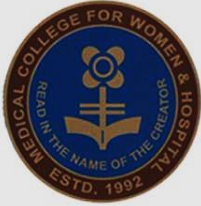


NEOPLASIA

Professor Tamanna Choudhury
HOD, Pathology
MCWH



References:

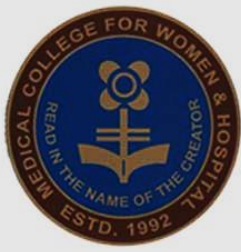
- **Robbins & Cotran Pathologic Basis of Disease- 9th edition**
- **IMAGES- Above mentioned book & internet**



NEOPLASIA

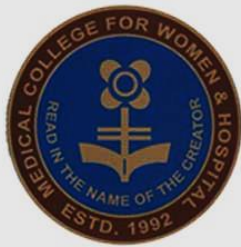
Nomenclature

Nomenclature means choosing of names for things, especially in science or other discipline



NEOPLASIA

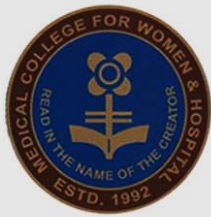
- ***Neoplasia* literally means “new growth”**
- **A new growth is called a neoplasm**



Nomenclature

TUMOUR = NEOPLASM

**ONCOLOGY (Greek *oncos* = tumor)
is the study of tumors or neoplasms**



Definition

The eminent British oncologist **Sir Rupert Willis** defined neoplasm as

"A neoplasm is an **abnormal mass** of tissue, 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** which evoked the change."



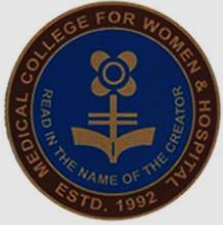
Nomenclature

Basic Components

All tumors, benign and malignant

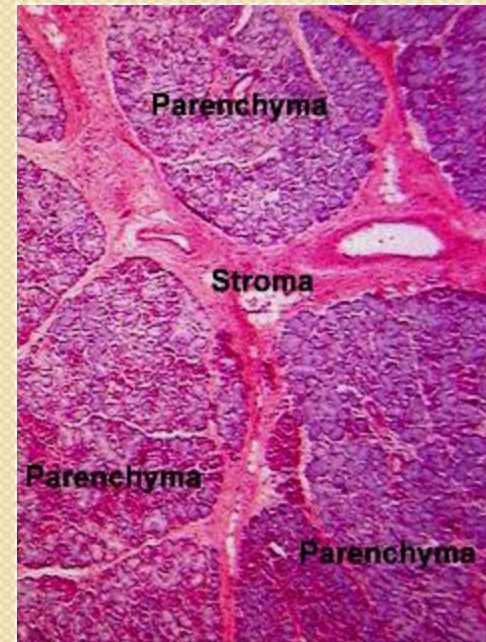
2 basic components

- (1) **Parenchyma** proliferating neoplastic cells
- (2) **Stroma** made up of connective tissue and blood vessels

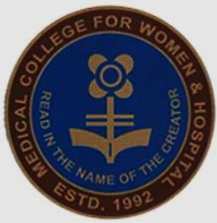


Components of a tumor

- Parenchyma : composed of tumor cells
- Stroma : supportive tissue



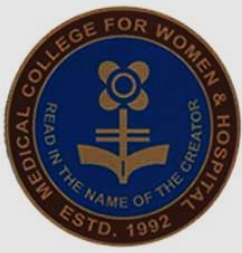
Nomenclature Basic Components



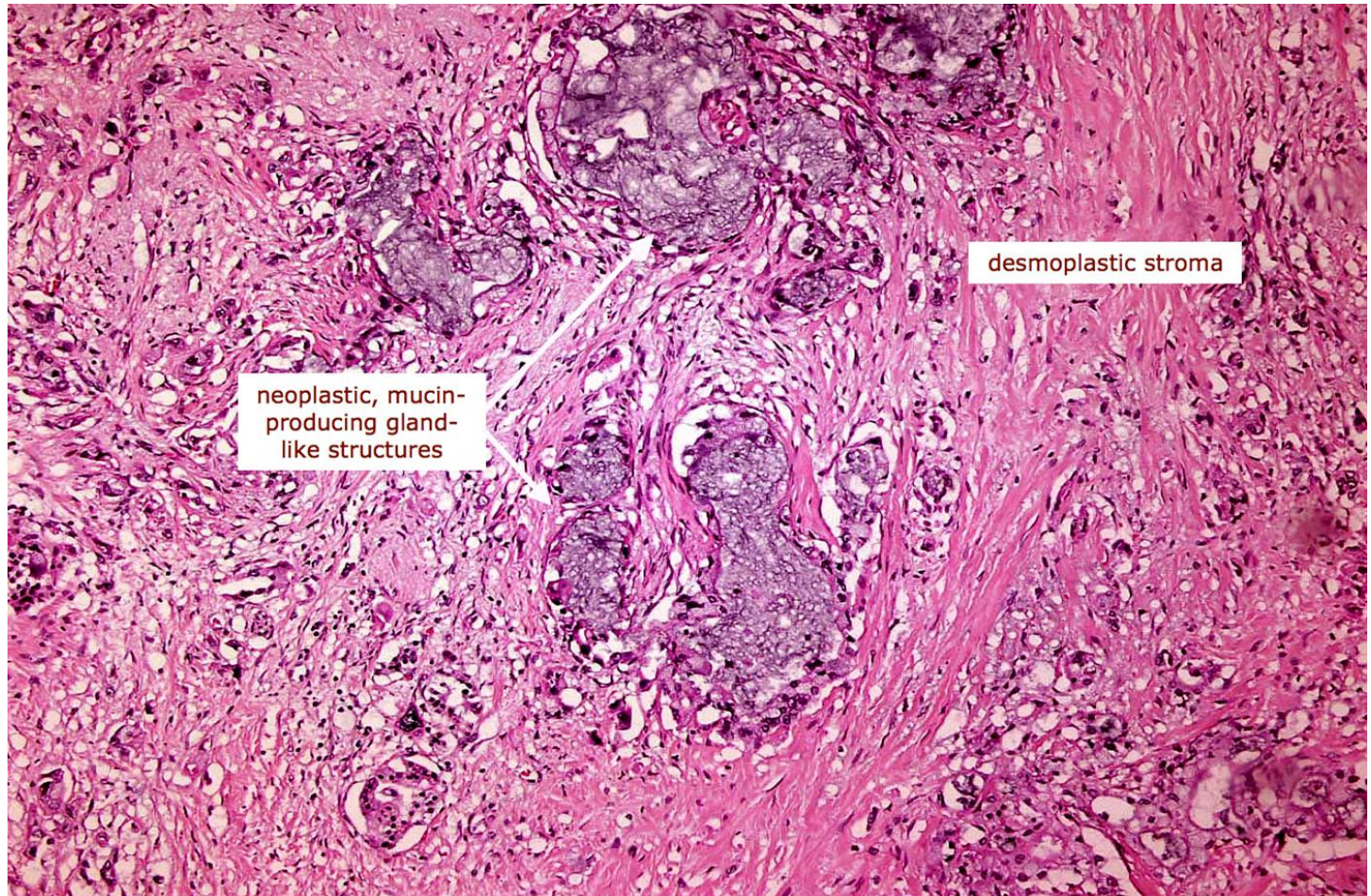
Nomenclature

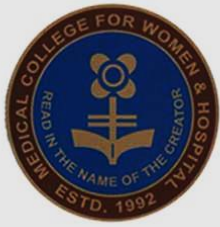
Basic Components

- **Soft and fleshy** when supporting connective tissue is scant
- **Desmoplasia** the parenchymal cells stimulate the formation of an **abundant collagenous stroma**
- **Scirrhou**s some desmoplastic tumors—are **stony hard** or (for example, some cancers of the female breast)



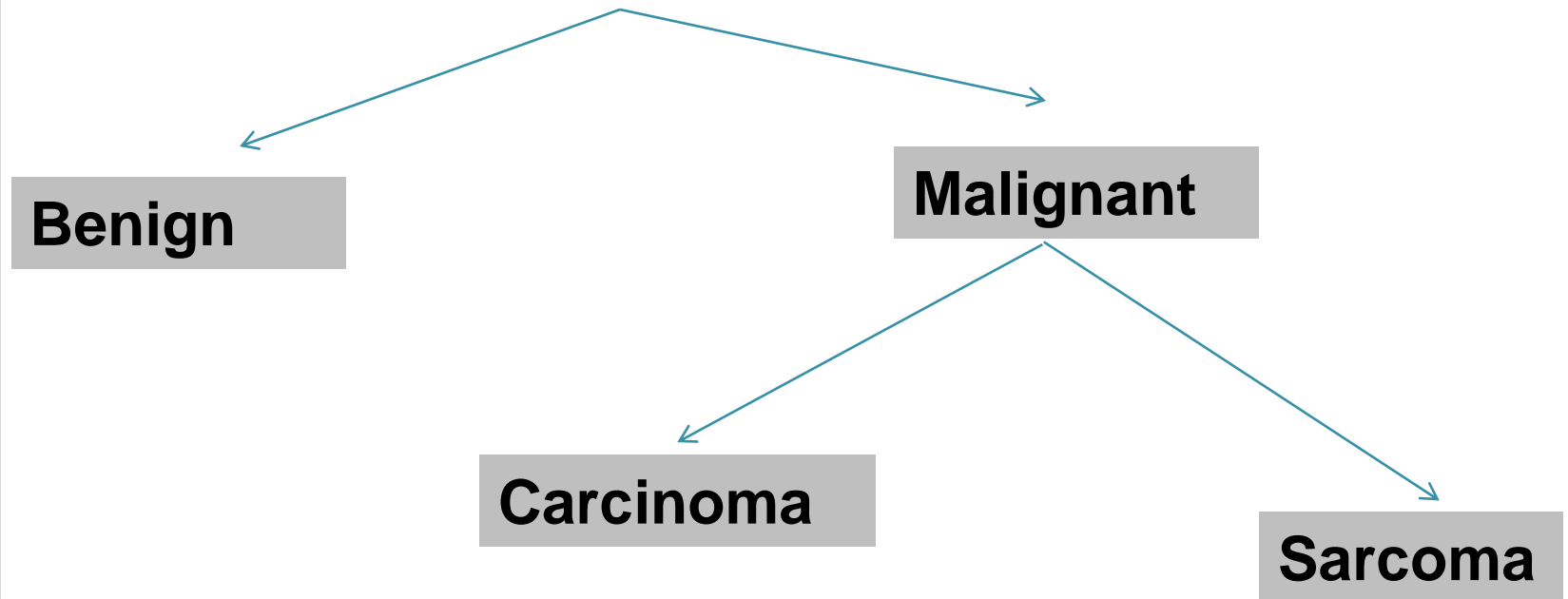
Desmoplasia

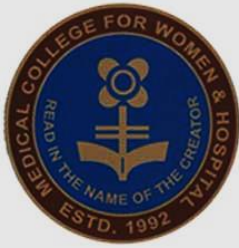




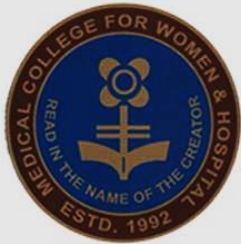
Nomenclature

Neoplasm





BENIGN TUMOURS



Benign tumour

- **Innocent** (gross & microscopic)
 - **Localized**
 - **Amenable** (responsive) to local surgical resection
-
- ▶ Patient usually *survives*
 - ▶ May cause *significant morbidity* (a diseased state or symptom)
 - ▶ Rarely fatal



