



NOVA

Charting New Horizons in Education

Intro **Neoplasia I** ism

16
Pathology

الدكتور حتى عنه مهم

الدكتور ما طلبه به أنا. بي
ايا

كل الصور معين !!



va Nomenclature



- Neoplasia means “new growth,” and a new growth is called a neoplasm.
- Tumor originally applied to the swelling caused by inflammation
- Oncology (Greek oncos = tumor) is the study of tumors or neoplasms.
- Although all physicians know what they mean when they use the term neoplasm, British oncologist Willis came closest: “A neoplasam 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.

Composition



- **All tumors have two main components:**

1. **Neoplastic Cells:** These form the tumor parenchyma (the functional tissue of the tumor).
2. **Reactive Stroma:** Made up of connective tissue, blood vessels, and immune system cells (both adaptive and innate).

- **Tumor Classification and Behavior:**

- ✓ Tumors are classified and their biological behavior is determined primarily by the parenchymal component (neoplastic cells).
- ✓ However, the growth and spread of tumors heavily depend on their stroma (the supportive tissue).

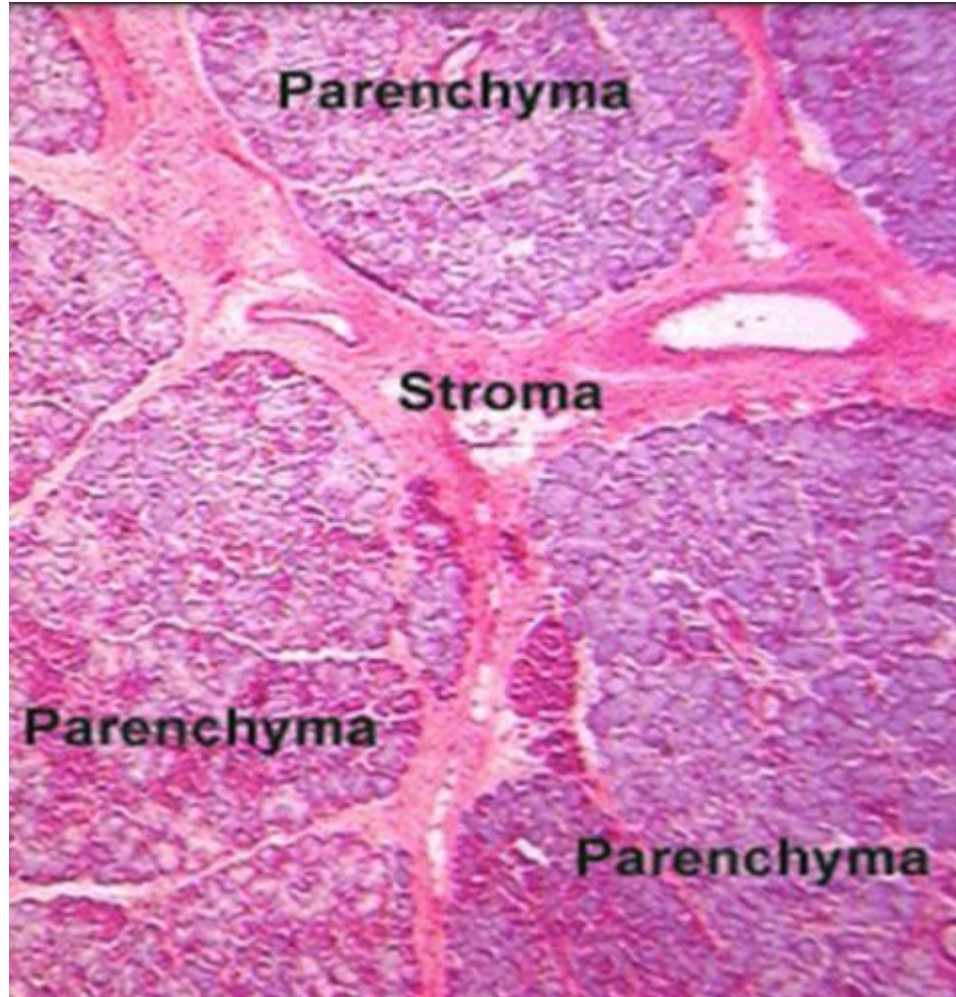
Composition



- **Variations in Tumor Stroma:**

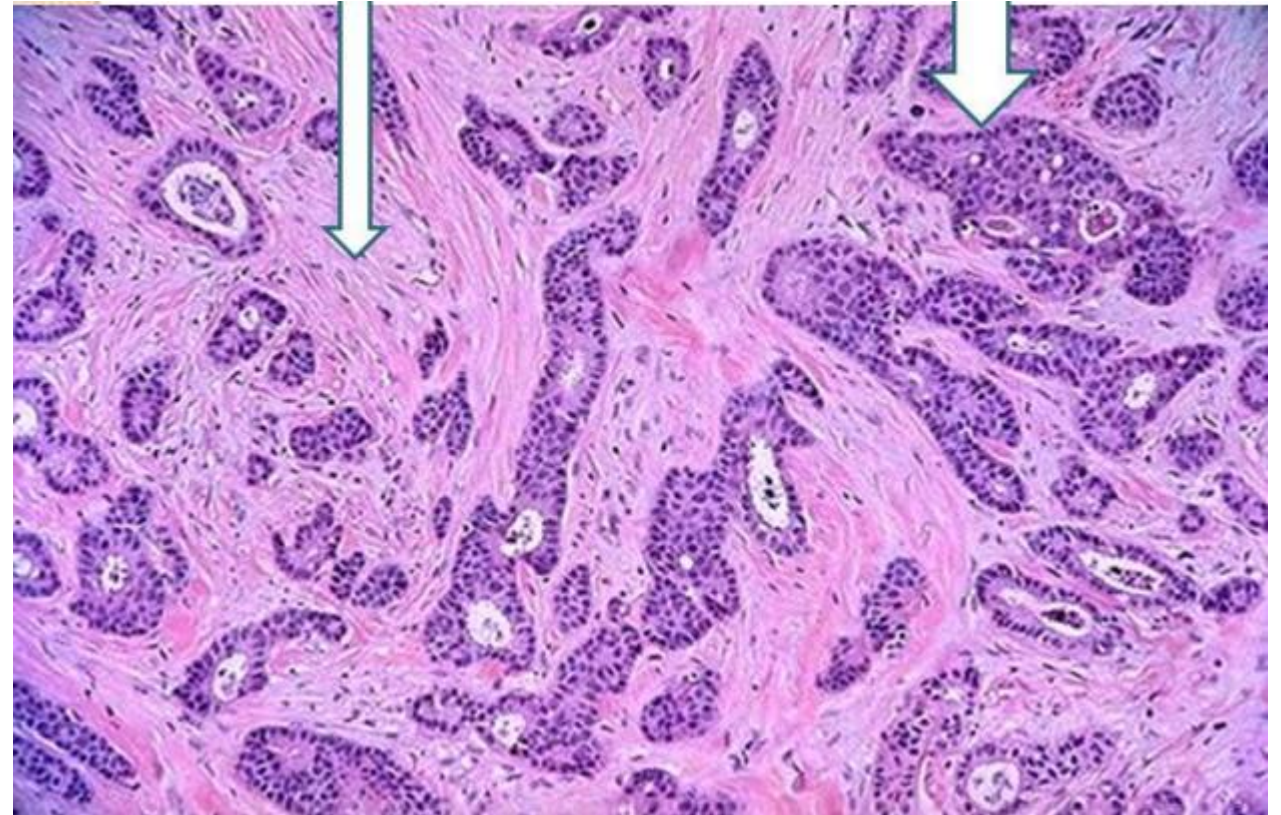
- ✓ In some tumors, there is little connective tissue (scant), making the tumor soft and fleshy.
- ✓ In other tumors, neoplastic cells stimulate the formation of abundant collagenous stroma, a process called **desmoplasia**.
- ✓ Some desmoplastic tumors, such as certain cancers of the female breast, can become very hard or **scirrhous** (stony hard).

