General pathology lab cell injury and inflammation.

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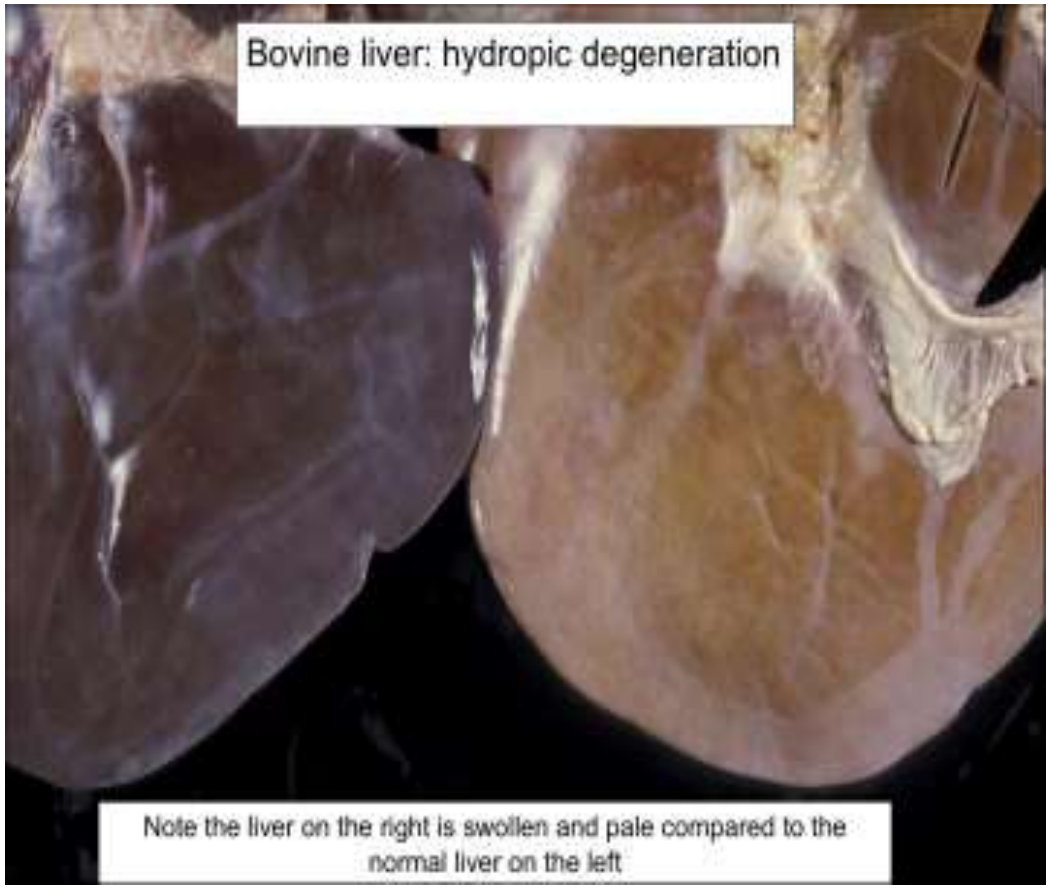
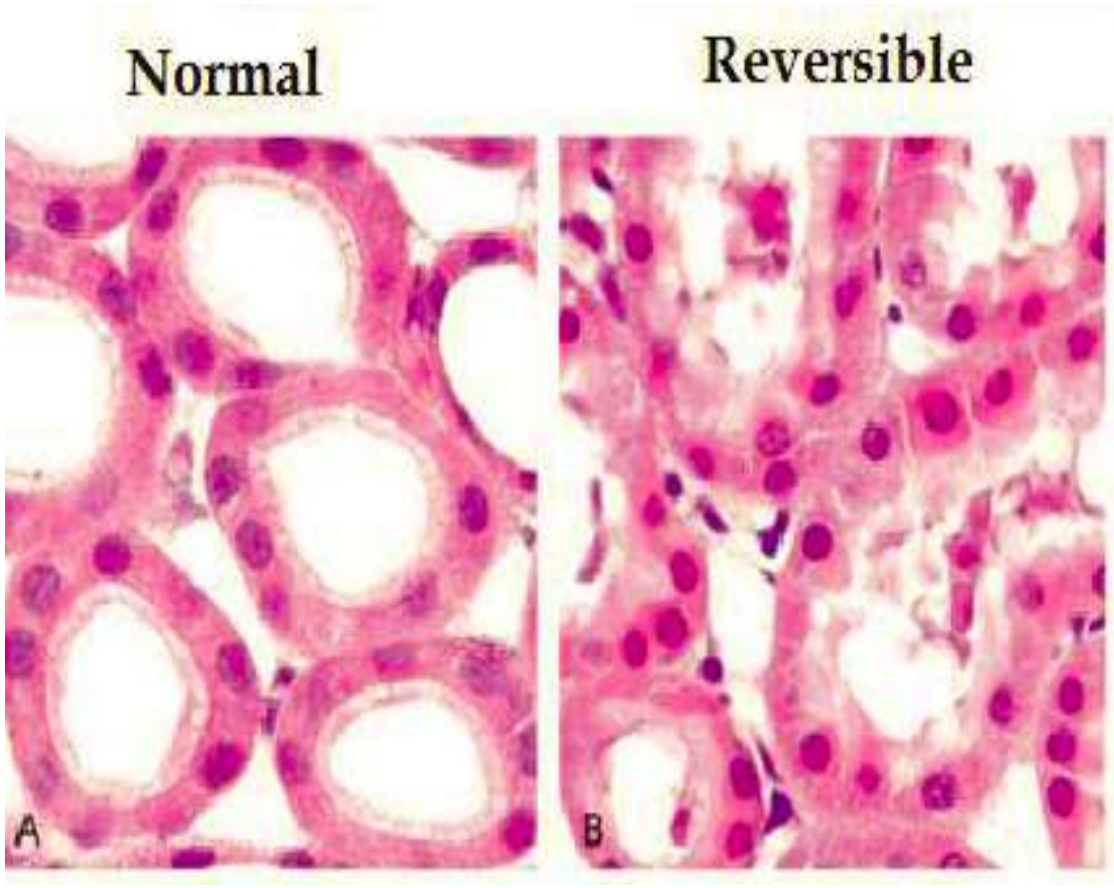
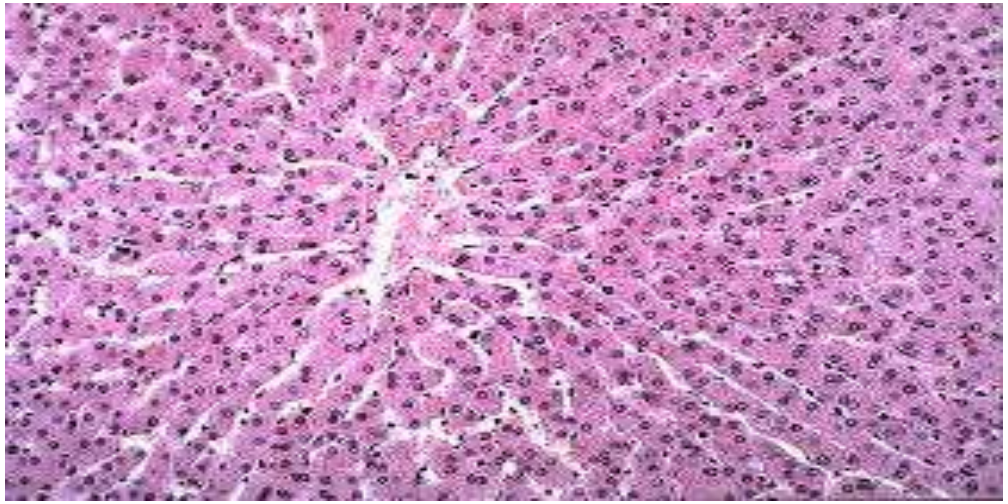
4-11-2024.