Nomenclature-Benign tumours

- **Benign tumors** are designated by the suffix **-oma** to the cell of origin
- Tumors of **mesenchymal cells** generally follow this rule

Mesenchyme - connective and skeletal tissues, including blood and lymph (fibroblasts, myoblasts, endothelium, mesothelium, osteoblasts, chondroblasts, adipocytes)



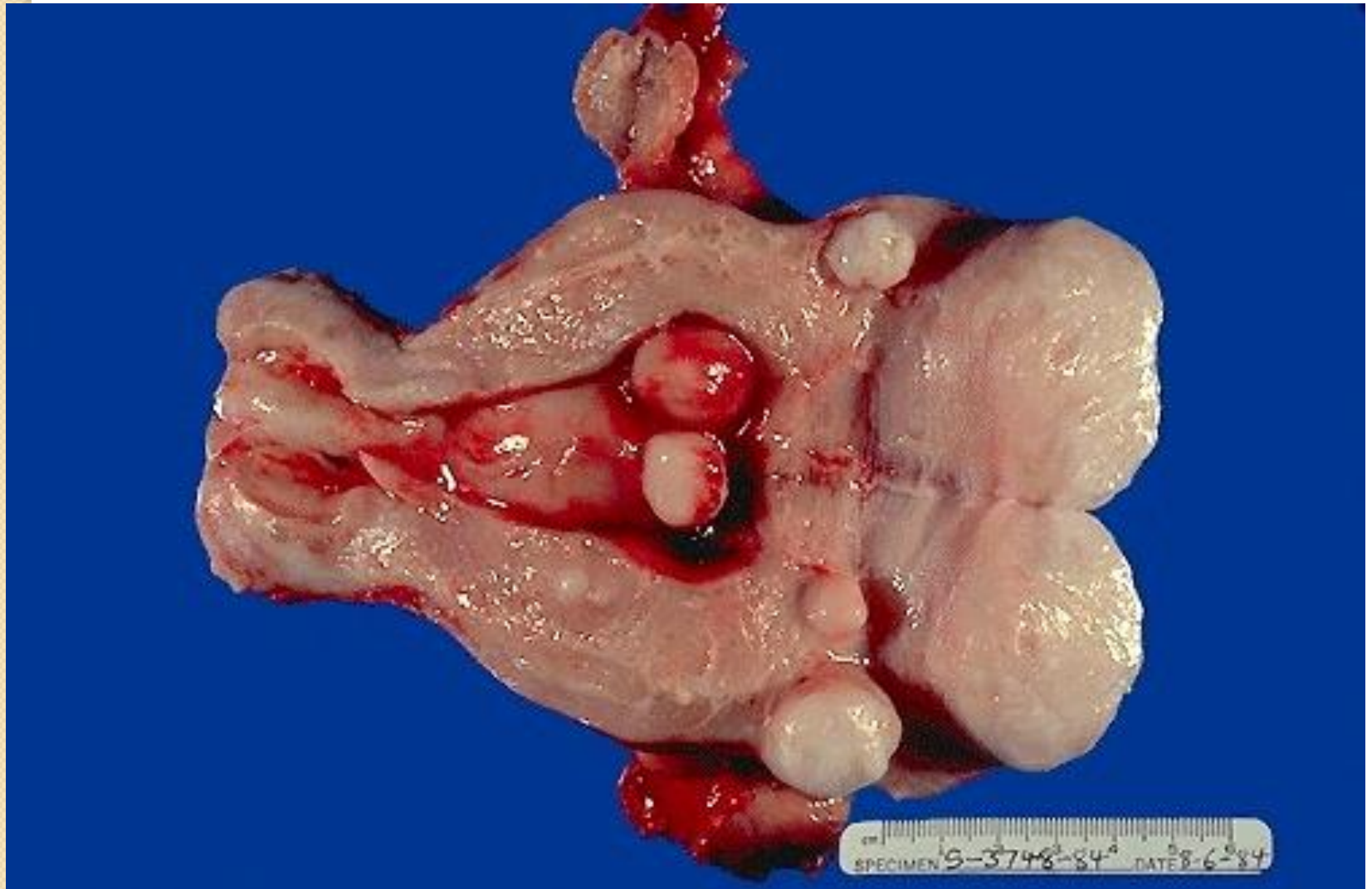
Nomenclature-Benign tumours

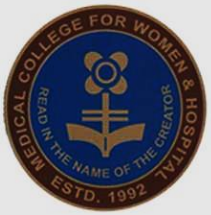
For example,

- ❑ a benign tumour of **smooth muscle** is called a ***leiomyoma***
- ❑ a benign tumor arising from **fibroblastic** cells is called a ***fibroma***,
- ❑ a benign **cartilaginous** tumor is a ***chondroma***
- ❑ a benign tumor of **osteoblasts** is an ***osteoma***
- ❑ a benign tumour of **mature fat cells** is a ***lipoma***



Leiomyoma of uterus

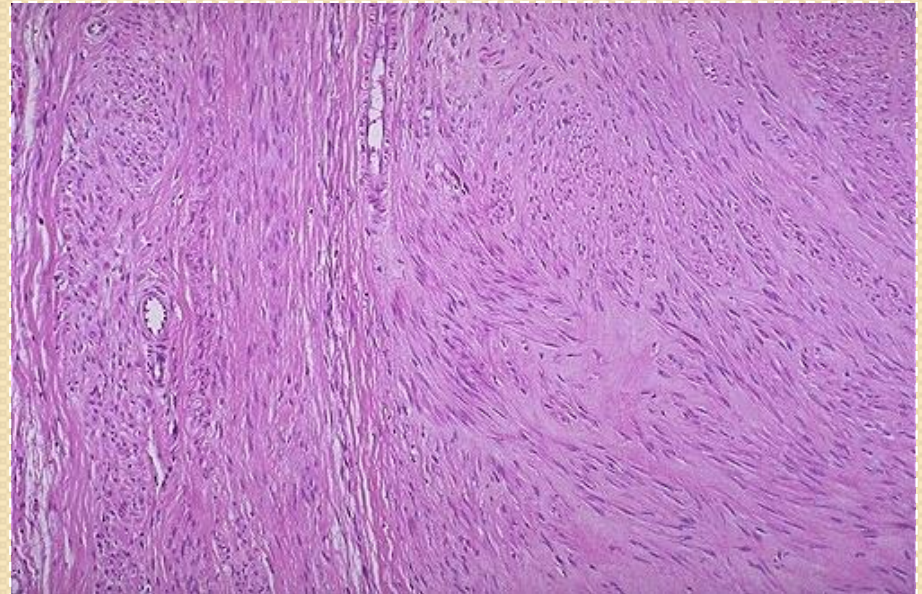




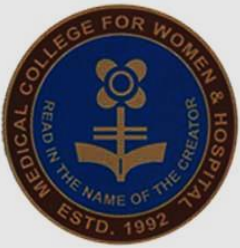
Leiomyoma -gross



Leiomyoma - microscopic



Nomenclature-Benign tumours

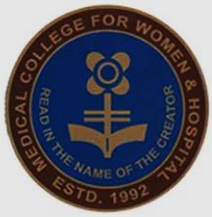


Nomenclature

Some **exceptions** are
Oma but NOT BENIGN

- Lymphoma
- Seminoma
- Dysgerminoma
- Mesothelioma
- Melanoma
- All blastomas

(hepatoblastoma, neuroblastoma, nephroblastoma)



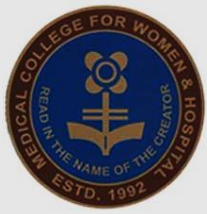
Nomenclature-Benign tumours

- In contrast, nomenclature of **benign epithelial** tumors is more complex
- They are variously classified
 - cells of origin,
 - microscopic architecture, and
 - macroscopic patterns.



Nomenclature-Benign epithelial tumours

- **Adenoma-** thyroid, parathyroid, pituitary, liver
- **Cystadenoma-** ovary
- **Papilloma-** skin, larynx, breast, eyelid, colon
- **Polyp-** colon, cervix, larynx



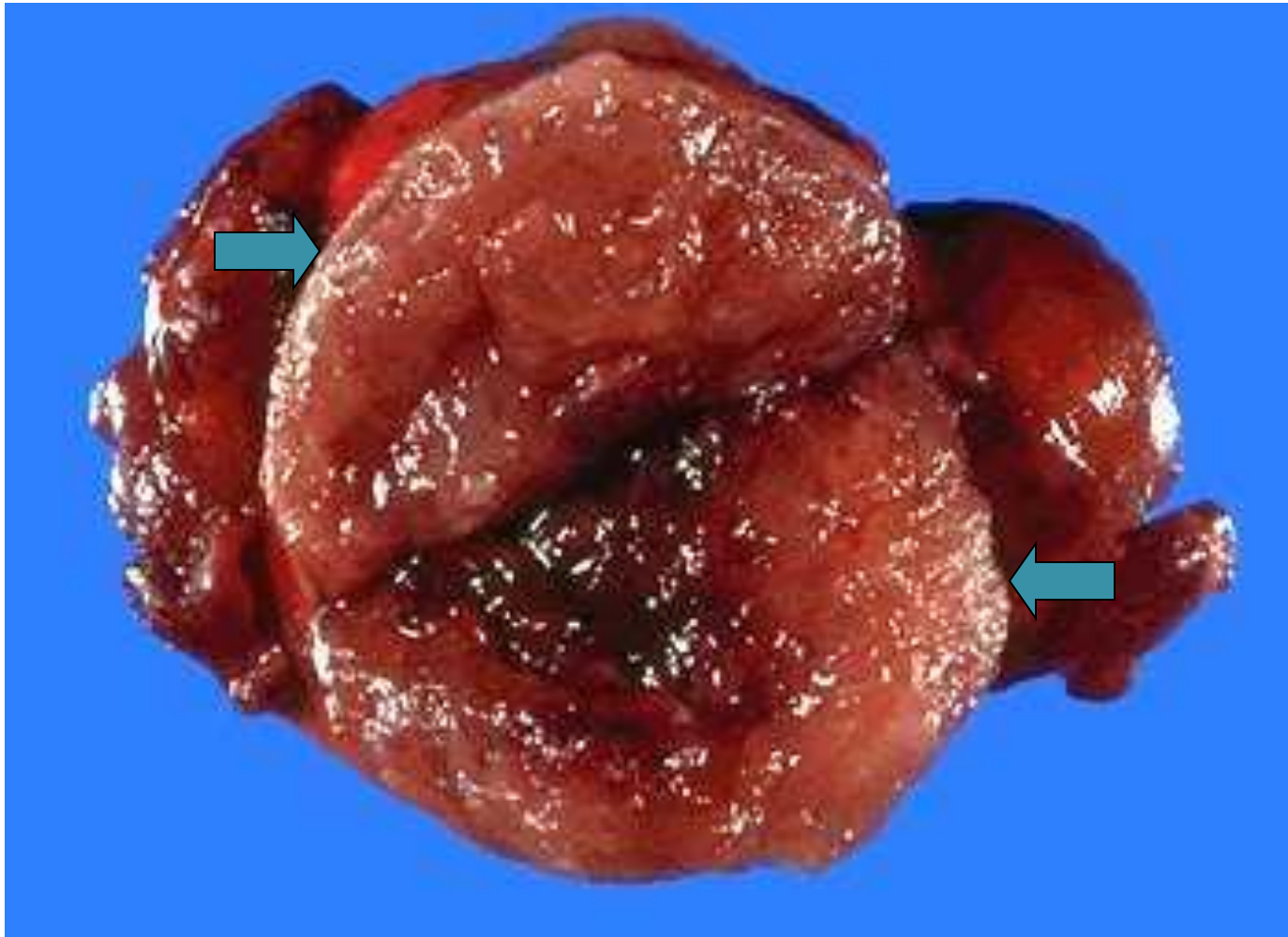
Nomenclature- Adenoma

Adenoma is the term applied to

- a **benign epithelial neoplasm** that forms **glandular patterns** as well as
- to tumors **derived from glands** but not **necessarily reproducing glandular patterns**



