

CLASSIFICATION OF TUMORS

Editing File

Objectives:

- ★
- ★ Definitions: neoplasm, tumor, oncology.
- ★ Classification of tumors into benign and malignant.
- ★ Nomenclature of tumors.
- ★ Characteristics of benign and malignant tumors.
- ★ Definitions: teratoma, hamartoma, choristoma.

Color Code:

Female's Notes

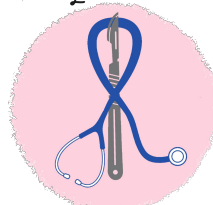
Male's Notes

Important

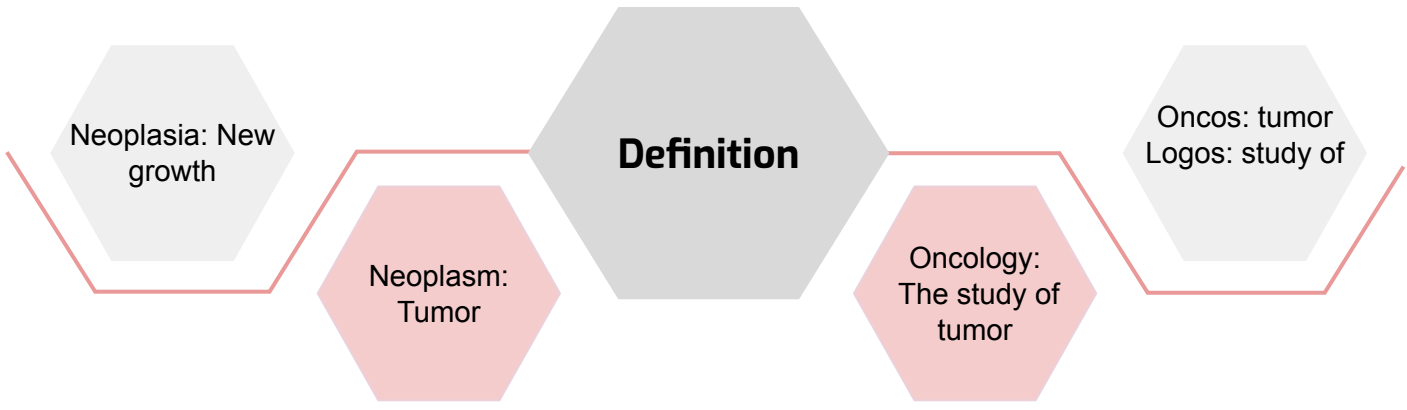
Extra



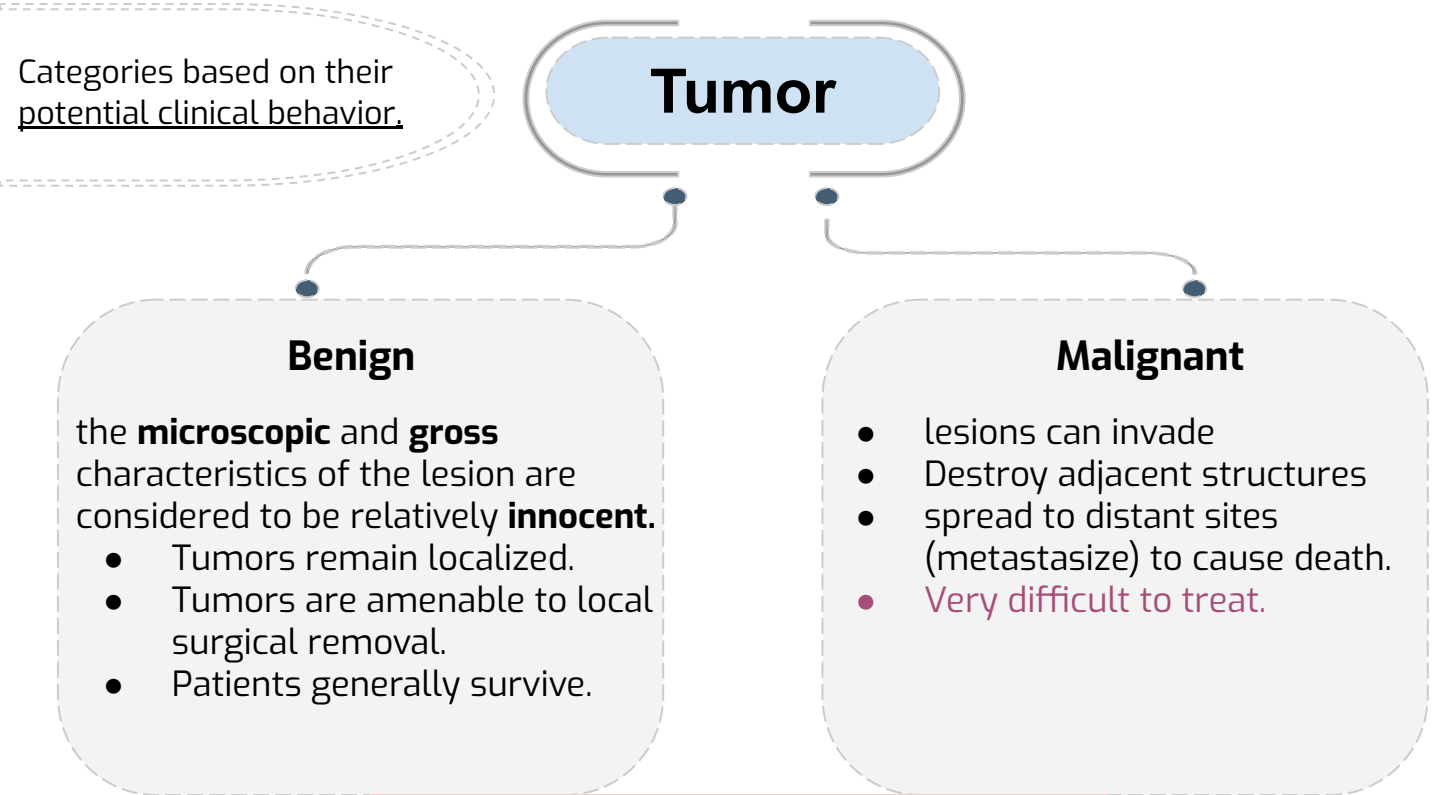
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Neoplasia



Classification of Tumors



Tumors basic components

The parenchyma

- Made up of **transformed or neoplastic cells**.
- The **nomenclature of tumors and their biologic behavior** are based primarily on the parenchymal component.

The supporting stroma

- Host-derived, non-neoplastic stroma, made up of **connective tissue, blood vessels, and host-derived inflammatory cells**.
- The **growth and evolution** of tumors is critically dependent on their stroma as an adequate stromal blood supply is a requisite for the tumor cells to live and divide.

