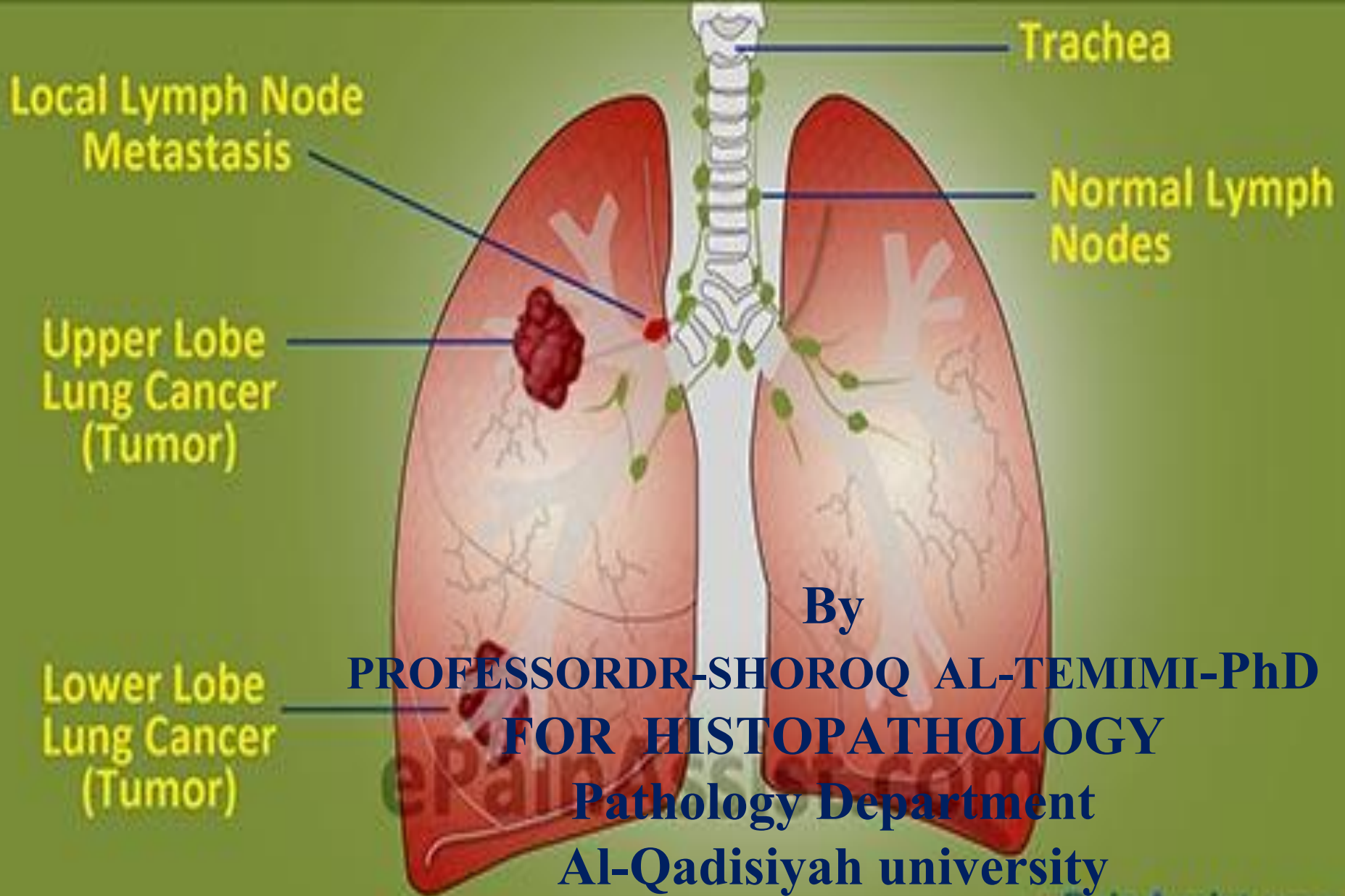


# Lung Cancer



By

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## **objective of lecture**

**1-Diffention of tumor**

**2-classification of tumor**

**3-Histologycal type of lung tumor**

**4-Pathogenesis of lung tumor**

**3-Morphological features of lung tumor**

**A 58y old men has developed cough with blood –streaked sputum and Wight loss .**

**A CXR reveals a 5 cm consolidated area near the RT hilum(central) with L.N enlargement . Multiple hepatic nodules by sonar examination . A sputum cytology reveals the presence of clusters of malignant cells .**