Composition



stroma

Parenchyma



❖ Benign



1. Benign tumors stay localized at their site of origin.
2. They are typically amenable to surgical removal.
3. Patients generally survive after treatment.
4. Exceptions occur when benign tumors are located in critical areas, such as the brain, where they can cause significant morbidity and may be fatal.

Encapsulated
well circumscribed
well differential

❖ **Naming Benign Tumors of Mesenchymal Cells:** Naming is relatively simple: the suffix "-oma" is added to the cell type from which the tumor arises.

- ✓ Example: A benign tumor of fibroblast-like cells is called fibroma.
- ✓ Example: A benign cartilaginous tumor is called chondroma.

*فبروما - ليفرومي -
الاستنيان*

❖ Benign



❖ **Naming Benign Epithelial Tumors:** The naming of benign epithelial tumors is more complex, based on:

1. The cell of origin.
2. The microscopic appearance.
3. The macroscopic architecture.

Adenoma
تقریباً

✓ Adenomas: Benign epithelial tumors derived from glandular tissues, even if the tumor cells don't form glandular structures.

1. Example: A benign tumor from renal tubular cells forming tightly clustered glands or a mass of adrenal cortical cells growing as a solid sheet is called adenoma.

❖ Benign → Papillary projection



❖ Other Types of Benign Epithelial Tumors:

- ✓ **Papillomas:** Benign tumors producing fingerlike or warty projections from epithelial surfaces.
- ✓ **Cystadenomas:** Benign tumors forming large cystic masses, such as those in the ovary.
- ✓ **Papillary Cystadenomas:** Tumors producing papillary projections that protrude into cystic spaces.
- ✓ **Polyps:** A polyp is a visible projection above a mucosal surface (e.g., in the gastric or colonic lumen), If the polyp contains glandular tissue, it is referred to as an adenomatous polyp.
- ✓ ~~POLYPS → When a neoplasm—benign or malignant— produces a macroscopically visible projection above a mucosal surface and projects, for example, into the gastric or colonic lumen, it is termed a polyp.~~
- ✓ If the polyp has glandular tissue, it is called an adenomatous polyp