Nomenclature of Tumors - Benign

Benign tumors are designated by attaching the **suffix-oma** to the cell type from which the tumor arises.

Has exceptions (slide7)

Mesenchymal tumors

Fibroma: a benign tumor arising in **fibrous tissue**.

Chondroma: a benign tumor arising in **cartilaginous tissue**.

Osteoma: a benign tumor arising in **bone tissue**.

Epithelial tumors

The nomenclature of benign epithelial tumors is more complex depends on:

- cell of origin
- microscopic pattern or macroscopic appearance.

→ **Adenoma:** producing gland patterns and to neoplasms derived from glands but not necessarily exhibiting glandular patterns.

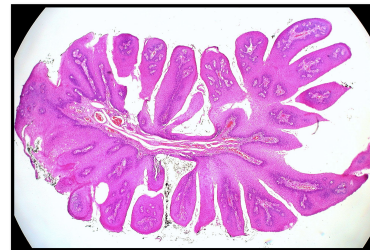
Forming glands under the microscope or arising from glands

→ **Papillomas:** neoplasms producing microscopically or macroscopically visible **finger-like or warty projections** from epithelial surfaces.

Papillomas Macroscopically



Papillomas Microscopically

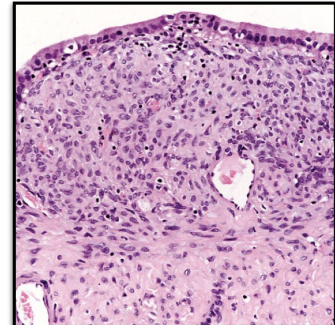


→ **Cystadenomas:** forming large **cystic masses**, as in the ovary.