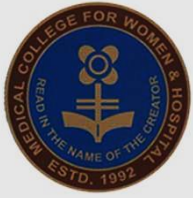
Thyroid- Follicular Adenoma



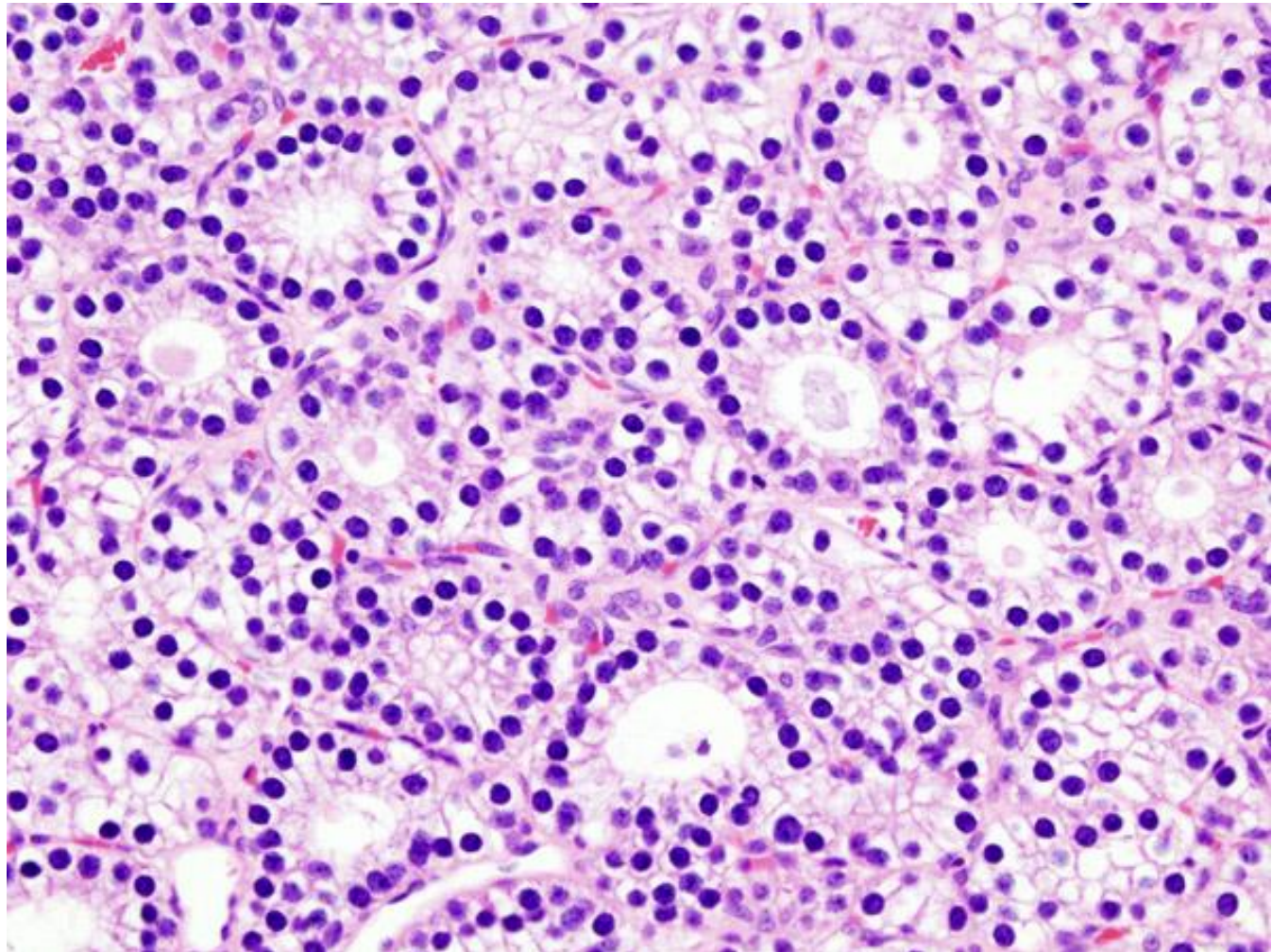


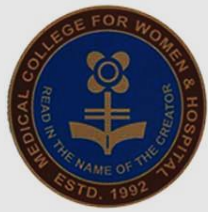
Follicular Adenoma- thyroid



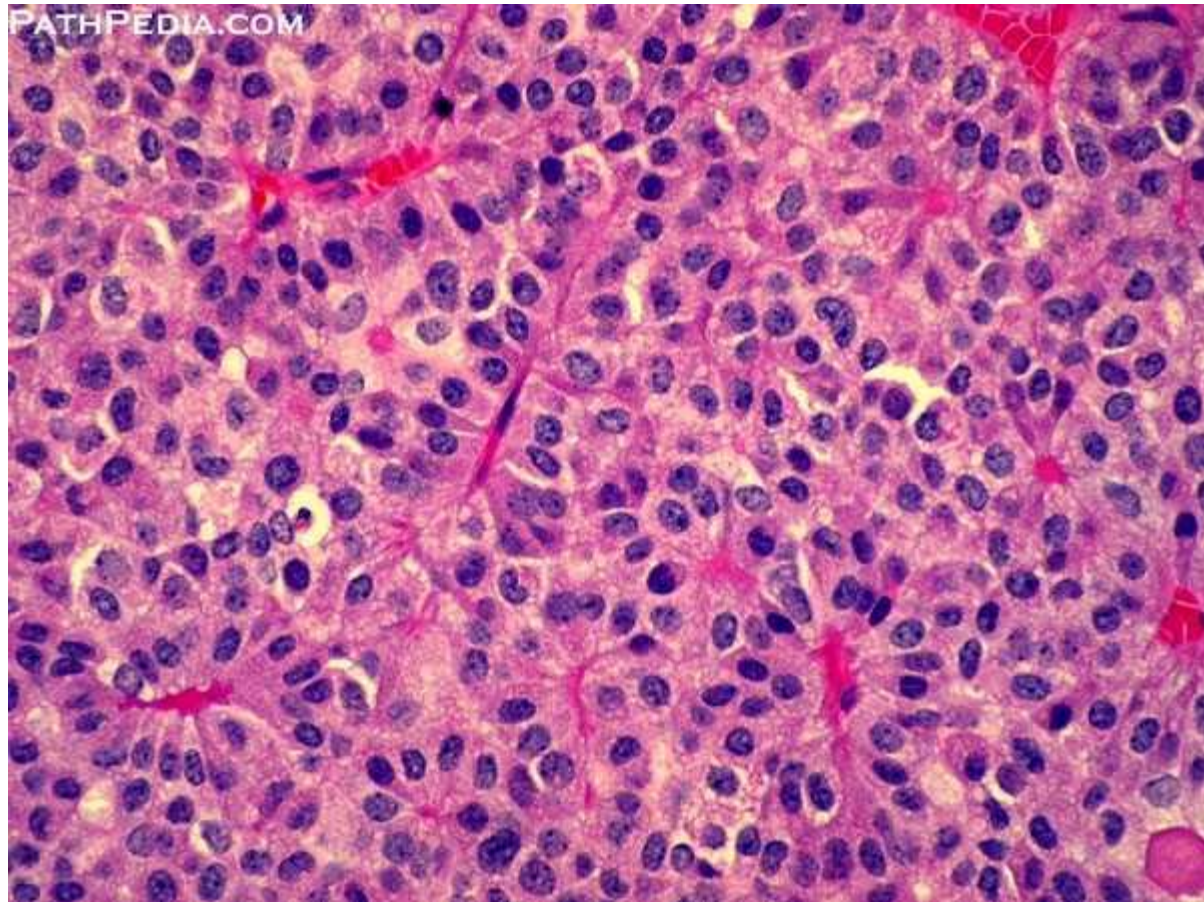


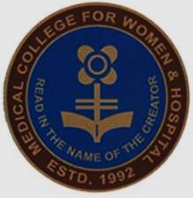
Parathyroid adenoma



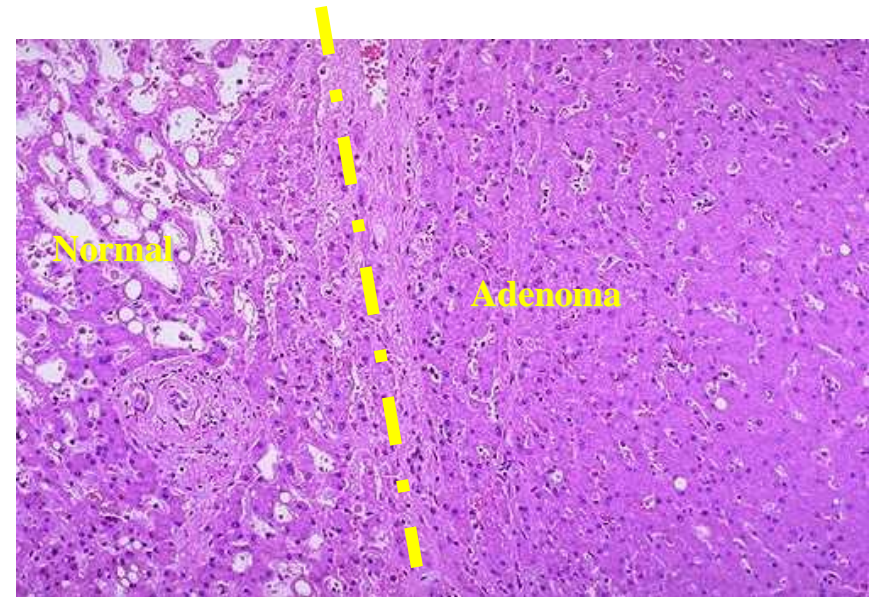
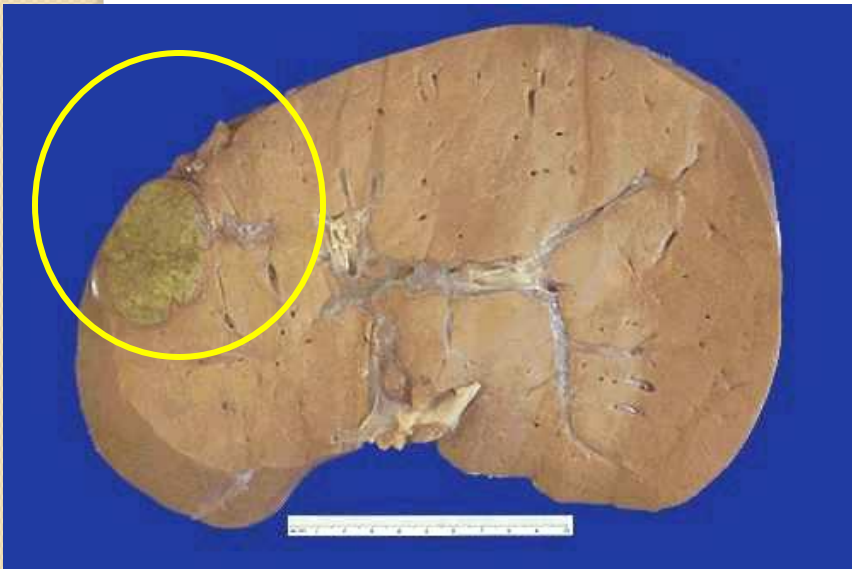