va Benign

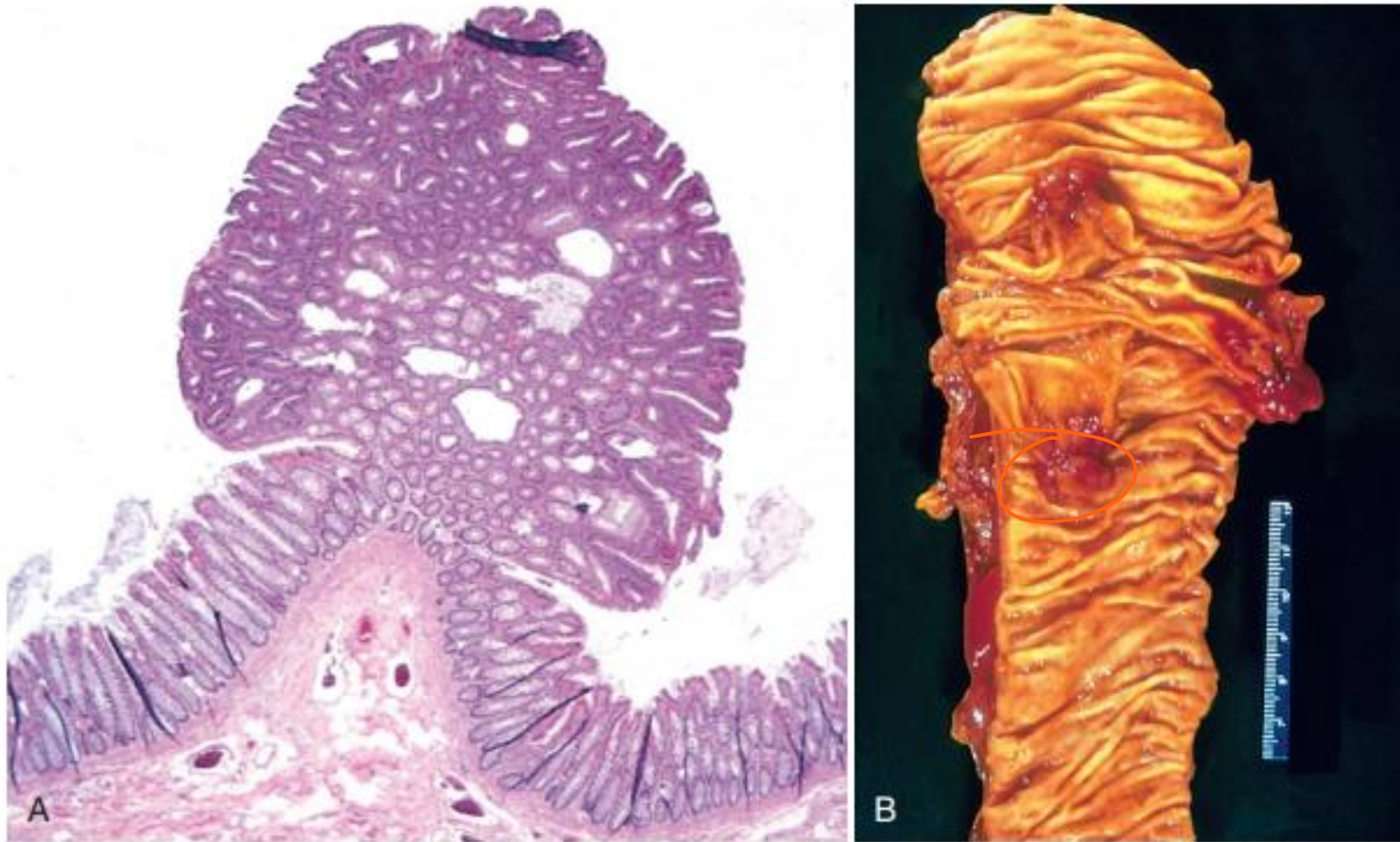


Figure 7.1 Colonic polyp. (A) An adenomatous (glandular) polyp is projecting into the colonic lumen and is attached to the mucosa by a distinct stalk. (B) Gross appearance of several colonic polyps.

va Benign



HEPATIC
ADENOMA

Benign



→ wart



Papilloma

VA Malignant



1. Malignant tumors can invade and destroy adjacent structures.
 2. They have the ability to spread to distant sites (metastasize).
 3. Malignant tumors are collectively referred to as cancers.
 4. The term comes from the Latin word for crab, due to their tendency to adhere to and seize any part in an obstinate manner.
 5. Not all cancers are deadly; some are discovered at early stages and can be treated through surgical excision or systemic drugs/therapeutic antibodies.
 6. Despite potential treatment, the designation “malignant” always signals a serious concern (Red flag).
- Nomenclature of Malignant Tumors: The naming system for malignant tumors is similar to that of benign neoplasms, with specific additions.

❖ Malignant

سارcoma



- ❖ **Malignant Tumors in Mesenchymal Tissues:** Malignant tumors arising in solid mesenchymal tissues (connective tissues) are called **sarcomas** (Greek "sar" meaning fleshy).
 - ✓ Examples: fibrosarcoma and chondrosarcoma.
- ❖ **Malignant Tumors in Blood-forming Cells:**
 - ✓ Tumors originating from blood-forming cells are called **leukemias** (literally "white blood") or **lymphomas** (tumors of lymphocytes or their precursors).
- ❖ **Malignant Tumors of Epithelial Cell Origin:** Malignant tumors arising from epithelial cells are called **carcinomas** → Carcinomas can be further classified:
 - ✓ Squamous cell carcinoma: Tumor cells resemble stratified squamous epithelium.
 - ✓ Adenocarcinoma: Neoplastic epithelial cells grow in a glandular pattern.