Cystadenomas Macroscopically

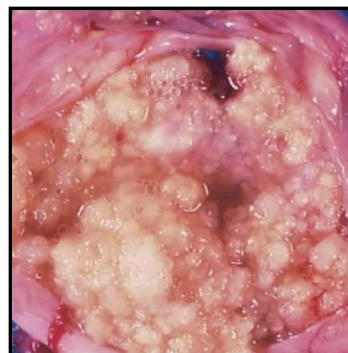


Cystadenomas Microscopically

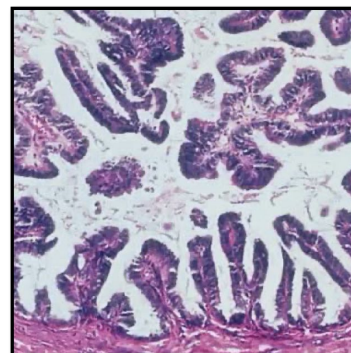


→ **papillary cystadenomas:** some of the latter produce papillary patterns that protrude into cystic spaces.

Papillary cystadenoma Macroscopically



Papillary cystadenoma Microscopically



Nomenclature of Tumors - Malignant

Malignant neoplasms arising in mesenchymal tissues are called **sarcomas**

Malignant tumors have no exceptions.

Mesenchymal Tumors (sarcomas)

Fibrosarcoma: a malignant tumor arising in **fibrous tissue**.

Chondrosarcoma: a malignant tumor arising in **cartilaginous tissue**.

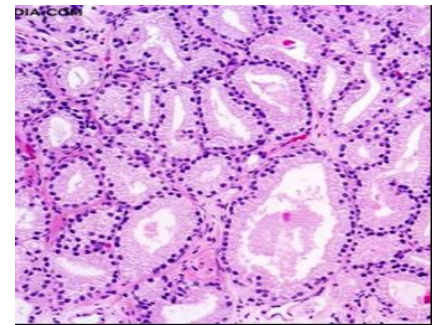
Osteosarcoma: a malignant tumor arising in **bone tissue**.

Malignant neoplasms arising in epithelial cells are called **carcinomas**

Epithelial Tumors (carcinomas)

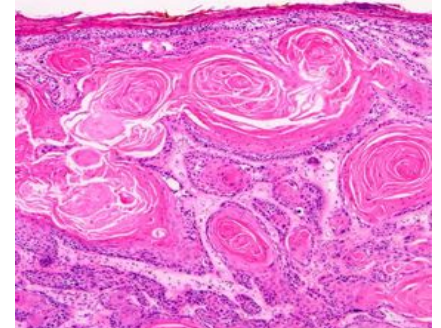
• **Adenocarcinomas:** Carcinomas arising from glandular epithelial cells (with or without forming glands)

Adenocarcinomas Microscopically



• **Squamous cell carcinomas:** Carcinomas arising from squamous cell (some producing keratin).
Example: Skin

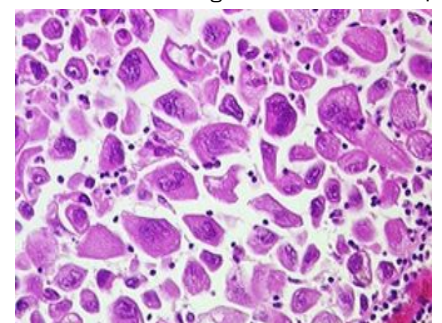
Squamous cell carcinomas Microscopically



• **Poorly differentiated carcinomas (undifferentiated carcinomas):** shows little or no differentiation. (When the tumor is so bad we can't know if it is adenocarcinoma or squamous cell carcinoma, it is called undifferentiated carcinoma)

Undifferentiated malignant tumor: a tumor that is composed of undifferentiated cells of **unknown tissue origin**. (we know it is malignant but we don't know if it is epithelial or mesenchymal, so we just call it undifferentiated malignant tumor)

Undifferentiated malignant tumor Microscopically



Nomenclature of Tumors

The transformed cells in a neoplasm, whether benign or malignant, often **resemble each other** (why?), because they all had been **derived from a single progenitor** (منشأ) **cell**, consistent with the monoclonal origin of tumors.

HOWEVER!