## **Neoplasia (tumor) mean new growth**

**Neoplasia is defined as: an abnormal mass of tissue,- resembling the tissue of origin, the growth of which exceeds and is uncoordinated with that of the normal tissues and persists in the same excessive manner after .cessation of the stimuli that evoked the change**

**A tumor cell's growth is autonomous–independent of- . controls**

**Monoclonal proliferation -**

# Tumor are classified according to biological behavior into

Benign neoplasia-1

malignant neoplasia -2

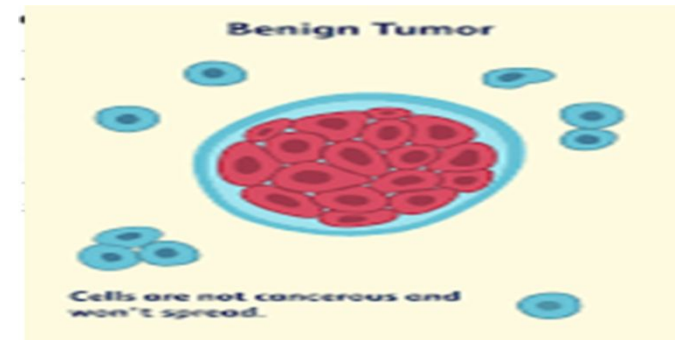
## Benign neoplasia

Uncontrolled focal proliferation/growth of well-differentiated cells (Cells resembling the tissue of origin)

. and monotonous pattern

Does not invade or metastasize-  
mobile/smooth edges-

Encapsulated



Amenable to surgical resection; the patient typically- -  
survives, although there are exceptions

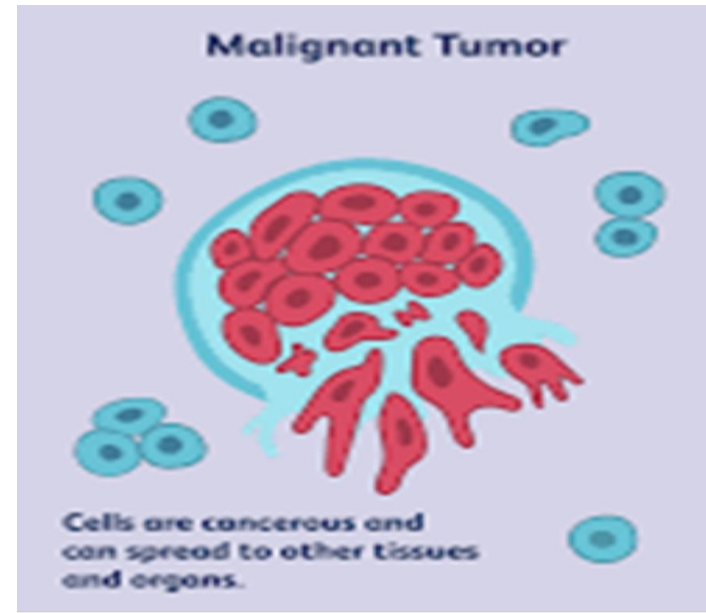
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Added oma suffix at the end- -

e.g, lipoma ,fibroma -

# Invasive malignant tumors

- Uncontrolled proliferation/growth
  - Penetration of the basement membrane
  - local Invasion and destruction of surrounding tissue
  - Penetrate organ walls or fungate through the surface
  - Distal metastasis is a marker for malignancy
  - Cause death of patient
  - surgical treatment or chemotherapy /radiotherapy or both
- :Malignant tumors are divided into two general categories**
- Carcinomas derived from epithelial cells
  - Sarcomas of mesenchymal cell origin



# Lung tumor

## 1-Benign lung tumor

-The most common benign lesions are hamartoma

## 2-Malignant lung tumor .

A-Primary lung cancer .

B-Secondary lung cancer (metastastatic cancer) .