❖ Malignant



❖ Identification of Tissue or Organ of Origin:

- ✓ Sometimes, the tissue or organ of origin can be identified and added as a descriptor, such as:
- ✓ Renal cell adenocarcinoma (kidney).
- ✓ Bronchogenic squamous cell carcinoma (lung).

❖ Undifferentiated Malignant Tumors:

- ✓ In about 2% of cases, cancers are composed of cells of unknown origin and are classified as undifferentiated malignant tumors.

❖ Malignant

حکری



Malignant tumors arising in solid mesenchymal tissues are usually called *sarcomas* (Greek *sar* = fleshy; e.g., fibrosarcoma, chondrosarcoma, leiomyosarcoma, and rhabdomyosarcoma), whereas those arising from blood-forming cells are designated *leukemias* (literally, white blood) or *lymphomas* (tumors of lymphocytes or their precursors).



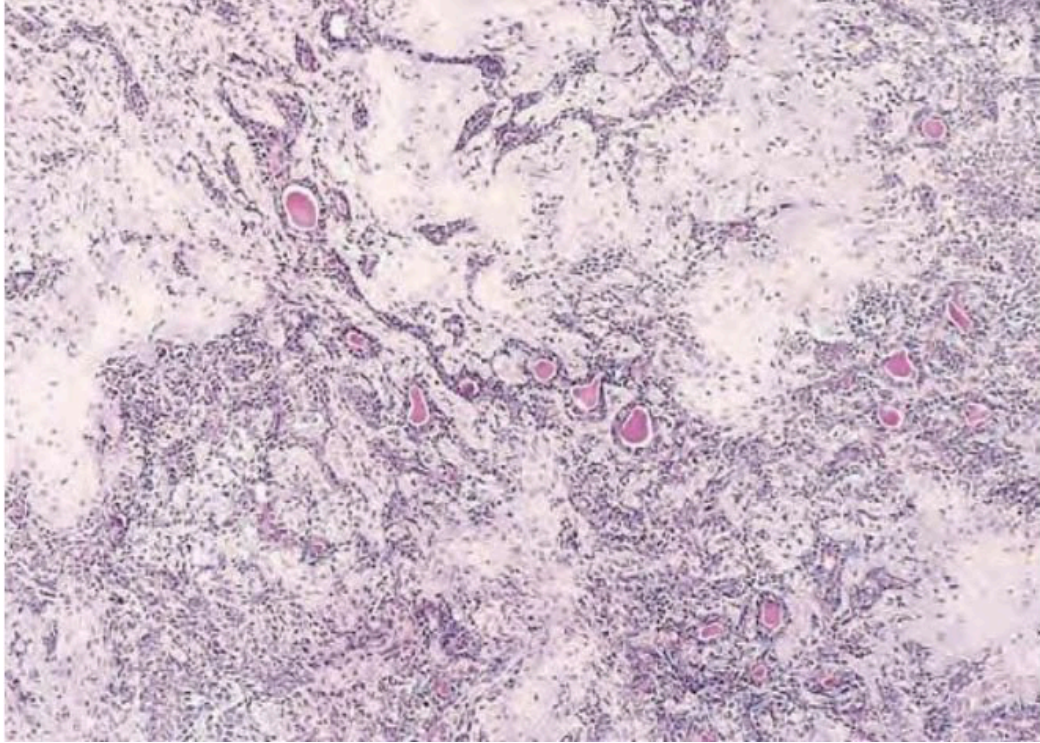
Malignant neoplasms of epithelial cell origin, derived from any of the three germ layers, are called *carcinomas*. Thus, cancers arising in the ectodermally derived epidermis, the mesodermally derived renal tubules, and the endodermally derived lining of the gastrointestinal tract are all termed carcinomas.

Neoplasms



- **Neoplastic Cells Resemble Each Other:** Neoplastic cells in a tumor, whether benign or malignant, typically resemble each other because they originate from a single transformed progenitor cell.
- **Mixed Tumors:** In rare instances, tumor cells undergo divergent differentiation, leading to mixed tumors.
- Mixed tumors are clonal, meaning they arise from a single progenitor cell, but that progenitor cell has the ability to differentiate into more than one lineage → An example of a mixed tumor is a mixed tumor of the salivary gland, also called a pleomorphic adenoma → This benign tumor contains epithelial components dispersed throughout a fibromyxoid stroma, and sometimes includes islands of cartilage or bone.