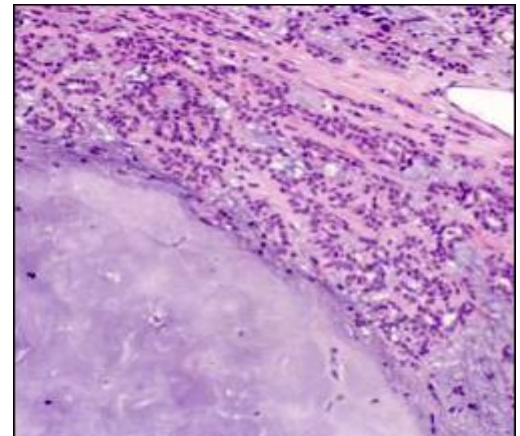
In some unusual instances, **divergent differentiation** of a single neoplastic clone along two lineages occurs, creating **Mixed Tumors**

Example on mixed tumors: **pleomorphic adenoma of the salivary gland**, they have obvious epithelial components dispersed (مبعثر) throughout a fibromyxoid stroma. Sometimes harboring islands of cartilage or bone. **All these diverse element derive from a single clone capable of giving rise to epithelial cells, or myoepithelial cells, or both.**

Pleomorphic adenoma Macroscopically



Pleomorphic adenoma Microscopically



Teratoma

Definition

Special type of mixed tumor, contains recognizable mature or immature cells or tissues and representative of more than one **germ cell layer** and sometimes all three

Origin

From Totipotential (pluripotent) cells such as those normally present in the **ovary and testis**, abnormally present in sequestered midline embryonic rests. These cells **have the capacity to differentiate into any cell type found in adult body**

Types

Benign (mature): all components within teratoma are **well differentiated**

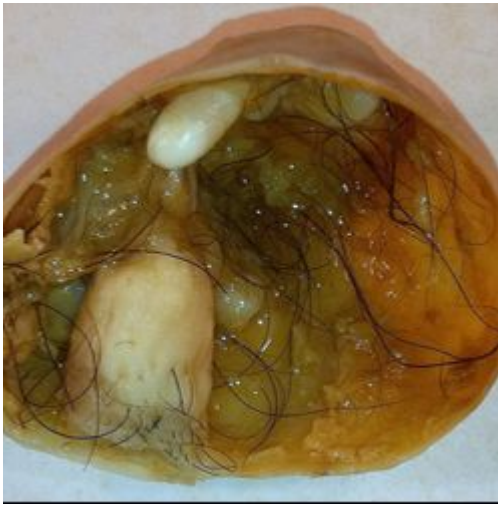
Malignant (immature): components within teratoma are **less differentiated**

In females:
Mature: benign
Immature: malignant

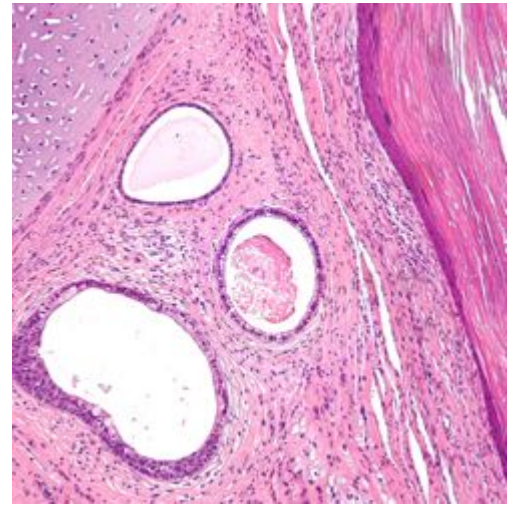
In males:
Pre puberty: benign
Post Puberty: malignant

Teratoma Cont.

Teratoma Macroscopically



Teratoma Microscopically



Hamartoma

Definition

Mass of disorganized benign-looking tissue to indigenous to the particular site.

It is benign, disorganized but correct location

Origin

Could be developmental malformations, or acquired translocation suggesting a neoplastic origin.

Example

Pulmonary chondroid hamartoma, contains **disorganized but histologically normal** cartilage, bronchi, vessels.