# Benign Lung tumor

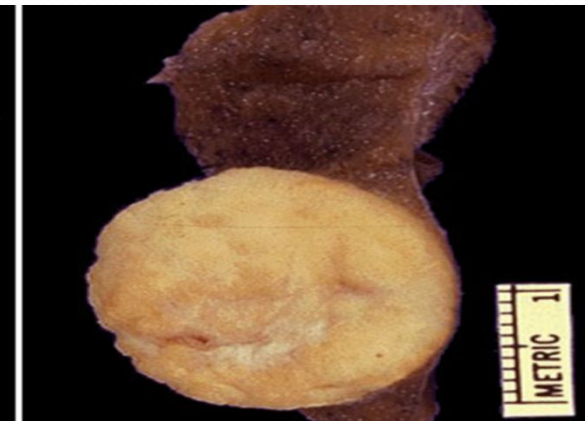
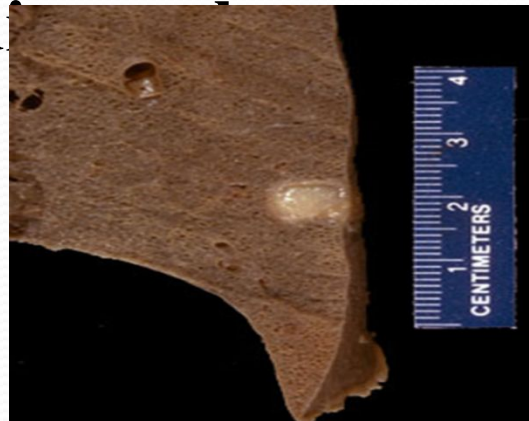
## Pulmonary Hamartoma:

- Is the most common benign tumor of the lung and is the third most common cause of solitary pulmonary nodules
- Tumor like malformation made up of an abnormal mixture of cells and tissues that produces a mass with disorganized tissues but mature specialized tissues originated from the particular site in which they occur.

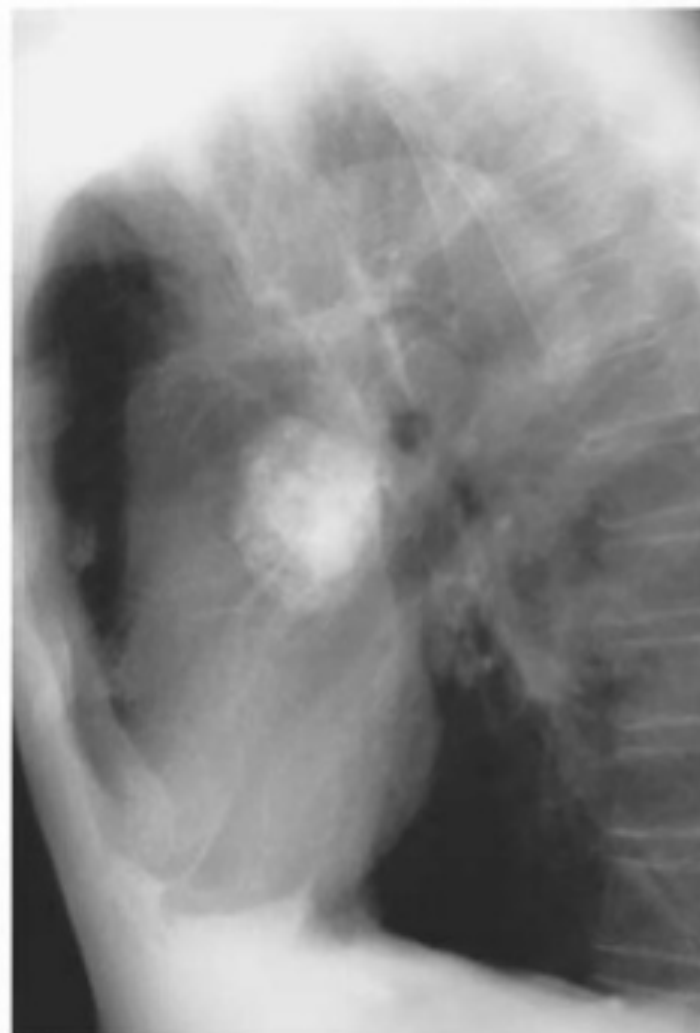
## Grossly

It is rounded, small (3-4 cm), discrete mass that often displayed as "coin" lesion with coarse popcorn calcification on chest radiograph.

