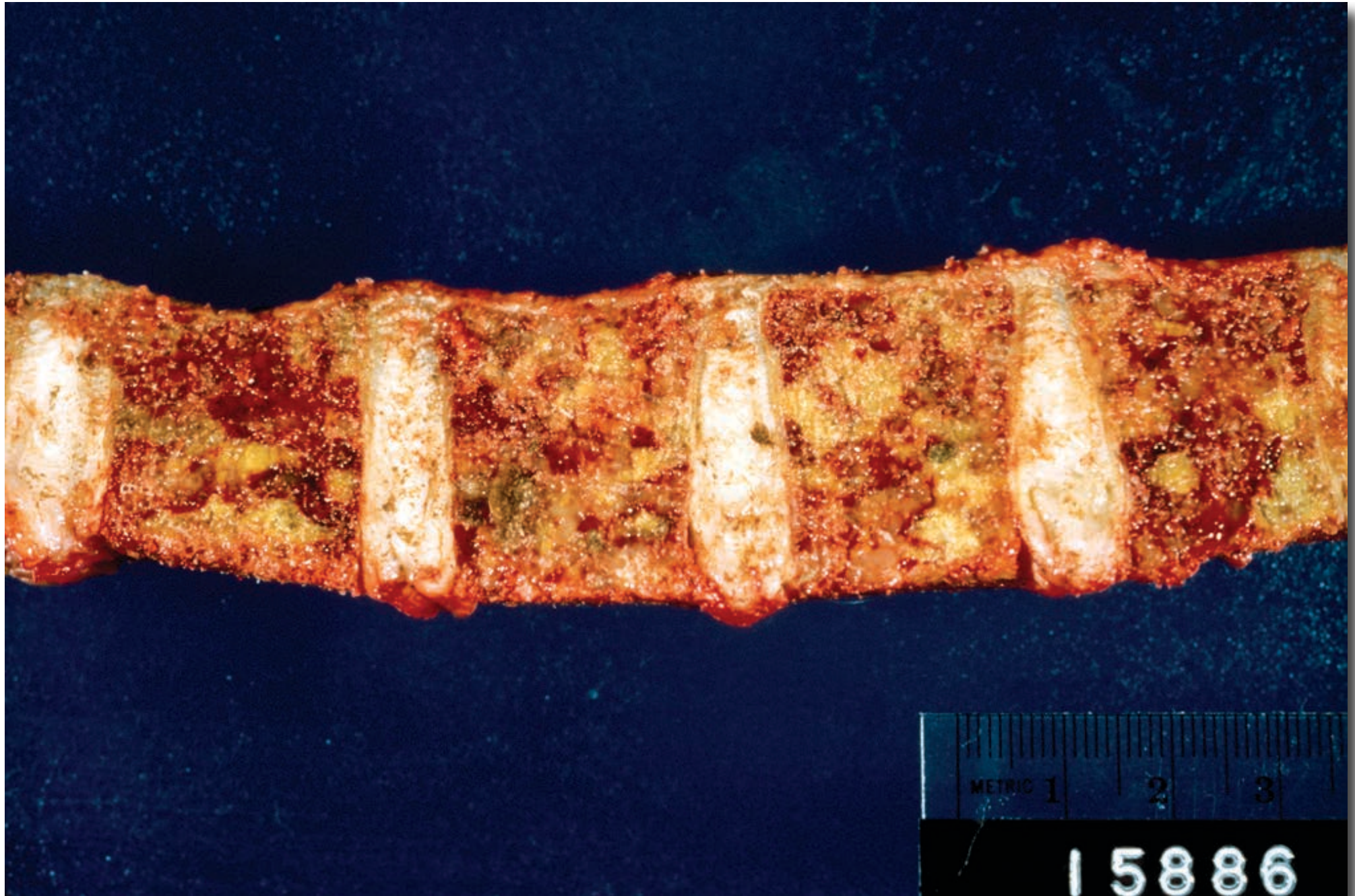
Metastatic Bronchogenic Carcinoma



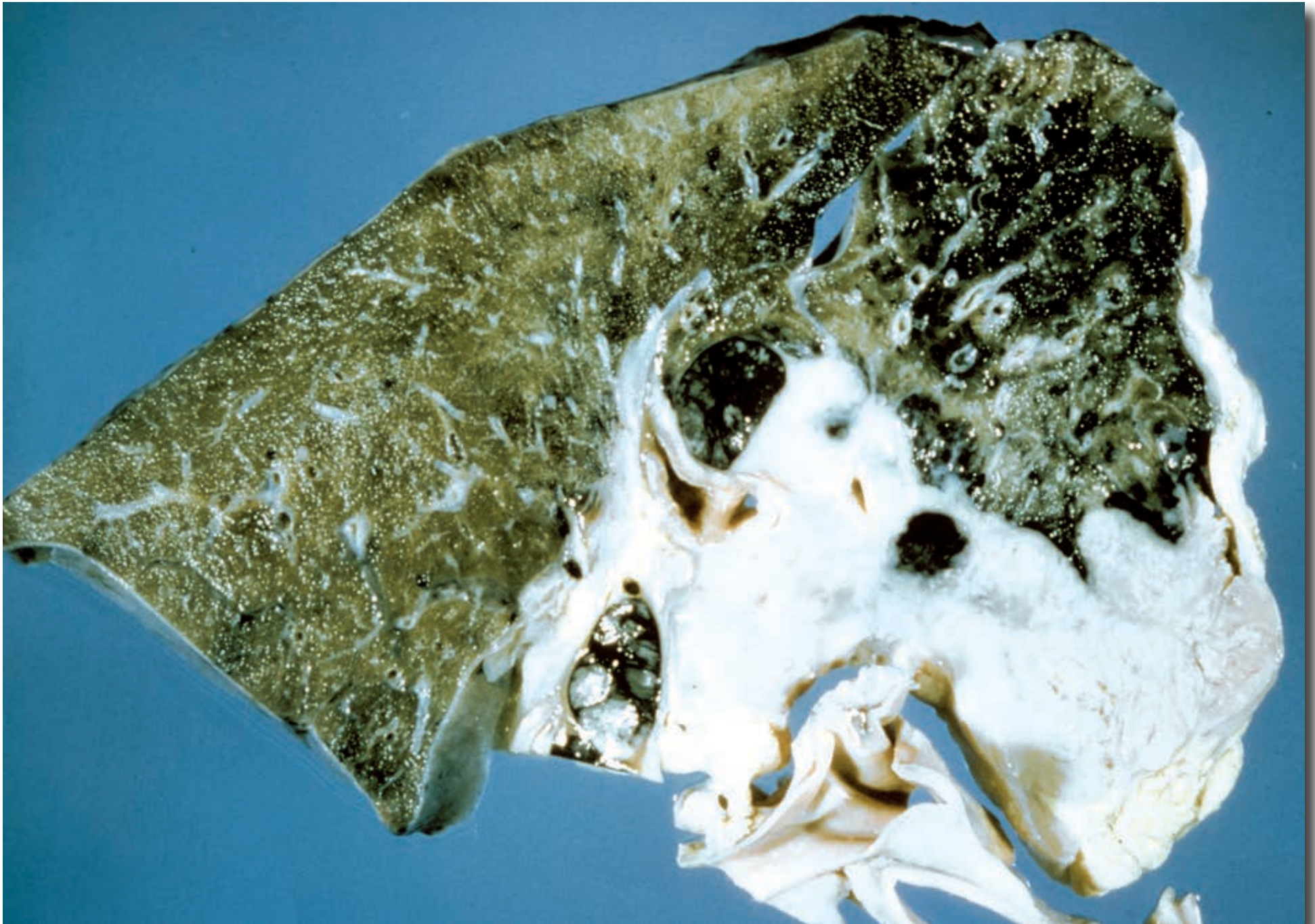
Metastatic Bronchogenic Carcinoma



Metastatic Bronchogenic Carcinoma