Choristoma

Definition

Congenital anomaly of a heterotopic rest of cells.
It is benign, organized but wrong location

Choristoma has usual trivial significance

Example

Small nodule of well-developed and **normally organized** pancreatic tissue found in submucosa of stomach, duodenum, or small intestine

Polyps

Definition

Mass that projects above the mucosal surface, as in the gut, to form macroscopically visible structure.

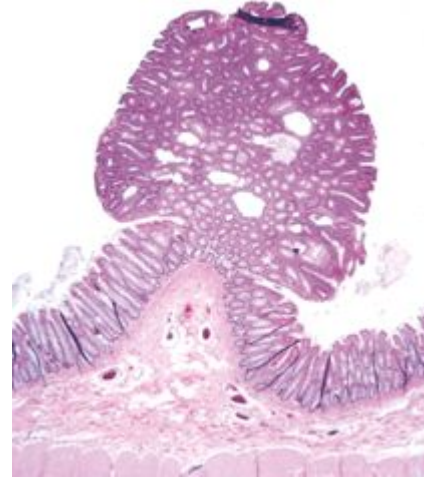
Origin

Could be developmental or has a neoplastic origin (benign tumor)

Polyp Macroscopically



Polyp Microscopically



Exceptions of tumors nomenclature

★ Important



These Tumors end with -OMA but they are **malignant NOT benign**

Summary

Although the terminology of neoplasms is regrettable not simple, a firm grasp of the nomenclature is important because it is the language by which the nature and significance of tumors are categorized.

Summary

ادعو دعاء السفر

Tissue of origin	Benign	Malignant
Composed of one parenchymal cell type		
Connective tissue and derivatives :	Fibroma Lipoma Chondroma Osteoma	Fibrosarcoma Liposarcoma Chondrosarcoma Osteogenic sarcoma
Endothelial and related tissue		
Blood vessels	Hemangioma	Angiosarcoma
Lymph vessels	Lymphangioma	Lymphangiosarcoma
Mesothelium		Mesothelioma
Brain coverings	Meningioma	invasive meningioma
Blood vessels and related cells		
Hematopoietic cells		Leukemia
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 adnexa		Basal cell carcinoma
Tumors of melanocytes	nervus	Malignant melanoma

Summary

Tissue of origin	Benign	Malignant
Epithelial lining of gland or ducts	adenoma Papilloma cystadenoma	adenosarcoma Papillary carcinomas cystadenocarcinoma
Lung	Bronchial adenoma	Bronchogenic carcinoma
Kidney	Renal tubular adenoma	Renal cell carcinoma
liver	Liver cell adenoma	Hepatocellular carcinoma
bladder	Urothelial papilloma	Urothelial carcinoma
placenta	Hydatidiform mole	choriocarcinoma
testicle		Seminoma Embryonal carcinoma
More than one neoplastic cell type-mixed tumors, usually derived from one germ cell layer		
Salivary glands	pleomorphic adenoma (mixed tumor of salivary gland)	Malignant mixed tumor of salivary gland
Renal anlage		Wilms tumor
More than one neoplastic cell type derived from more than one germ layer-Teratogenous		
Totipotential cells in gonads or in embryonic rests	Mature teratoma, dermoid cyst	Immature teratoma, teratocarcinoma

Summary

Nomenclature of Tumors

Arising from connective tissue

Mesenchymal

Arising from epithelial cells البطانة

Epithelial

Benign

- Fibroma
- Chondroma
- Osteoma

Malignant

- Fibrosarcoma
- Chondrosarcoma
- Osteosarcoma

Benign

- Adenoma
- papillomas
- cystadenomas
- Papillary cystadenomas

Malignant

- Adenocarcinomas
- Squamous cell carcinoma
- Undifferentiated carcinoma

E.g pleomorphic adenoma of the salivary gland

Mixed tumor

Mixed tumor contain **mature** or **immature** cells or tissues

Tretanoma

Undifferentiated malignant tumors

hamartoma

Benign - disorganized - correct location

christoma

Benign - organized - abnormal location

Polyp

Mass that projects above the mucosal surface

Exceptions Nomenclature

- Lymphoma (malignant tumor from lymphocyte)
- Mesothelioma (malignant tumor from mesothelium cell)
- Melanoma (malignant tumor from melanocyte)
- Seminoma (malignant tumor from testis)

1 A 40-year-old man has a positive stool guaiac test during a routine physical examination. A colonoscopy is performed and a 0.9-cm, circumscribed, pedunculated mass on a short stalk is found in the upper rectum. Which of the following terms best describes this lesion?

