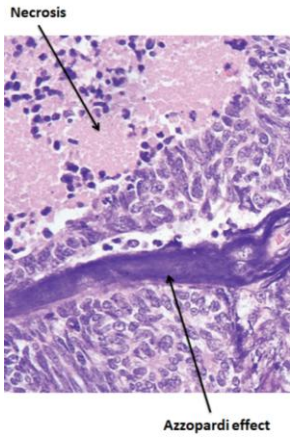
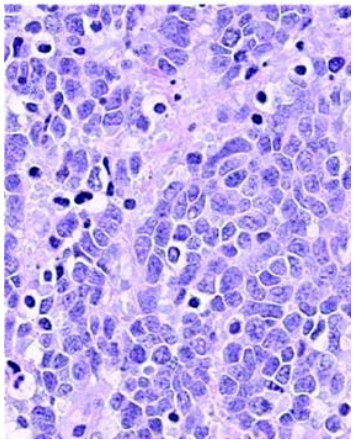
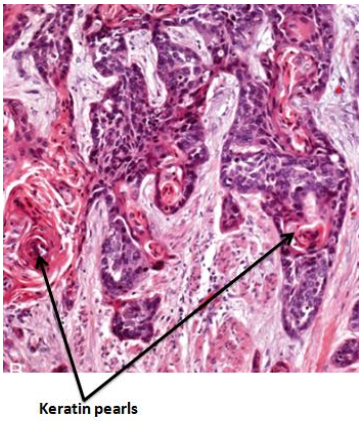
Unit II – Problem 7 – Pathology: Lung Cancer

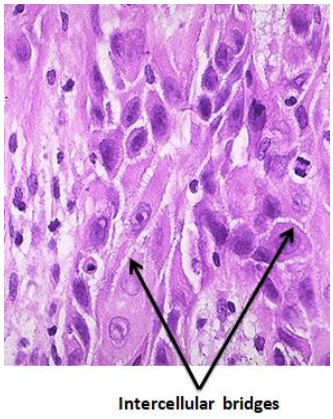
- **Most common cancers (in order):**
  - Breast cancer (in females) + prostate cancer (in males).
  - Lung cancer.
  - Rectal cancer.
- **Age group affected**: 60 years.
- **Risk factors:**
  - **Cigarette smoking (in 85% of cases).** Most common carcinogens in cigarette smoking are:
    - ✓ Polycyclic aromatic hydrocarbons.
    - ✓ Arsenic.
  - **Radon** (it is generated from radioactive decay of uranium and it is an odorless, colorless gas).
  - **Asbestos** (it is more likely to result in lung cancer than mesothelioma).
- **Clinical presentation (non-specific):**
  - **Cough with hemoptysis.**
  - **Weight loss.**
  - **Chest x-ray reveals**: solitary nodule (2-5 cm). If this nodule has been present for a long time without any changes → it is most likely to be benign. Notice that biopsy is necessary for diagnosis of cancer.
- **Classic division of lung carcinoma:**
  - **Small-cell carcinoma (15%):** responding to chemotherapy.
  - **Non-small cell carcinomas (85%):** treated by surgery
    - ✓ Adenocarcinoma (40%): formation of glands with mucus production.
    - ✓ Squamous cell carcinoma (30%): characterized by keratin pearls and intercellular bridges.
    - ✓ Large cell carcinoma (10%): when there are no glands, mucin or keratin pearls.
    - ✓ Carcinoid tumor (5%).
- **Small cell carcinoma:**
  - **Histology**: poorly differentiated small cells with mitosis and necrosis.
  - **Seen in:** male smokers.
  - **Location**: central with paraneoplastic syndrome such as production of (ADH) or (ACTH: resulting in Cushing's Syndrome).