Pituitary adenoma





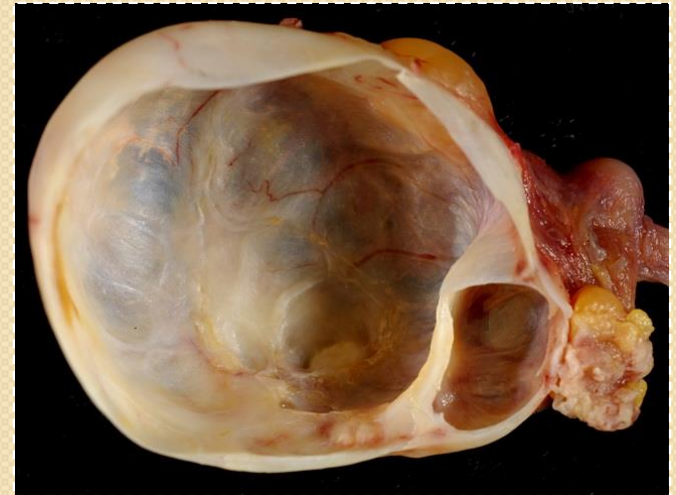
Hepatic Adenoma





Nomenclature-cystadenoma

Cystadenomas- those that form large cystic masses, as in the ovary

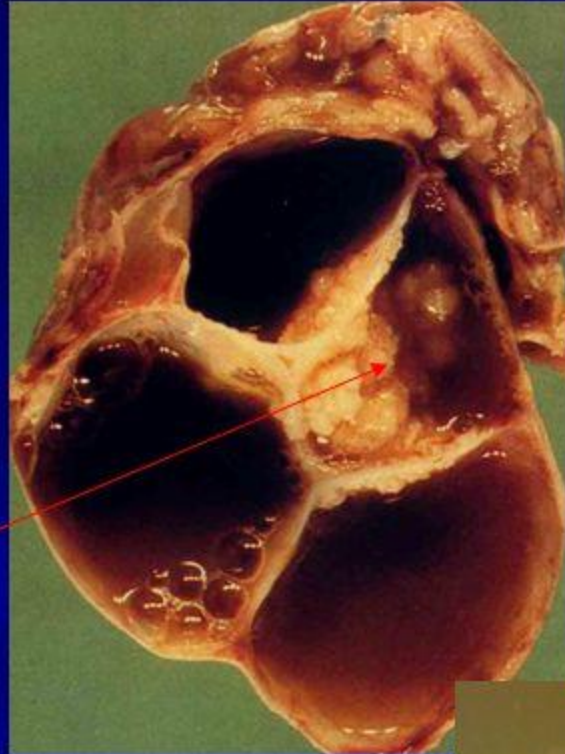


Benign ovarian Mucinous cystadenoma

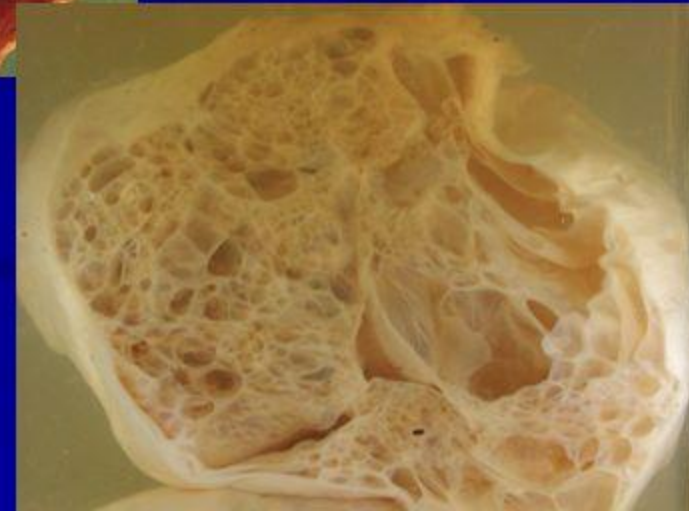
Gross :

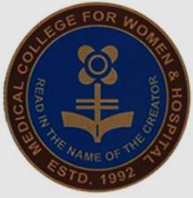
the cut surface of the cyst is **multilocular**
more cysts of variable size

the surface of the cyst is **completely smooth** but may be **slightly nodular due to projecting loculi**



multilocular cyst



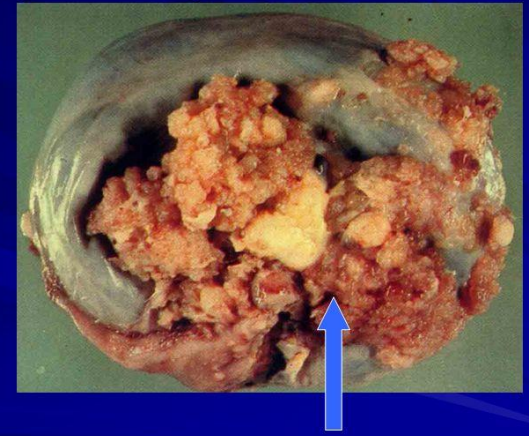


Nomenclature- papillary cystadenoma

Papillary cystadenomas – those tumors that produce papillary patterns and protrude into cystic spaces

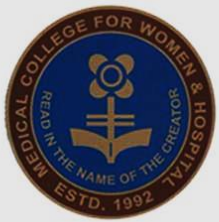
Papillary serous cystadenoma

Benign tumors typically present with **small papillary projections** ,



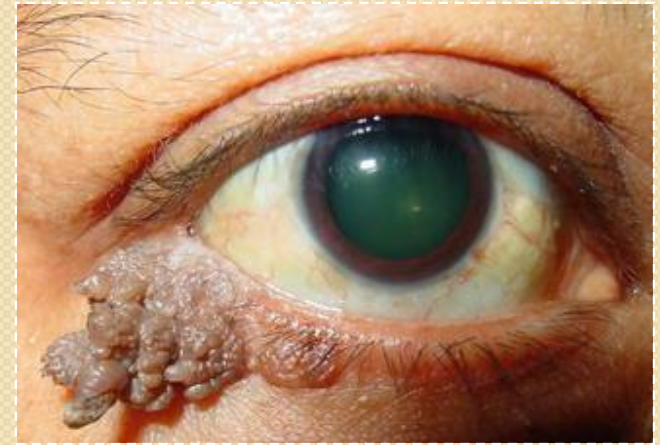
a cyst cavity lined by **more thick papillary** tumor growths

NEXT

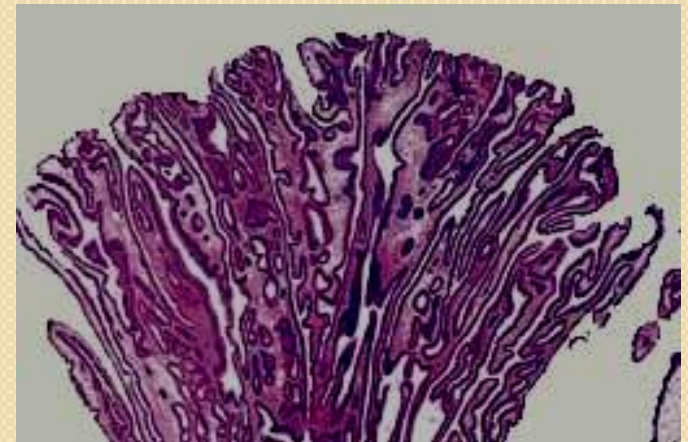


Papilloma

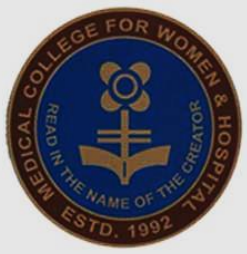
Benign epithelial neoplasms producing **microscopically or macroscopically visible finger-like or warty projections** from epithelial surfaces



Papilloma- eyelid



Papilloma of the colon with finger-like projections into the lumen



Papilloma



Viral wart (squamous cell papilloma)

- Most common benign lid tumour
- Raspberry-like surface

Pedunculated



Sessile





Nomenclature-POLYP

When a neoplasm, benign or malignant,

- ❑ produces a **macroscopically** visible projection
- ❑ above a ***mucosal*** surface and
- ❑ ***projects*** (gastric or colon lumen)



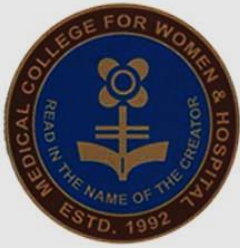
Nomenclature-POLYP

Colonic polyp

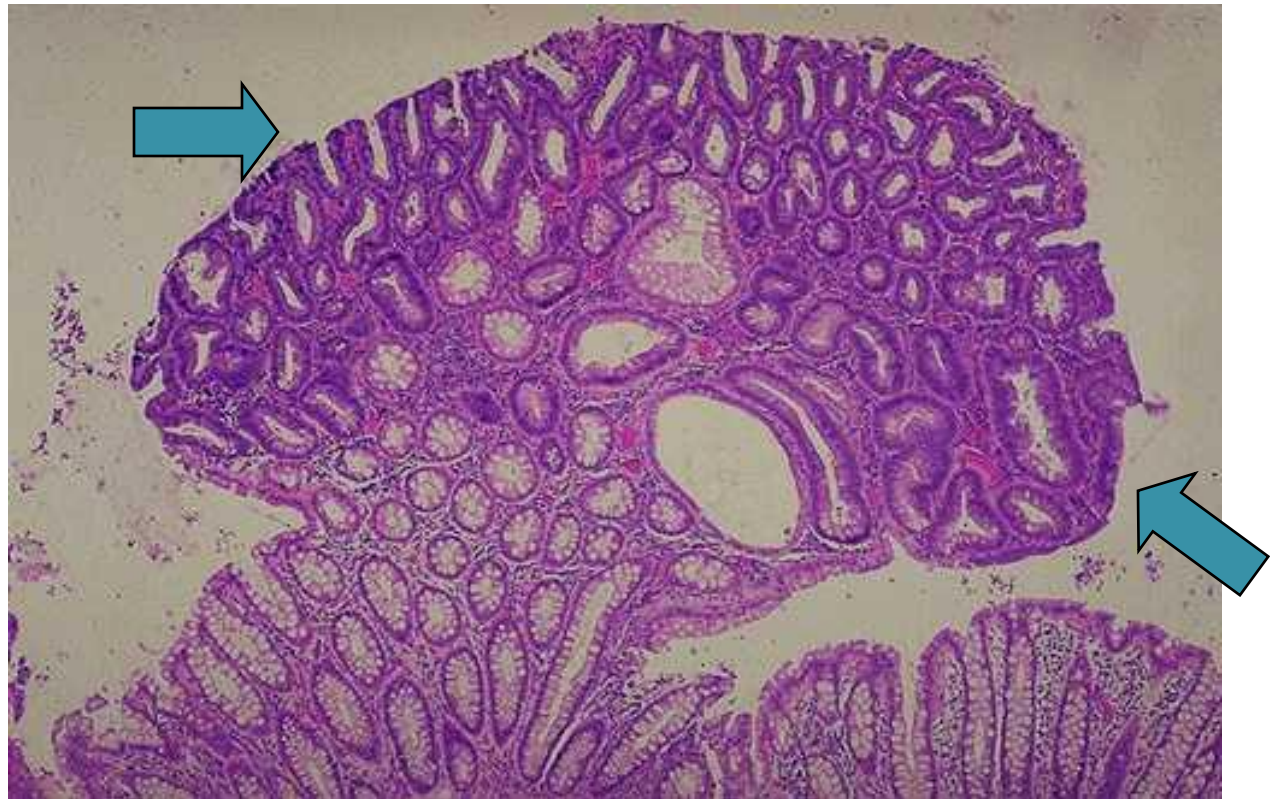


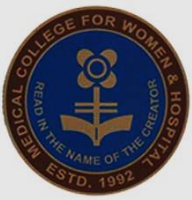
Cervical polyp





Colonic Polyp





Nomenclature

ADENOMATOUS POLYP

If the polyp has glandular tissue it is called an ***adenomatous polyp***



An adenomatous (glandular) polyp is projecting into the colonic lumen and is attached to the mucosa by a distinct stalk



MALIGNANT TUMOURS



Nomenclature- Malignant tumour

- ***Cancer*** is the common term for all malignant tumors.
- Probably derived from the Latin for **crab**
- “Adheres to any part that it seizes upon in an obstinate manner like the crab.”