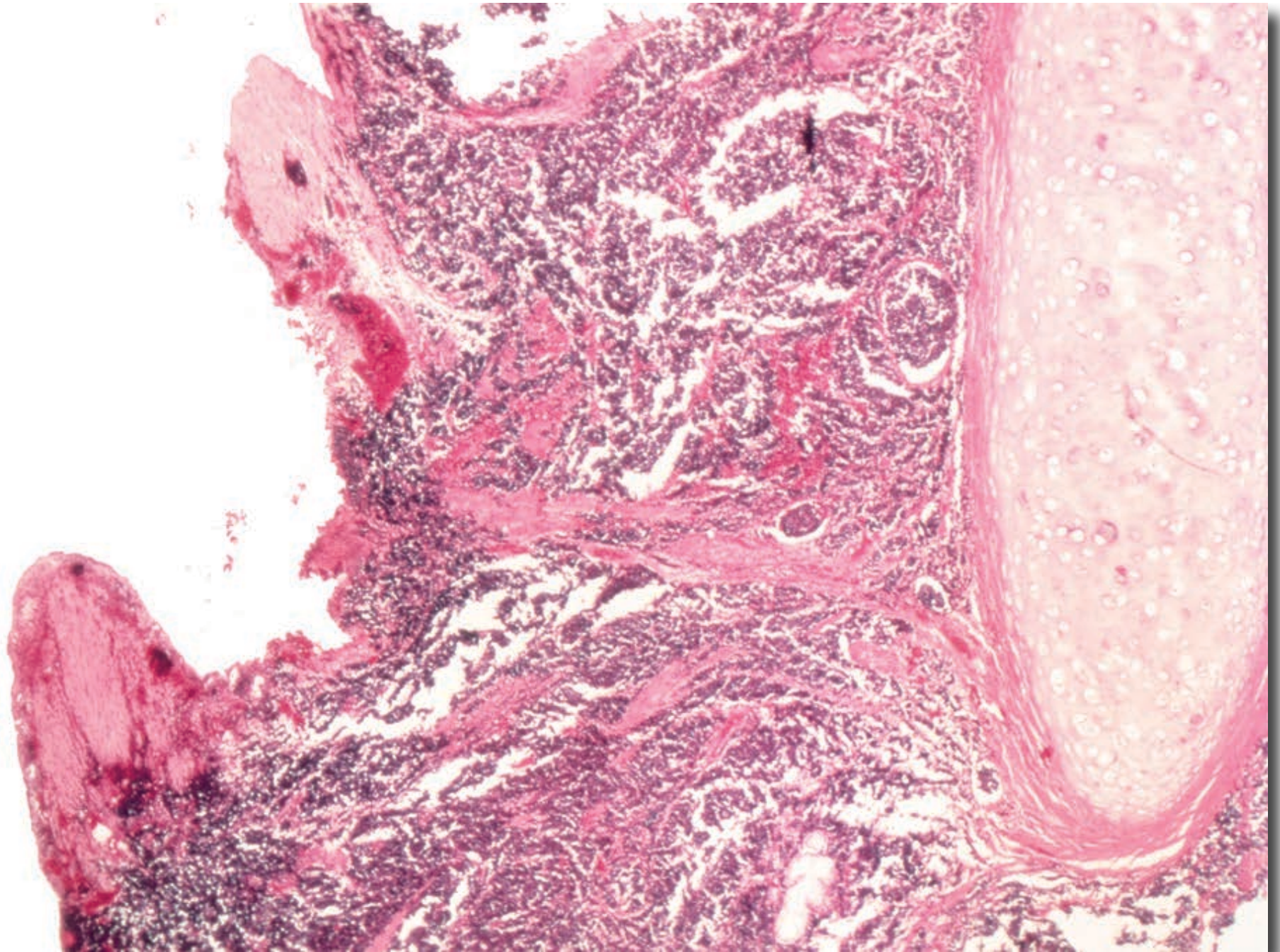
Small Cell Carcinoma



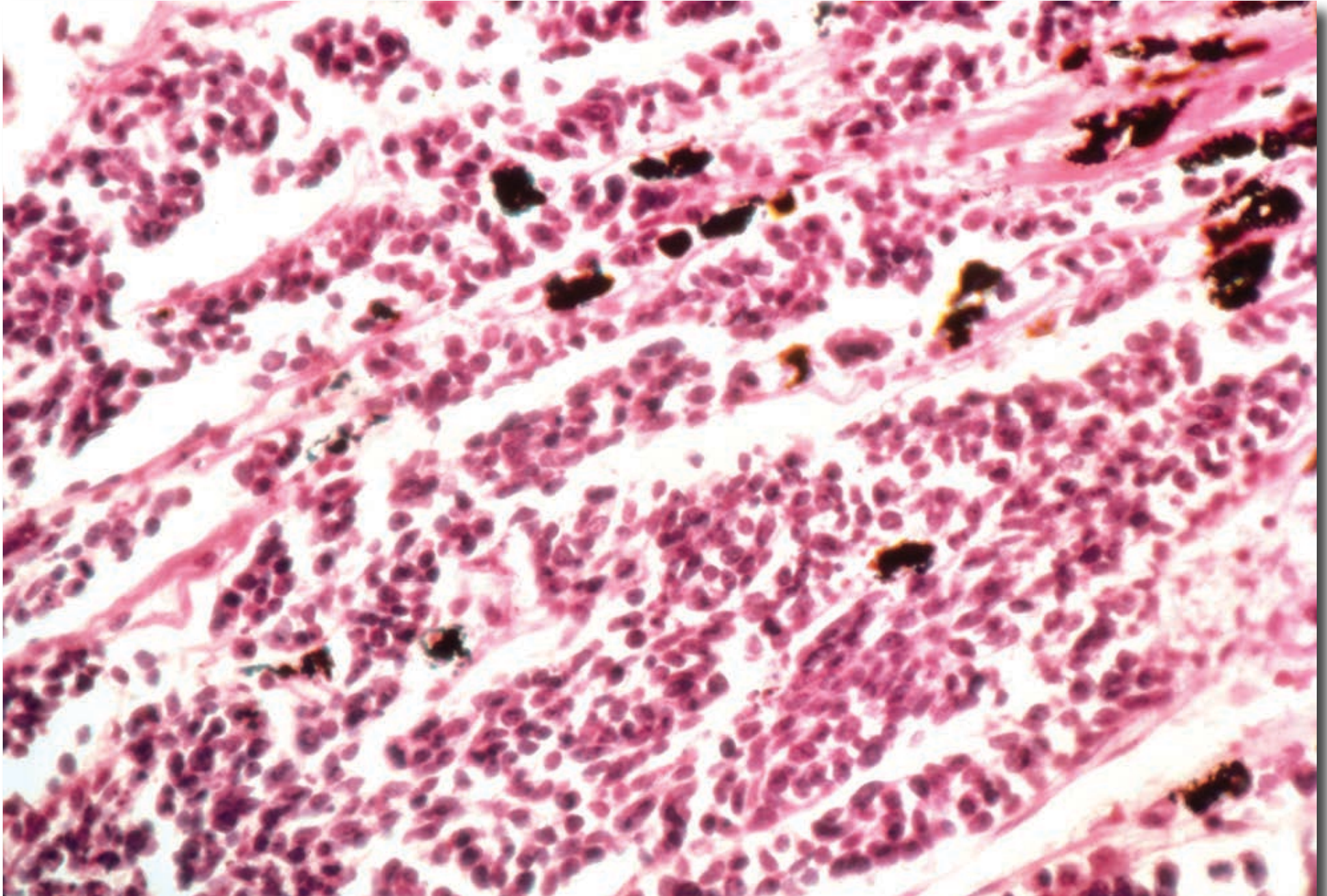
Small Cell Carcinoma



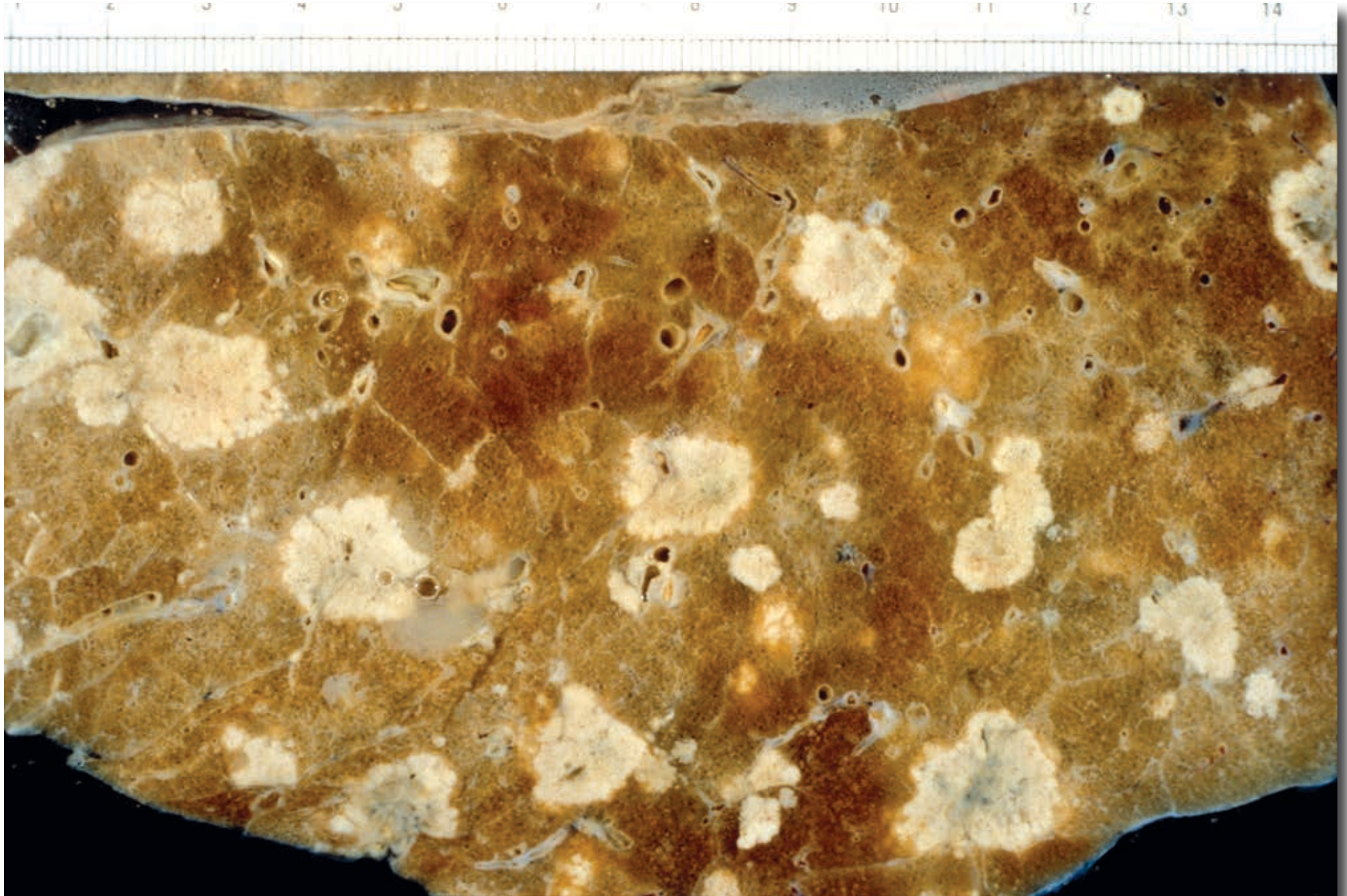