Sertoli
Gland



Teratoma



- A teratoma is a special type of mixed tumor that contains recognizable mature or immature cells or tissues derived from more than one germ cell layer.
- Teratomas may contain elements from all three germ layers (ectoderm, mesoderm, and endoderm).
- **Origin of Teratomas:** Teratomas originate from totipotent germ cells, which normally reside in the ovary and testis, or may be found in midline embryonic rests.
- Germ cells have the capacity to differentiate into any of the cell types found in the adult body.
- **Composition of Teratomas:** Because germ cells can differentiate into a variety of cell types, teratomas can give rise to neoplasms containing elements such as bone, epithelium, muscle, fat, nerve, and other tissues, all mixed together in an unorganized fashion.

Teratoma

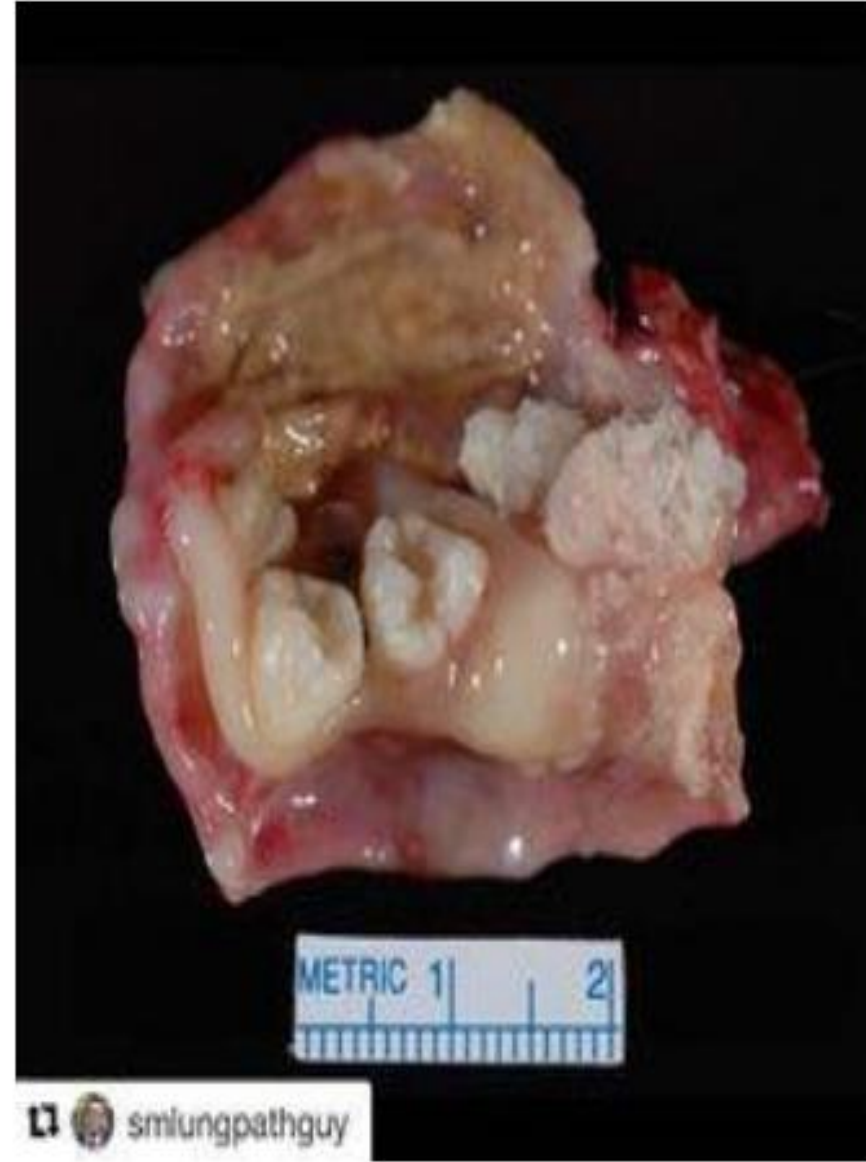


- The great majority of neoplasms, even mixed tumors, are composed of cells from a single germ layer.
- **An exception is a tumor called a teratoma**, which contains recognizable mature or immature cells or tissues belonging to more than one germ cell layer (and sometimes all three).
- Teratoma originates from germ cells that are normally present in the ovary and testis and sometimes also found in abnormal midline embryonic rests
- Such cells can differentiate into any of the cell types found in the adult body and so, may give rise to neoplasms that contain, in a **helter-skelter fashion**, bone, epithelium, muscle, fat, nerve, and other tissues.
- Common pattern is seen in the ovarian cystic teratoma (dermoid cyst), which create a cystic tumor lined by skin replete with hair, sebaceous glands, and tooth structures.