Nomenclature- Malignant tumour

- Can invade & destroy adjacent structures
- Spread to distant sites (metastasize) to cause death

Comparisons between benign and malignant tumours

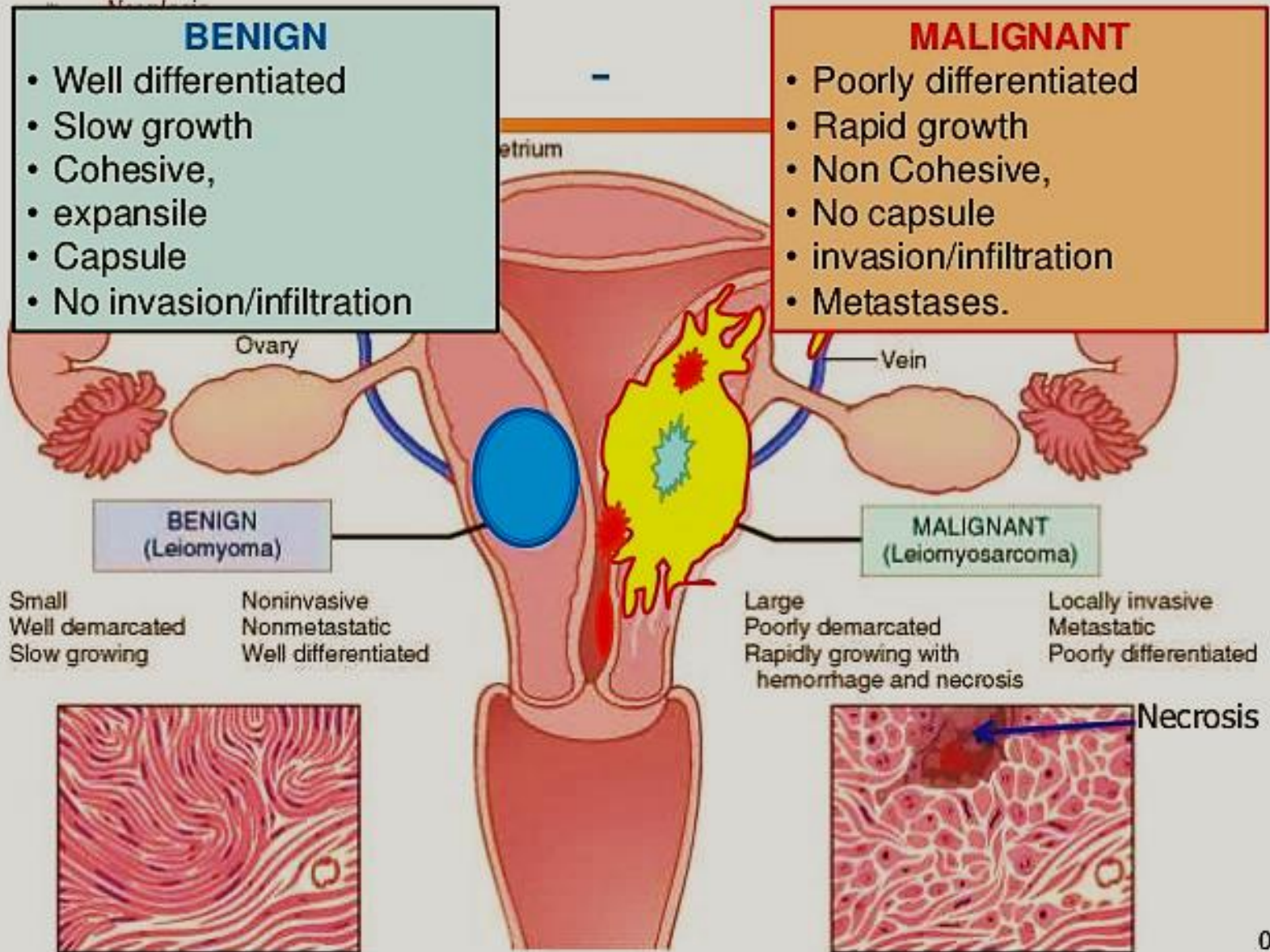
Characteristics	Benign	Malignant
Differentiation/ anaplasia	Well differentiated; structures sometimes typical tissue of origin	Some lack of differentiation (anaplasia); structures often atypical
Rate of growth	Slow growing	Erratic, may be slow or rapid; Usually faster growth
Local invasion	No local invasion; well circumscribed and have a capsule	Locally invasive Infiltrate to surrounding tissues; poorly circumscribed
Metastasis	Absent	Frequent

BENIGN

- Well differentiated
- Slow growth
- Cohesive,
- expansile
- Capsule
- No invasion/infiltration

MALIGNANT

- Poorly differentiated
- Rapid growth
- Non Cohesive,
- No capsule
- invasion/infiltration
- Metastases.





Nomenclature- Malignant tumour

CARCINOMA

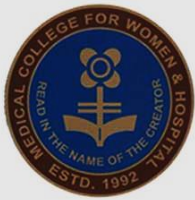
- Malignant neoplasm of epithelial cell origin (derived from any of the three germ layers) is called **CARCINOMA**
- Examples include:
 - **Squamous cell carcinoma of cervix**
 - **Adenocarcinoma of stomach**
 - **Hepatocellular carcinoma**
 - **Renal cell carcinoma**



Nomenclature-Malignant tumour

SARCOMA

- *Malignant tumors* arising in mesenchymal tissues is called **SARCOMA**
- Examples include:
 - **Leiomyosarcoma**
 - **Chondrosarcoma**
 - **Osteosarcoma**
 - **Liposarcoma**



Nomenclature- Sarcoma

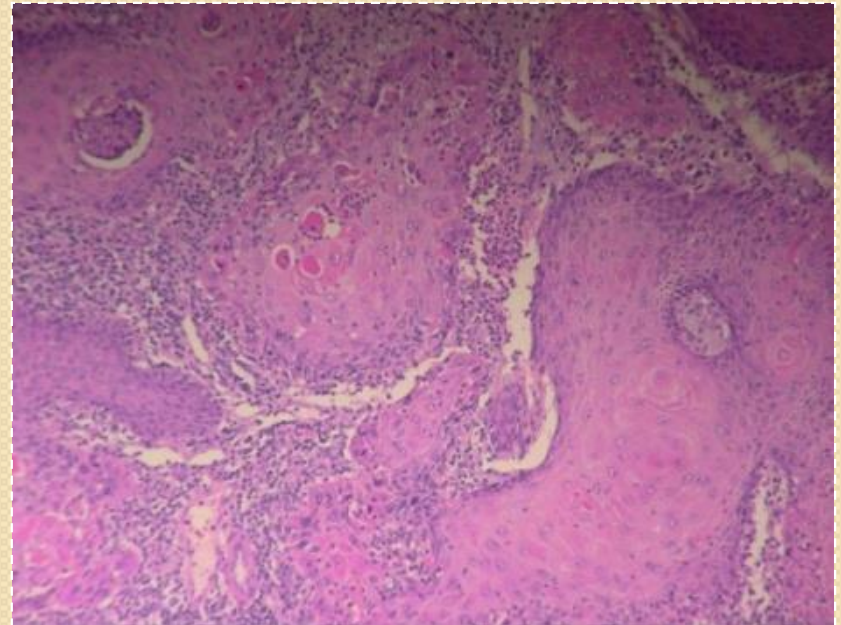
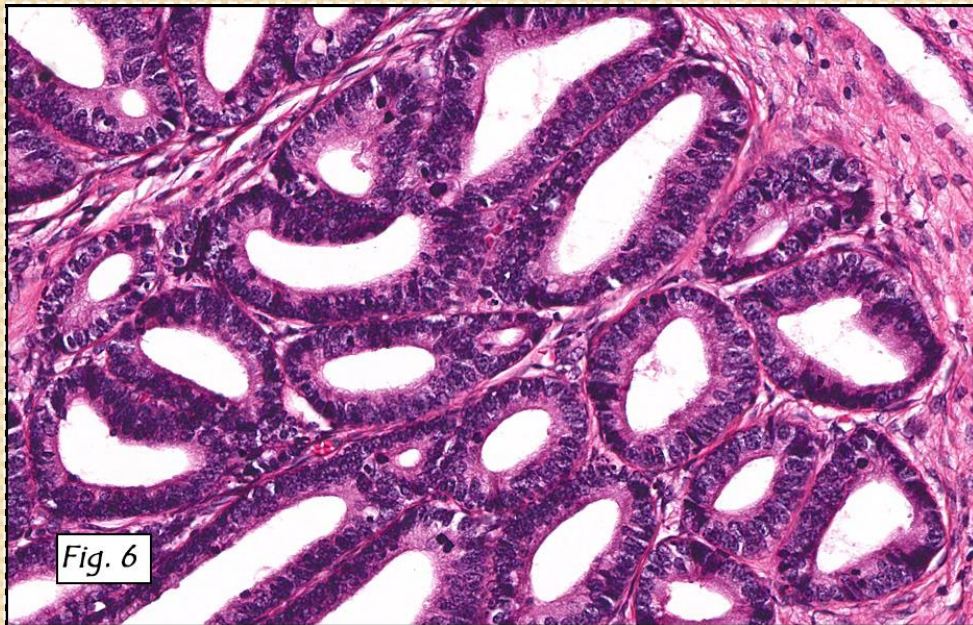
(Greek *sar* = fleshy) because they have little connective tissue stroma)