rounded, small (3-4 cm) mass with calcification





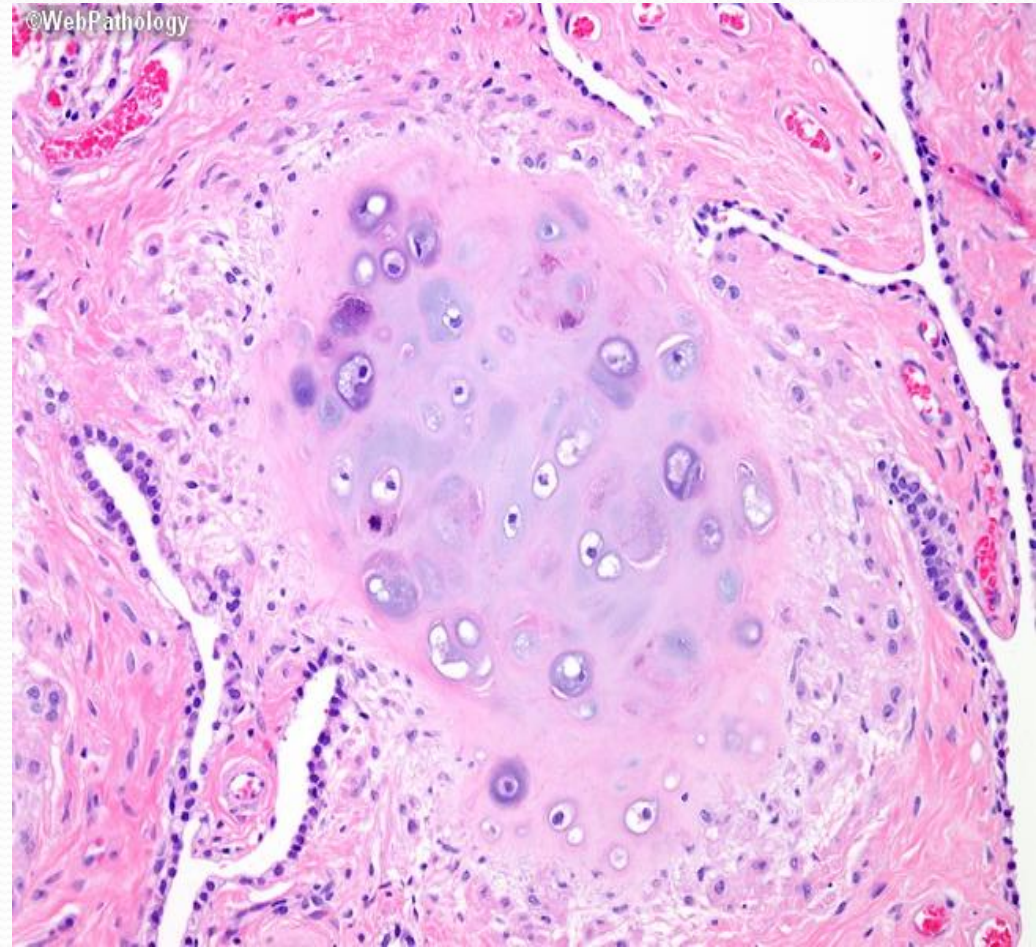


**A** **B**  
**Round, completely smooth, hamartoma in a 57 year old asymptomatic man. There is typical coarse popcorn calcification in this lesion which is unusually large.**



## Microscopically

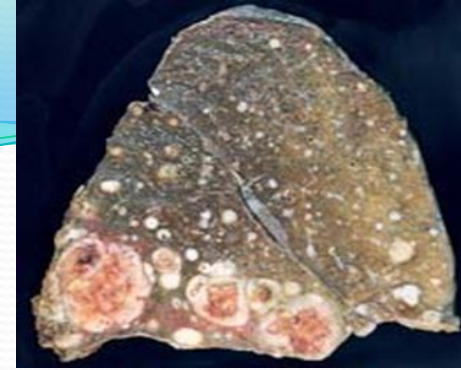
**They consist of mature cartilage with a scattered of bronchial glands that are often admixed with fat, fibrous tissue, and blood vessels in varying proportions.**



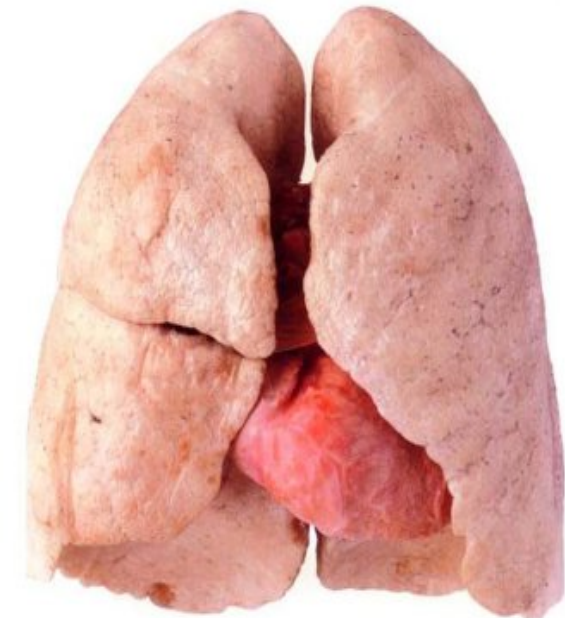
# Lung cancer

- Primary lung cancer is a common disease.
- About 90-95% of lung cancer are **bronchogenic carcinomas** , which tumor arise from bronchial epithelium
- About 5% of lung cancer are bronchial carcinoids and 2-5% are mesenchymal and miscellaneous neoplasms .
- Most patients are in the age group of **50-60** years.