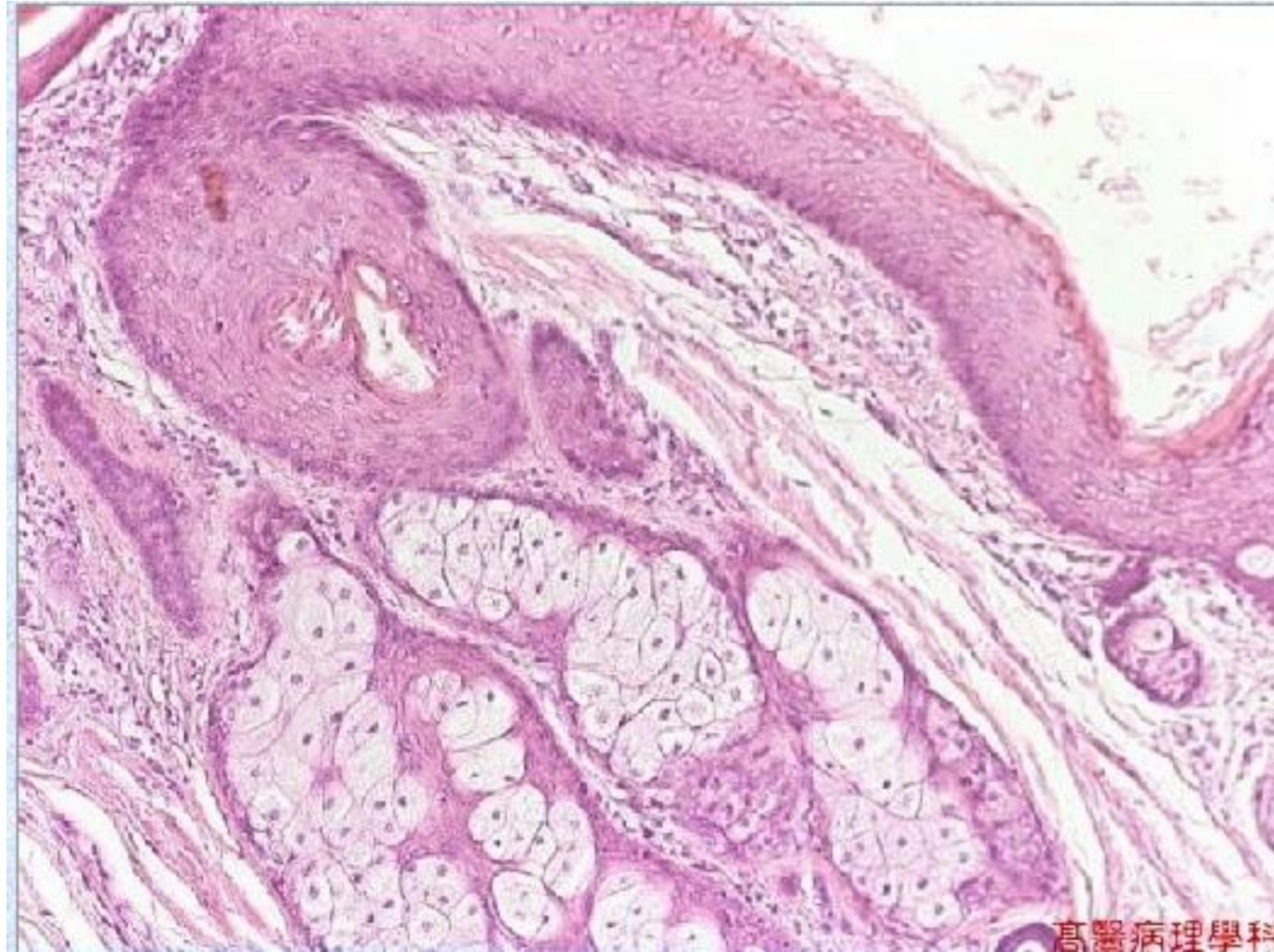
Teratoma



رنگه
صهه



va Teratoma



Dermoid
Cyst

Mature skin with sebaceous glands and hair follicles.

高醫病理學科

❖ Misnomers



- There are some inappropriate usages. For instance, benign-sounding designations such as lymphoma, melanoma, mesothelioma, and seminoma are used for certain malignant neoplasms

+ Dysgerminoma

- **Hamartoma** is a mass of disorganized tissue resembling the involved site, such as the lung or the liver.
- ✓ Although historically thought of as developmental malformations, hamartomas have clonal chromosomal aberrations that are acquired through somatic mutations and are best considered unusual benign neoplasms.
- **Choristoma** is a congenital anomaly consisting of a heterotopic nest of cells. For example, a small nodule of pancreatic tissue may be found in the submucosa of the stomach, duodenum, or small intestine → The designation -oma, connoting a neoplasm, gives these lesions an undeserved gravity, as they are usually trivial.



Tissue of Origin	Benign	Malignant
Tumors Composed Predominantly of a Single Cell Type		
Connective tissue and derivatives	Fibroma	Fibrosarcoma
	Lipoma	Liposarcoma
	Chondroma	Chondrosarcoma
	Osteoma	Osteosarcoma
Endothelium and related cell types		
Blood vessels	Hemangioma	Angiosarcoma
Lymph vessels	Lymphangioma	Lymphangiosarcoma
Mesothelium		Mesothelioma