Carcinoma

Adenocarcinoma

Squamous cell carcinoma

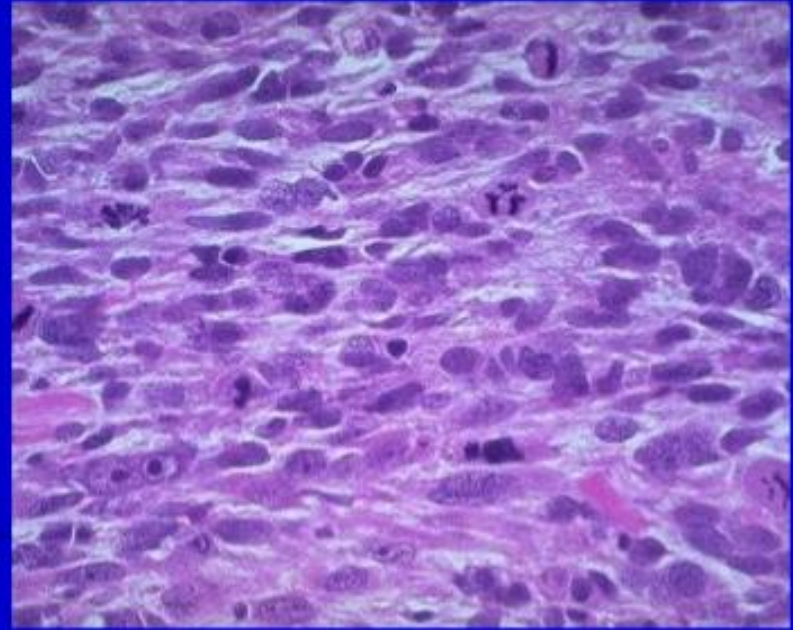
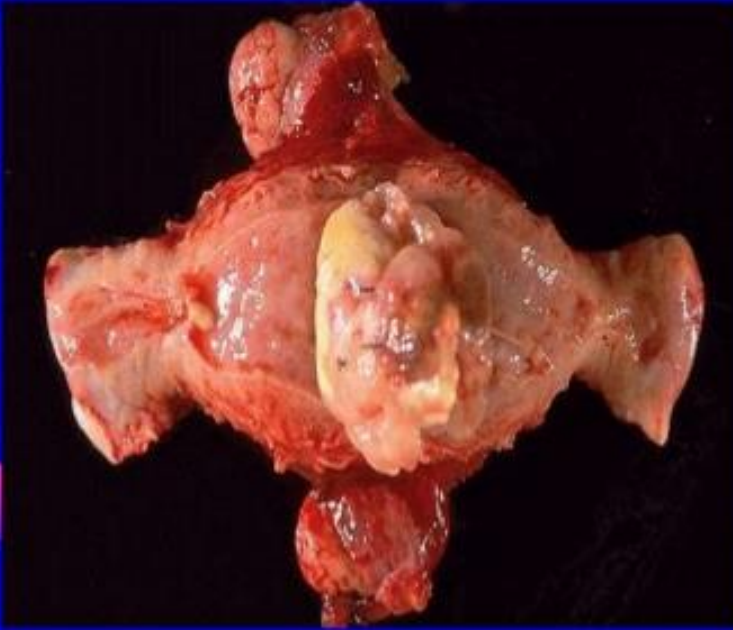


When neoplastic epithelial cells grow in a glandular pattern microscopically it is termed an Adenocarcinoma

A cancer in which the tumour cells resemble stratified squamous epithelium is termed a Squamous cell carcinoma

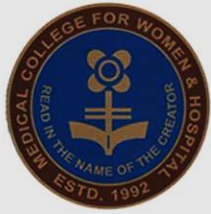
Liomyosarcoma of the uterus: soft fleshy tumor arising from myometrium.

The tumor shows bundles of malignant smooth muscle fibres.



Differences between Carcinoma and Sarcoma

Trait	Carcinoma	Sarcoma
Age incidence	Middle age	All age including early age
Structure	Cells are usually arranged in groups or columns; well formed stroma; less haemorrhage and necrosis	Cells are diffusely arranged in sheets; poor stroma ; haemorrhage and necrosis
Growth	Somehow slow growing	Usually rapid
Metastasis	Early lymphatic; later bloodborne	Usually blood borne metastases; lymphatic spread uncommon
Radiosensitivity	Highly sensitive	More resistant



Nomenclature

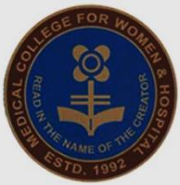
Leukaemia (arising from white blood cells)

Lymphomas (tumours of lymphocytes and their precursors)



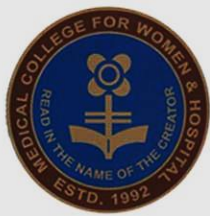
Nomenclature- Undifferentiated Malignant tumour

a cancer composed of unknown tissue origin

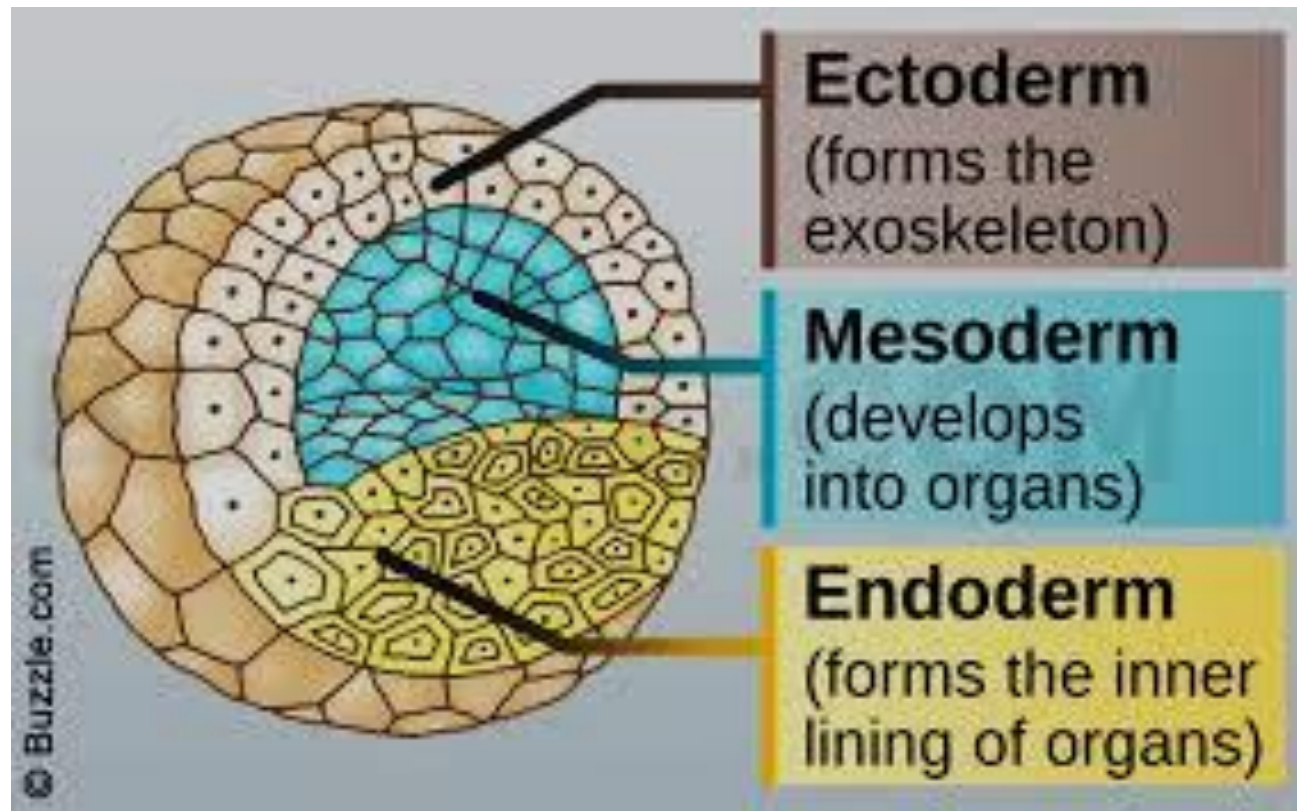


Nomenclature- Mixed tumour

- Neoplasms with **more than one cell** type but arising from **only one germ layer** are called "mixed tumors".
- Divergent differentiation of a single neoplastic clone creates a mixed tumour



Germ layers



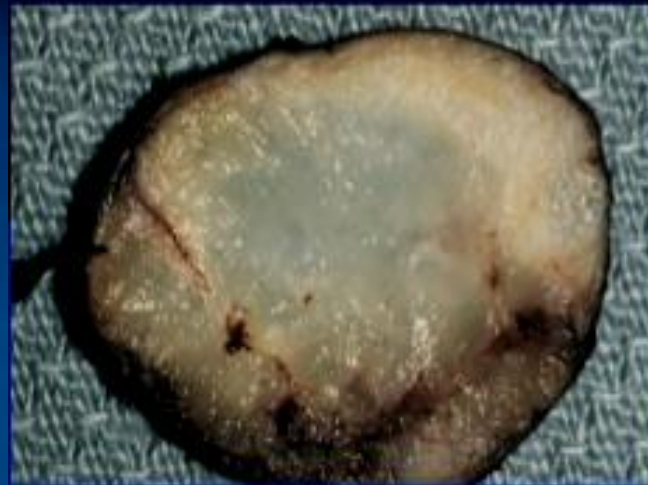


Nomenclature- Mixed tumour

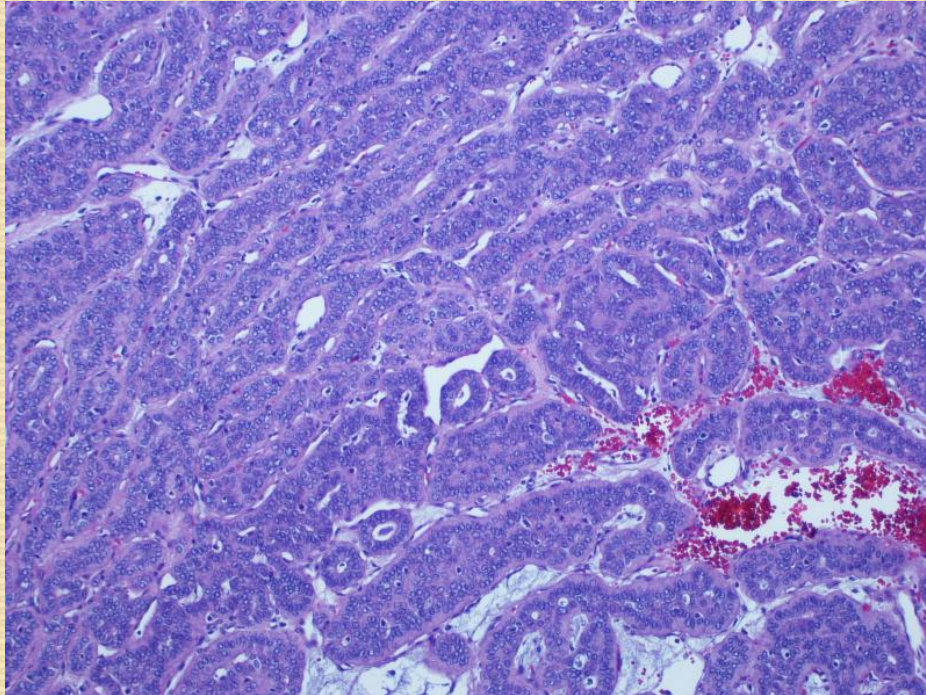
- The best example is the benign mixed tumor (also called **pleomorphic adenoma**) of salivary gland

Mixed Tumors

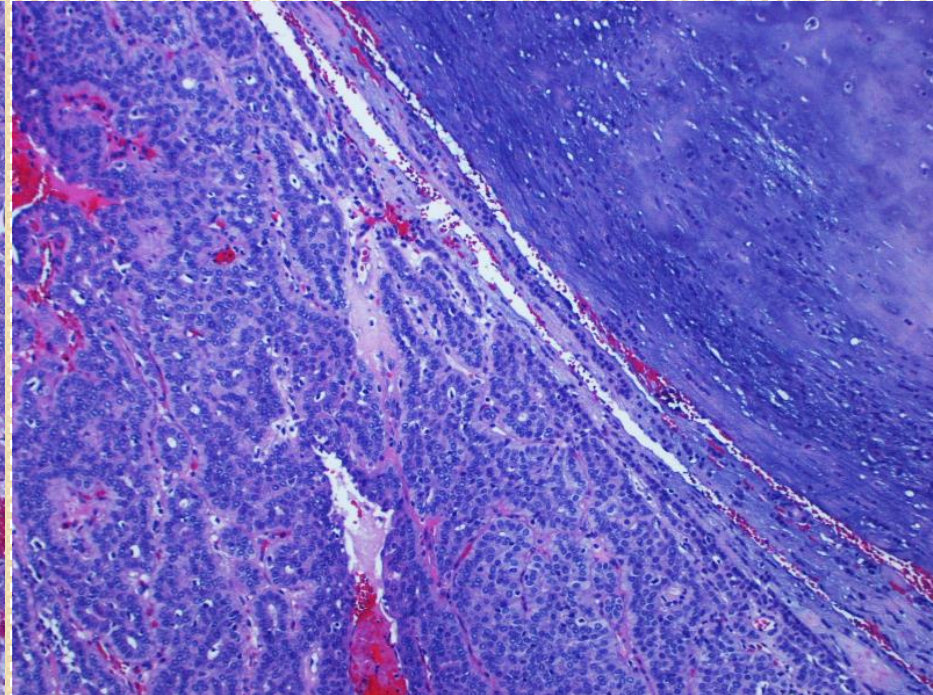
“Pleomorphic Adenoma”