**-Lung are frequently the site for metastases (secondary cancer) .**



**-The strong relationship of cigarette smoking and lung cancer.**



Healthy Lung



Smoker's Lung



# **Primary lung cancer bronchogenic carcinomas**

**There are four major histological types of bronchogenic carcinomas**

- 1. Squamous cell carcinoma**
- 2. Adenocarcinoma**
- 3. Small-cell carcinoma**
- 4. Large-cell carcinoma.**

❖ **For therapeutic purposes, carcinomas of the lung are divided into two groups:**

**1-Small-cell lung cancer (SCLC).**

**2-Non-Small- Cell Lung Cancer (NSCLC):**

**-Squamous cell.**

**-Adenocarcinomas.**

**-Large-cell carcinomas.**

**\*The reason for this division is that SCLC have metastasized by the time of diagnosis and hence are not curable by surgery but with high initial responses to radiation and chemotherapy .**

In contrast, **NSCLCs** usually respond **poorly** to **chemotherapy** and are **better** treated by **surgery** according to stage of lung cancer ( stage I and stage II) while in stage III and IV better treated by chemotherapy and radiation and no role of surgery in advance stages.

These two groups show genetic differences:

**SCLCs** are characterized by a **high frequency of RB** (Rb is tumor suppressive) gene mutations ( un activation of Rb gene) .

while the **p16** gene (p16 is tumor suppressive) is commonly un activated of p16 in **NSCLCs**.

# Pathogenesis of lung cancer

## **1-The role of Cigarette smoking:**

**is the most important etiologic factor , correlating with amount and duration of smoking .**

**Women** have a higher susceptibility to tobacco carcinogens than do men .

The increased risk is **60** times greater among habitual heavy smokers (two packs a day for 20 years) compared with nonsmokers.



-There is a **linear correlation** between the **intensity** of smoking and the appearance of **squamous metaplasia** that progresses to **squamous dysplasia** and **carcinoma in situ**, before culminating in invasive cancer.

-In addition to squamous cell carcinoma also **small-cell carcinomas** show the strongest association with tobacco exposure.

## 2-The role of occupation-related environmental agents:

These may act alone or with smoking to be pathogenically related to some lung cancers (dusts containing arsenic, chromium, uranium, nickel, vinyl chloride, and mustard gas).

**Asbestosis** (is long-term inflammation and scarring of the lungs due to asbestos fibers.) increases risk of cancer **five-fold** (with a latency of **10-30** years) .When combined with smoking ,the risk is **50-90 fold** greater .



**3- Pathogenesis involves a stepwise accumulation of genetic abnormalities ;10-20 mutations have occurred by the time a tumor is clinically apparent .**

**I-Mutations in dominant proto-oncogenes and this mutation lead to activation of that genes so-called oncogenes (c-MYC, K-RAS, EGFR, and HER-2/NEU) .**

**2- Mutations in tumor-suppressor genes lead to un activation (loss of function of tumor-suppressor genes (p53, RB, and p16) .**

**3-mTOR pathway molecules are mutated (increased activation of this pathway) in up to 30% of lung cancers .**

**4- c-KIT(a receptor tyrosine kinase and telomerase activities) are also often increased .**

#### **4-Precursor lesions include**

**1-Squamous dysplasia and carcinoma in situ .**

**2-Atypical adenomatous hyperplasia .**

**3-Diffuse idiopathic pulmonary neuroendocrine cell hyperplasia .**

# **bronchogenic Carcinoma**

**-Carcinomas of the lung begin as small mucosal lesions that are usually firm and gray-white.**

**-Further enlargement result in either intra-luminal masses, or invasion of the bronchial wall to form large bulky masses pushing into adjacent lung parenchyma. Obstruction of the bronchial lumen often produces distal atelectasis , infection (bronchiectasis or pneumonia) or obstruction by tumor may produce focal emphysema.**

**Some tumors tend to arise centrally near the hilum i.e. in major bronchi, especially squamous cell & small cell carcinomas.**

-Adenocarcinomas **may occur centrally** but are **usually peripherally** located, many arising in relation to peripheral lung scars ("**scar carcinomas**")

-**Large cell tumor** also arise peripherally .

-Large tumors ( in all tumor types) may undergo **cavitation** caused by **central necrosis**.



*To learn  
you must  
want to be  
taught.*

Thanks