- A Adenoma
- B Carcinoma
- C Choristoma
- D Hamartoma
- E Hyperplasia
- F Sarcoma

1 A A discrete small mass such as that described is probably benign. Adenomas arise from epithelial surfaces. Though adenocarcinoma may arise from a colonic adenoma, such malignant lesions tend to be larger and more irregular. A choristoma is a benign mass composed of tissues not found at the site of origin. A hamartoma is a rare benign mass composed of tissues usually found at the site of origin. A hyperplastic colonic lesion tends to be smaller and flatter. A sarcoma is a malignant neoplasm arising in mesenchymal tissues, not in epithelium.

PBD9 266–268 BP9 162–163 PBD8 260 BP8 174–175

2 A 32-year-old woman has experienced dull pelvic pain for the past 2 months. Physical examination shows a right adnexal mass. An abdominal ultrasound scan shows a 7.5-cm cystic ovarian mass. The mass is surgically excised. The surface of the mass is smooth, and it is not adherent to surrounding pelvic structures. On gross examination, the cystic mass is filled with hair. Microscopically, squamous epithelium, tall columnar glandular epithelium, cartilage, and fibrous connective tissue are present and resemble normal tissue counterparts. Which of the following is the most likely diagnosis?

- A Adenocarcinoma
- B Fibroadenoma
- C Glioma
- D Hamartoma
- E Mesothelioma
- F Rhabdomyosarcoma
- G Teratoma

2 G A teratoma is a neoplasm derived from totipotential germ cells that differentiate into tissues that represent all three germ layers: ectoderm, endoderm, and mesoderm. When the elements all are well differentiated, the neoplasm is “mature” (benign). Adenocarcinomas have malignant-appearing glandular elements. Fibroadenomas have a benign glandular and stromal component; they are common in the breast. Gliomas are found in the central nervous system. Hamartomas contain a mixture of cell types common to a tissue site; the lung is one site for this uncommon lesion. A mesothelioma arises from the lining of thoracic and abdominal body cavities. A rhabdomyosarcoma comprises cells that poorly resemble striated muscle; most arise in soft tissues.

PBD9 267–268 BP9 163–164 PBD8 261–262 BP8 175

★ MCQs

Q1: Malignant neoplasms arising in mesenchymal tissues are called:

- | | | | |
|--------------|------------|------------|--------------|
| A. Carcinoma | B. Adenoma | C. Sarcoma | D. Papilloma |
|--------------|------------|------------|--------------|

Q2: Which one of the following is the name of benign tumor arising from gland?

- | | | | |
|-------------------|------------|--------------|------------|
| A. Chondrosarcoma | B. Adenoma | C. Chondroma | D. Fibroma |
|-------------------|------------|--------------|------------|

Q3: An osteoma is a _____ tumor that arises in _____ tissues

- | | | | |
|-----------------------------|-----------------------|--------------------------|-----------------|
| A. Malignant, Cartilaginous | B. Malignant, Fibrous | C. Benign, Cartilaginous | D. Benign, Bone |
|-----------------------------|-----------------------|--------------------------|-----------------|

Q4: Malignant Teratoma's components are less differentiated than benign Teratoma,

- | | | | |
|---------|----------|----------------|---------------|
| A. True | B. False | C. Allah knows | D. Ask chaina |
|---------|----------|----------------|---------------|

Q5: Which one of the following is a malignant tumor?

- | | | | |
|-----------------|------------|-------------------|--------------|
| A. Mesothelioma | B. Fibroma | C. Adenocarcinoma | D. Both A, C |
|-----------------|------------|-------------------|--------------|

Q6: The growth and evolution of tumors is critically dependent on their?

- | | | | |
|---------------|-------------|-----------|-------------|
| A. Parenchyma | B. Location | C. Stroma | D. Function |
|---------------|-------------|-----------|-------------|

★ SAQ

Q1: Where do Teratomas originate from?

Slide 5

Q2: What is one example of Choristoma?

Slide 6

Q3: what are the tumors basic components?

Slide 2

If SpongeBob can light a fire under water, **you can pass pathology.**

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