Epithelial component



Epithelial component and cartilaginous area

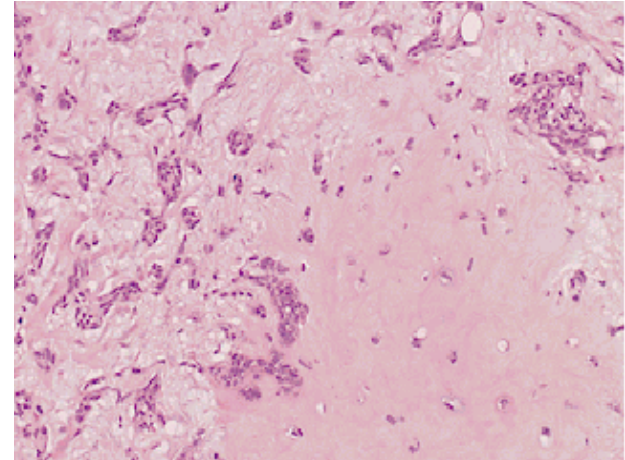


Pleomorphic adenoma- Mixed tumour

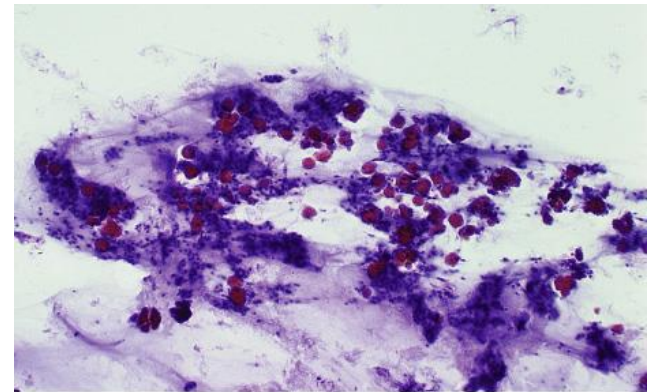
Pleomorphic adenoma



Gross appearance of pleomorphic adenoma



Microscopic appearance of Pleomorphic adenoma



FNAC of Pleomorphic adenoma



Teratoma

- Originates from ***totipotential germ cells***
- Contains both mature & immature cells or tissues belonging to **more than one germ layer (sometimes all three)**
- May give rise to neoplasm that contain bone, epithelium, muscles, fat, nerve and other tissues

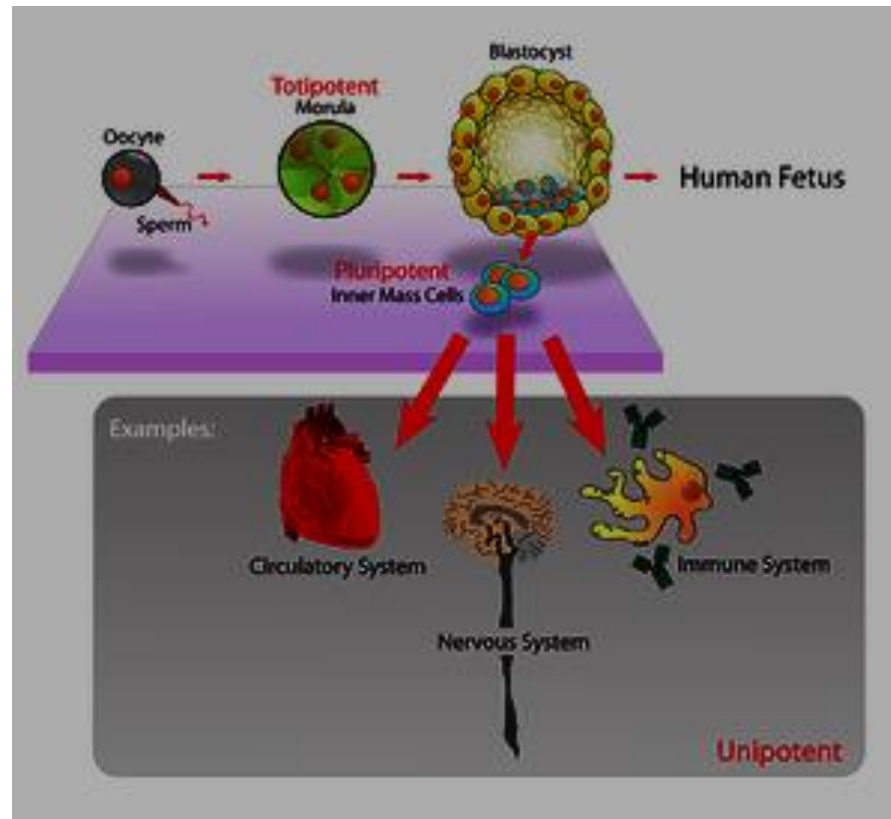


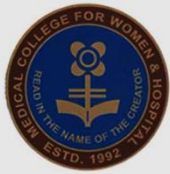
Totipotential germ cells

- An embryonic cell that is capable of developing into any variety of body cells
- **Such as - bone, epithelium, muscle, fat, nerve, and other tissues**



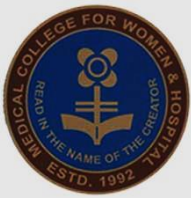
Totipotential germ cells





Teratoma- Common sites

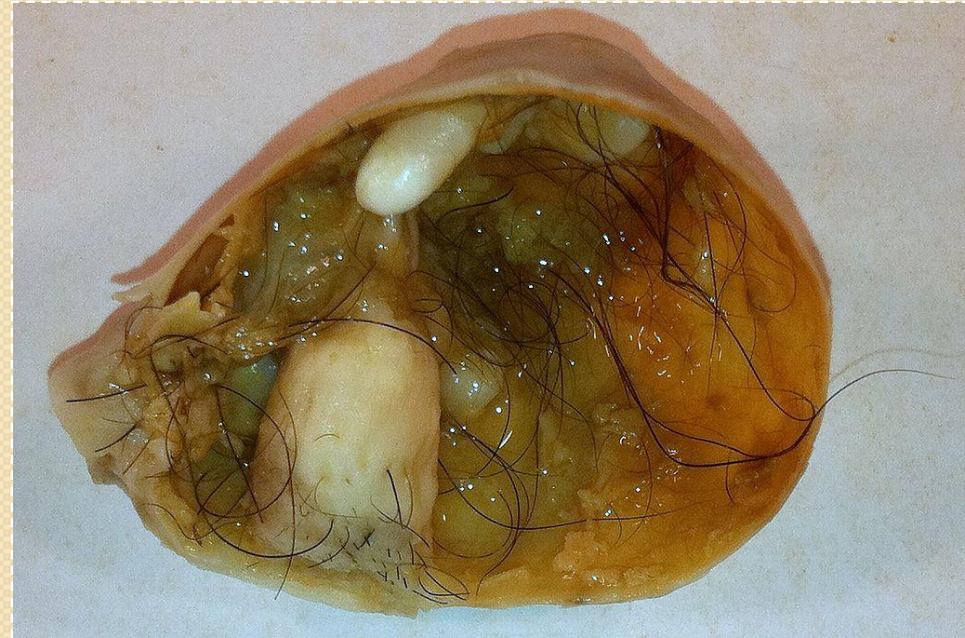
- Ovary
- Testis
- Abnormal midline embryonic rests
 - Head neck
 - Mediastinum
 - Sacrococcygeal region
 - Retroperitoneum



Teratoma

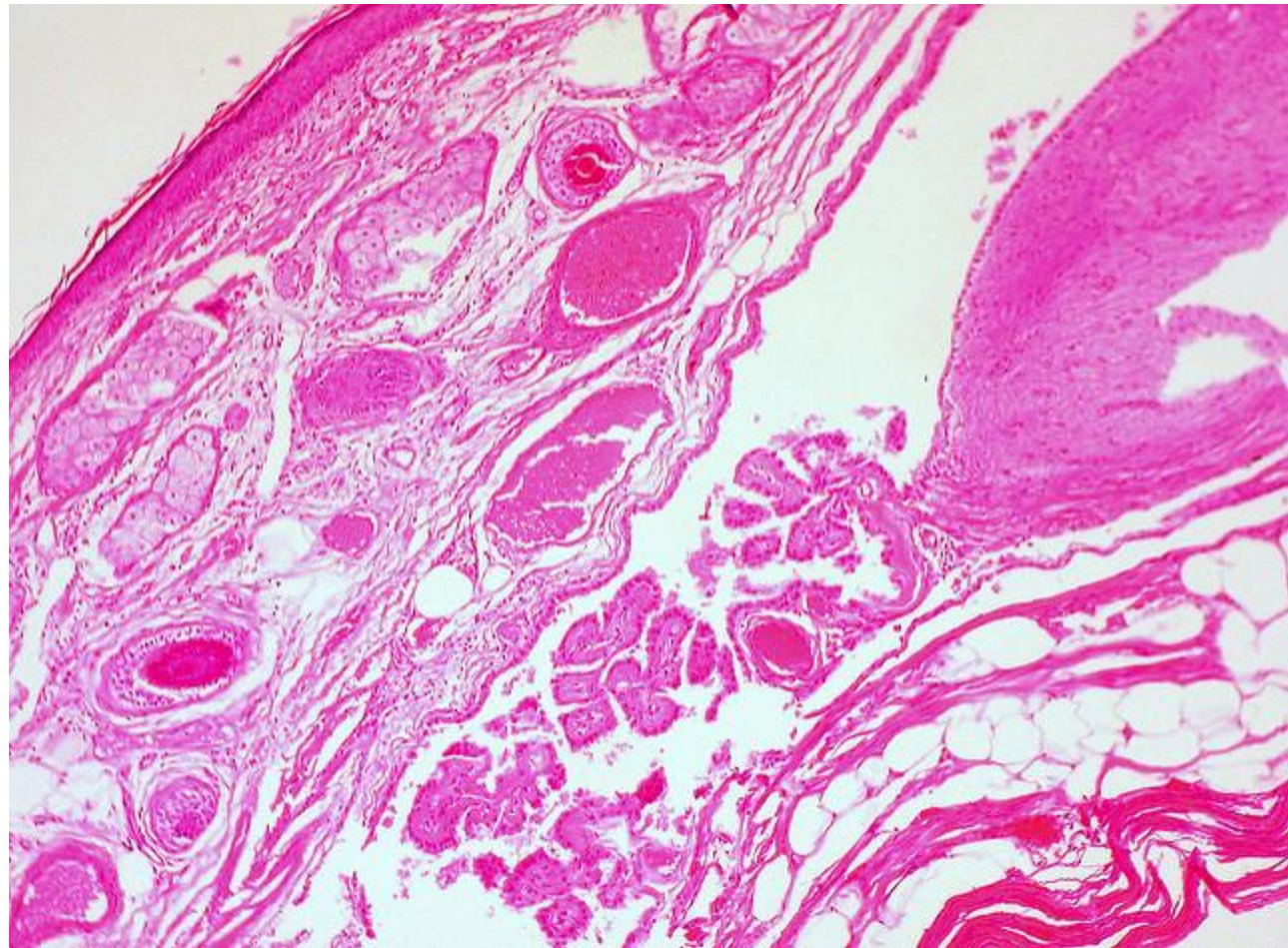
- A particularly common pattern is ovarian cystic teratoma (dermoid cyst)