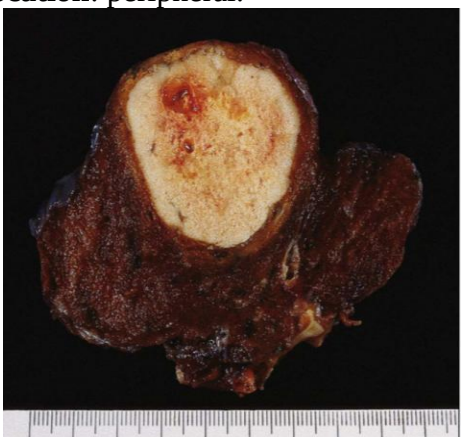


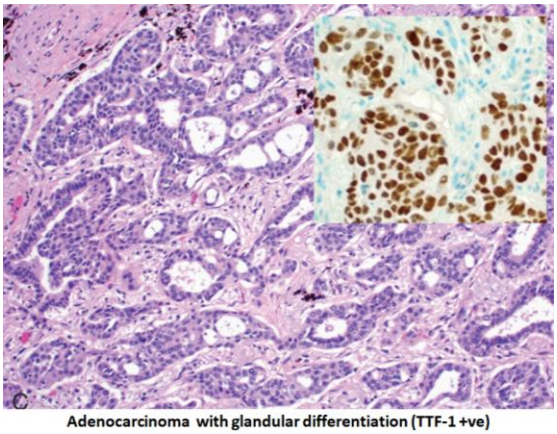
- **Squamous cell carcinoma:**
  - **Histology**: keratin pearls or intercellular bridges.
  - **Seen in**: male smokers.
  - **Location**: central with production of parathyroid Hormone-Related Peptide (PTHrP) → resulting in hypercalcemia.





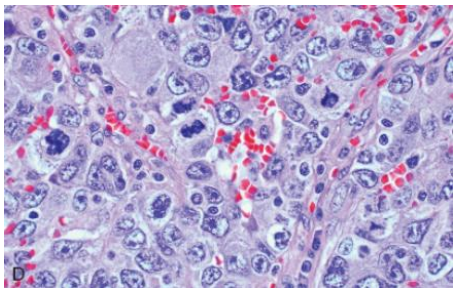
- **Adenocarcinoma:**
  - **Histology**: glands and mucin production.
  - **Seen in:** non-smokers and females.
  - **Location**: peripheral.



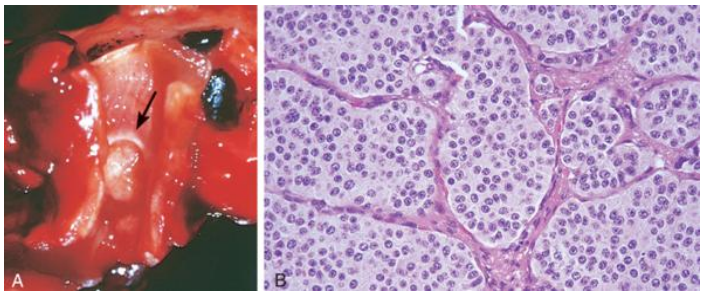


Adenocarcinoma with glandular differentiation (TTF-1 +ve)

- **Large cell carcinoma:**
  - **Histology**: poorly-differentiated large cells.
  - **Seen in**: smokers.
  - **Location**: central and peripheral.
  - **Prognosis**: poor.



- **Brnochoalveolar carcinoma:**
  - **Definition**: tumor growing along pre-existing small airways (bronchioles) and alveoli.
  - **Arising from**: Clara cells.
  - Not related to smoking.
  - **Location**: peripheral.
  - **Characteristics**: can present with pneumonia-like consolidation on imaging.
  - **Prognosis**: excellent.
- **Carcinoid tumor:**
  - **Histology**: well-differentiated neuroendocrine cells which are chromogranin-positive.
  - Not related to smoking.
  - **Location**: central or peripheral → forming a polyp-like mass in the bronchus.
  - Low-grade malignancy and rarely can cause carcinoid syndrome.



- **Metastasis to the lung:**
  - **Most common sources**: breast and colon cancers.
  - **Imaging**: shows multiple circular nodules.
  - Notice that metastasis is more common than primary tumors of the lung.
- **Local complications of lung cancer:**
  - **Pleural involvement**: especially with adenocarcinoma (because it is peripheral).
  - **Obstruction of superior vena cava (SVC).**
  - **Involvement of recurrent laryngeal nerve (creating hoarsness) or phrenic nerve (creating diaphragmatic paralysis).**
  - **Compression of sympathetic chain** (when the tumor is located at the apex of the lung) → resulting in Horner's syndrome which is characterized by:
    - ✓ Partial ptosis.
    - ✓ Constricted pupil.
    - ✓ Anhidrosis.
- **TNM-staging:**
  - **T**: size and local extension.
  - **N**: lymph nodes involvement.
  - **M**: metastasis (notice that lung tumors commonly metastasize to adrenal gland).
- **Prognosis of lung cancer**: 5-year survival of lung cancer is 15% (because it usually presents late in the course).
- **Mesothelioma:**
  - **Definition**: malignant neoplasm of mesothelial cells.
  - **Cause**: exposure to asbestos.
  - **Clinical presentation:**
    - ✓ Recurrent pleural effusions.
    - ✓ Dyspnea.
    - ✓ Chest pain.
  - Tumor encases the lung.