Small Cell Carcinoma



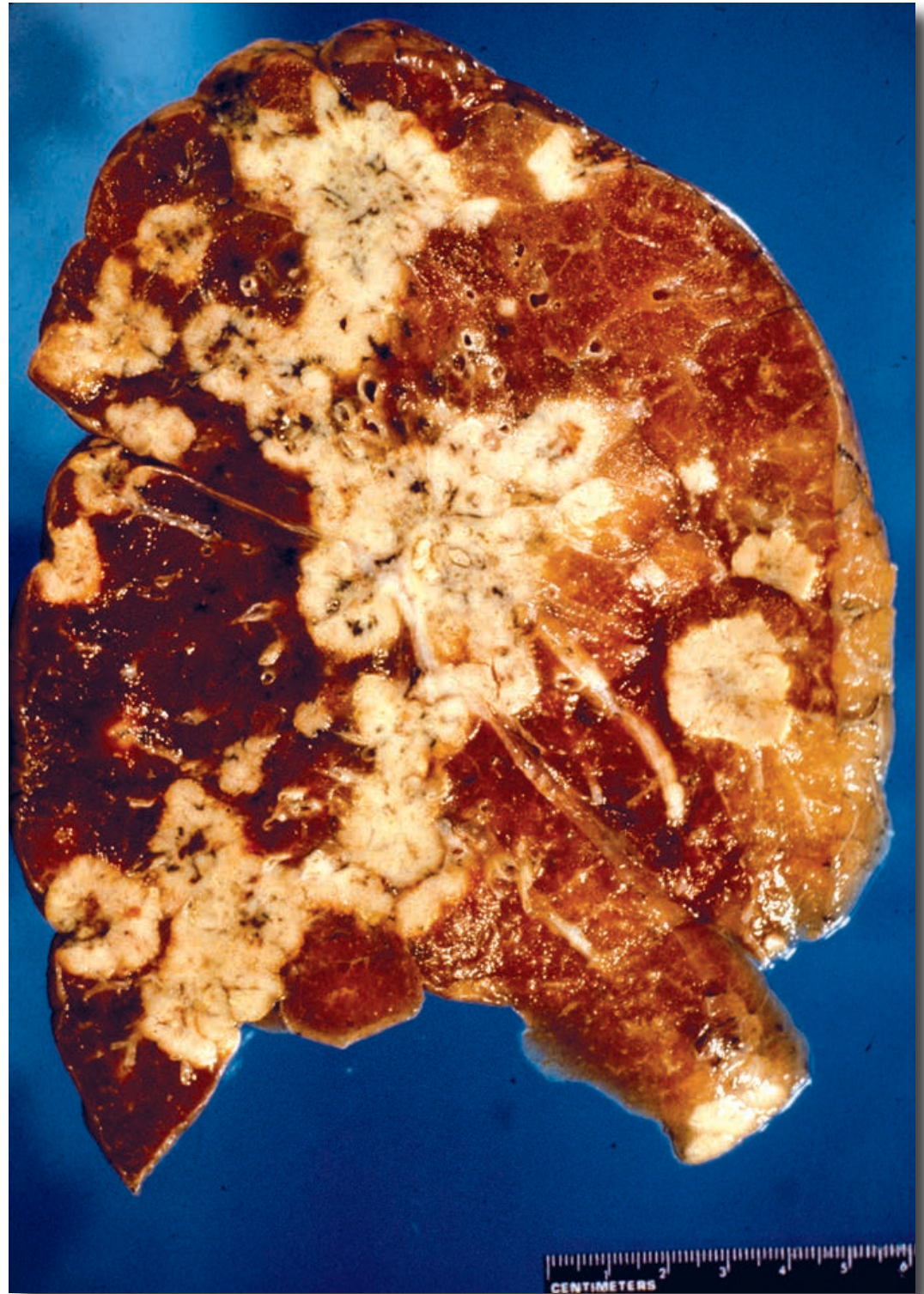
Small Cell Carcinoma



Metastatic Colon Carcinoma



Metastatic Cervical Carcinoma



Lung Cancer

- Clinical manifestations

- Intrathoracic effects of lung cancer

- Local effects - cough & sputum production, wheezing, hemoptysis, dyspnea, chest pain
- Infections distal to tumor - obstruction of airways by tumors lead to distal infections
- Pleural effusions

- Extrathoracic effects of lung cancer

- Due to metastasis - superior vena caval obstruction, recurrent nerve paralysis, painful bone lesions, neurologic symptoms
- Paraneoplastic syndromes - endocrine, neuromuscular, skeletal, cutaneous, cardiovascular



The real reason dinosaurs became extinct