Ovarian Cystic Teratoma- gross

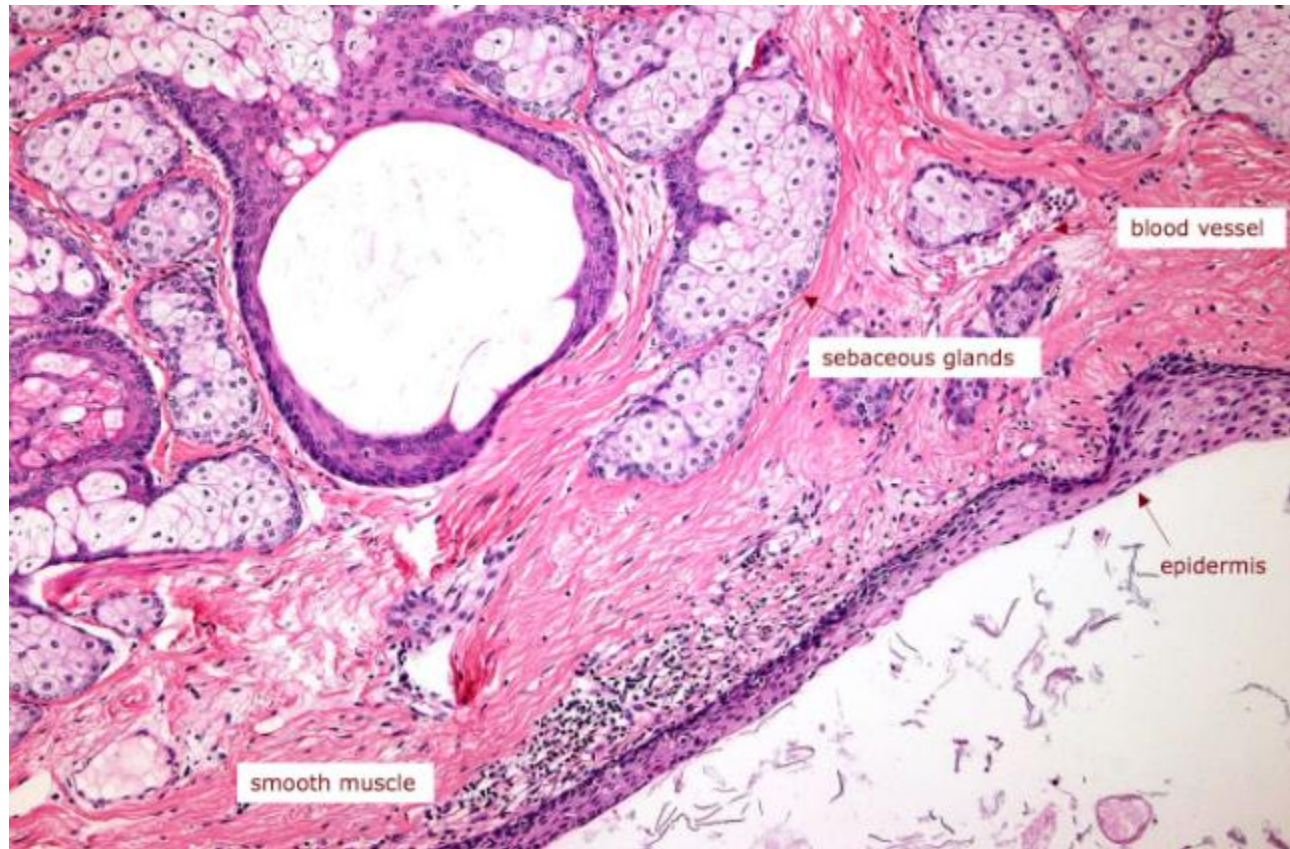


Dermoid cyst

Teratoma- microscopic



Teratoma- microscopic





Tumour like conditions

- Hamartomas
- Choriostoma



Hamartoma

- A disorganized but benign masses composed of cells indigenous to the involved site
- Once thought – developmental malformation
- Many have clonal chromosomal aberrations for somatic mutation- **now considered as neoplasms**
- **Example: pulmonary hamartoma**

INDIGENOUS: originating or occurring naturally in a particular place; native

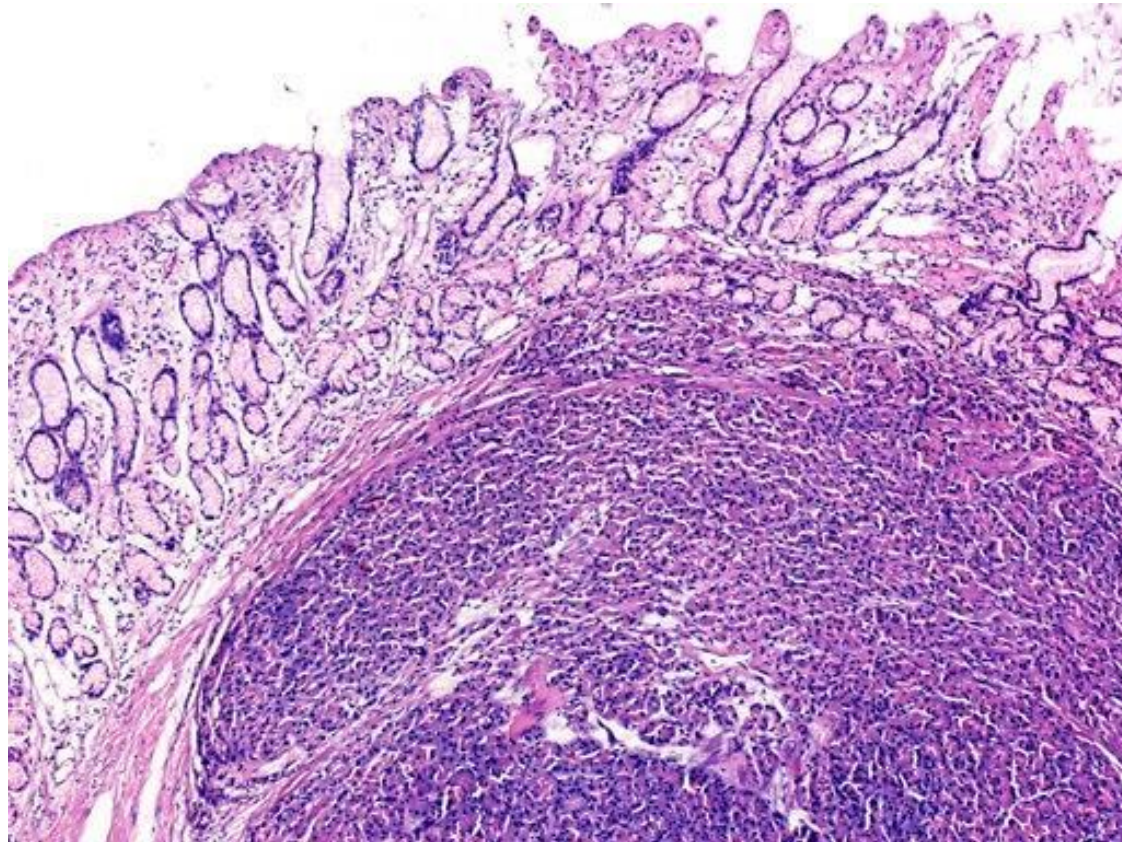


Choriostoma

- Heterotopic rest of cells
- Examples:
- A small nodule of well developed & normally organized **pancreatic tissue in submucosa of the stomach, duodenum, or small intestine**
- Actual significance not known



CHORIOSTOMA- ectopic pancreatic tissue in the stomach



Nomenclature of Tumours

Tissue of origin	Benign	Malignant
COMPOSED OF ONE PARENCHYMAL CELL TYPE		
<i>Tumours of Mesenchymal origin</i>		
Connective tissue and derivatives	Fibroma	Fibrosarcoma
	Lipoma	Liposarcoma
	Chondroma	Chondrosarcoma
	Osteoma	Osteogenic sarcoma

Nomenclature of Tumours

Tissue of origin	Benign	Malignant
COMPOSED OF ONE PARENCHYMAL CELL TYPE		
<i>Vessels and surface coverings</i>		
Blood vessels	Haemangioma	Angiosarcoma
Lymph vessels	Lymphangioma	Lymphangiosarcoma
Mesothelium	Benign fibrous tumor	Mesothelioma
Brain coverings	Meningioma	Invasive meningioma

Nomenclature of Tumours

Tissue of origin	Benign	Malignant
COMPOSED OF ONE PARENCHYMAL CELL TYPE		
<i>Blood cells and related cells</i>		
Haematopoietic cells		Leukaemia
Lymphoid cells		Lymphoma

Nomenclature of Tumours

Tissue of origin	Benign	Malignant
COMPOSED OF ONE PARENCHYMAL CELL TYPE		
Muscle		
Smooth	Leiomyoma	Leiomyosarcoma
Striated	Rhabdomyoma	Rhabdomyosarcoma

Nomenclature of Tumours

Tissue of origin	Benign	Malignant
COMPOSED OF ONE PARENCHYMAL CELL TYPE		
<i>Tumors of Epithelial origin</i>		
Stratified squamous	Squamous cell papilloma	Squamous cell carcinoma
Basal cell of skin & adnexa		Basal cell carcinoma
Epithelial linings of glands or ducts	Adenoma, Papilloma, Cystadenoma	Adenocarcinoma, Papillary carcinoma Cystadenocarcinoma
Respiratory passages	Bronchial adenoma	Bronchogenic carcinoma
Renal epithelium	Renal tubular adenoma	Renal cell carcinoma
Liver cells	Hepatic adenoma	Hepatocellular carcinoma
Urinary tract epithelium	Transitional cell papilloma	Transitional cell carcinoma
Placental epithelium	Hydatidiform mole	Choriocarcinoma
Testicular epithelium		Seminoma, Embryonal carcinoma
Tumours of melanocytes	Nevus	Malignant melanoma

Nomenclature of Tumours

Tissue of origin	Benign	Malignant
More than one neoplastic cell type- mixed tumors, usually derived <u>from one germ layer</u>		
Salivary gland	Pleomorphic adenoma (mixed tumor of salivary gland)	Malignant mixed tumor of salivary gland origin
Renal anlage		Wilms tumor

Anlage: Rudimentary basis of a particular organ or other part especially in a embryo

Nomenclature of Tumours

Tissue of origin	Benign	Malignant
More than one neoplastic cell type derived <u>from more than one germ layer-</u> teratogenous		
Totipotential cells in gonads or in embryonic tissues	Mature teratoma, dermoid cysts	Immature teratoma, teratocarcinoma

What we have learnt from this lecture?

Neoplasm

- Definition
- Components
 - Parenchyma
 - Stroma

Benign tumour

- Adenoma
- Papilloma
- Cystadenoma
- Polyp

Malignant tumour

- Carcinoma
- Sarcoma
- Leukaemia
- Lymphoma
- Undifferentiated

Mixed tumour

Teratoma

Hamartoma

Choriostoma

What we have learnt from this lecture?

- Differences between benign and malignant tumours
- Differences between carcinoma and sarcoma



Thank
You