Brain coverings	Meningioma	Invasive meningioma
Blood cells and related cell types		
Hematopoietic cells		Leukemias
Lymphoid tissue		Lymphomas
Muscle		
Smooth	Leiomyoma	Leiomyosarcoma
Striated	Rhabdomyoma	Rhabdomyosarcoma



Skin		
Stratified squamous	Squamous cell papilloma	Squamous cell or epidermoid carcinoma
Basal cells of skin or adnexa		Basal cell carcinoma
Tumors of melanocytes	Nevus	Melanoma
Epithelial lining of glands or ducts	Adenoma	Adenocarcinoma
	Papilloma	Papillary carcinomas
	Cystadenoma	Cystadenocarcinoma
Lung	Bronchial adenoma	Bronchogenic carcinoma
Kidney	Renal tubular adenoma	Renal cell carcinoma
Liver	Hepatic adenoma	Hepatocellular carcinoma
Bladder	Urothelial papilloma	Urothelial carcinoma
Placenta	Hydatidiform mole	Choriocarcinoma
Testicle		Seminoma Embryonal carcinoma
Ovary	Serous cystadenoma, mucinous cystadenoma	Serous cystadenocarcinoma, mucinous cystadenocarcinoma

Tumors Composed of Multiple Cell Types Normally Derived From the Same Germ Cell Layer

Salivary glands	Pleomorphic adenoma (mixed tumor of salivary gland)	Malignant mixed tumor of salivary gland
Renal anlage		Wilms tumor

Tumors Composed of Multiple Cell Types Normally Derived From More Than One Germ Cell Layer

Totipotential cells in gonads or in embryonic rests	Mature teratoma, dermoid cyst	Immature teratoma, teratocarcinoma
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