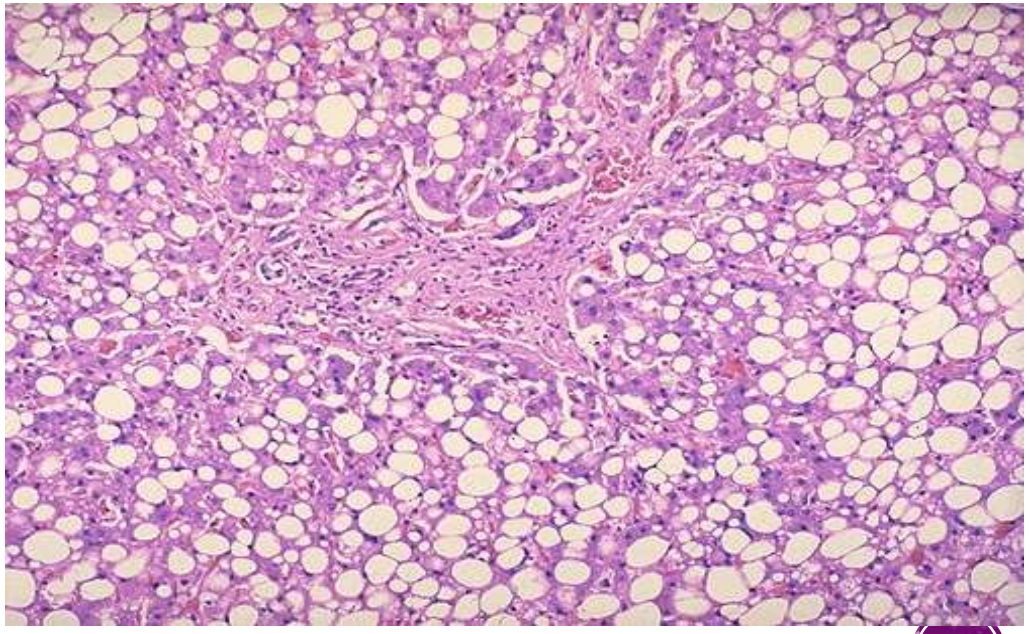
Morphological changes of reversible cell injury:
1. Cellular Swelling



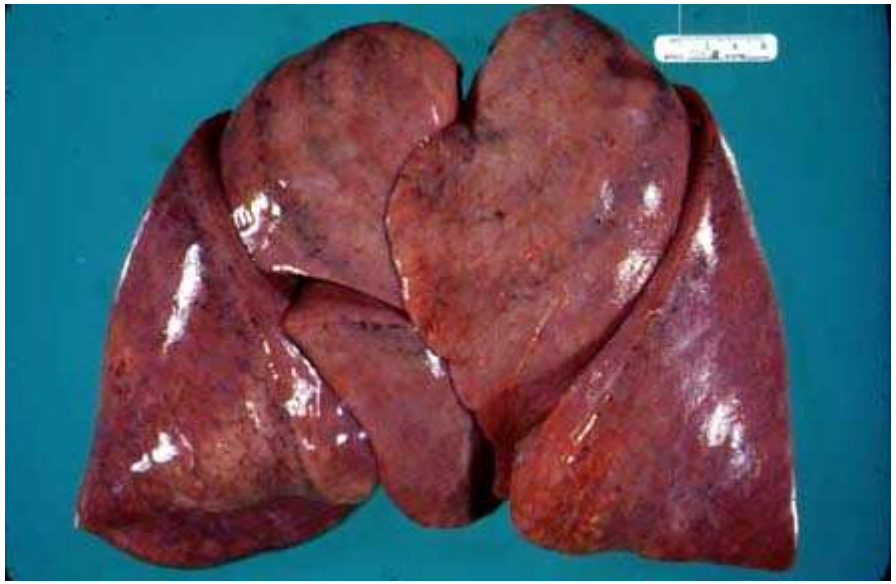


2. Fatty change

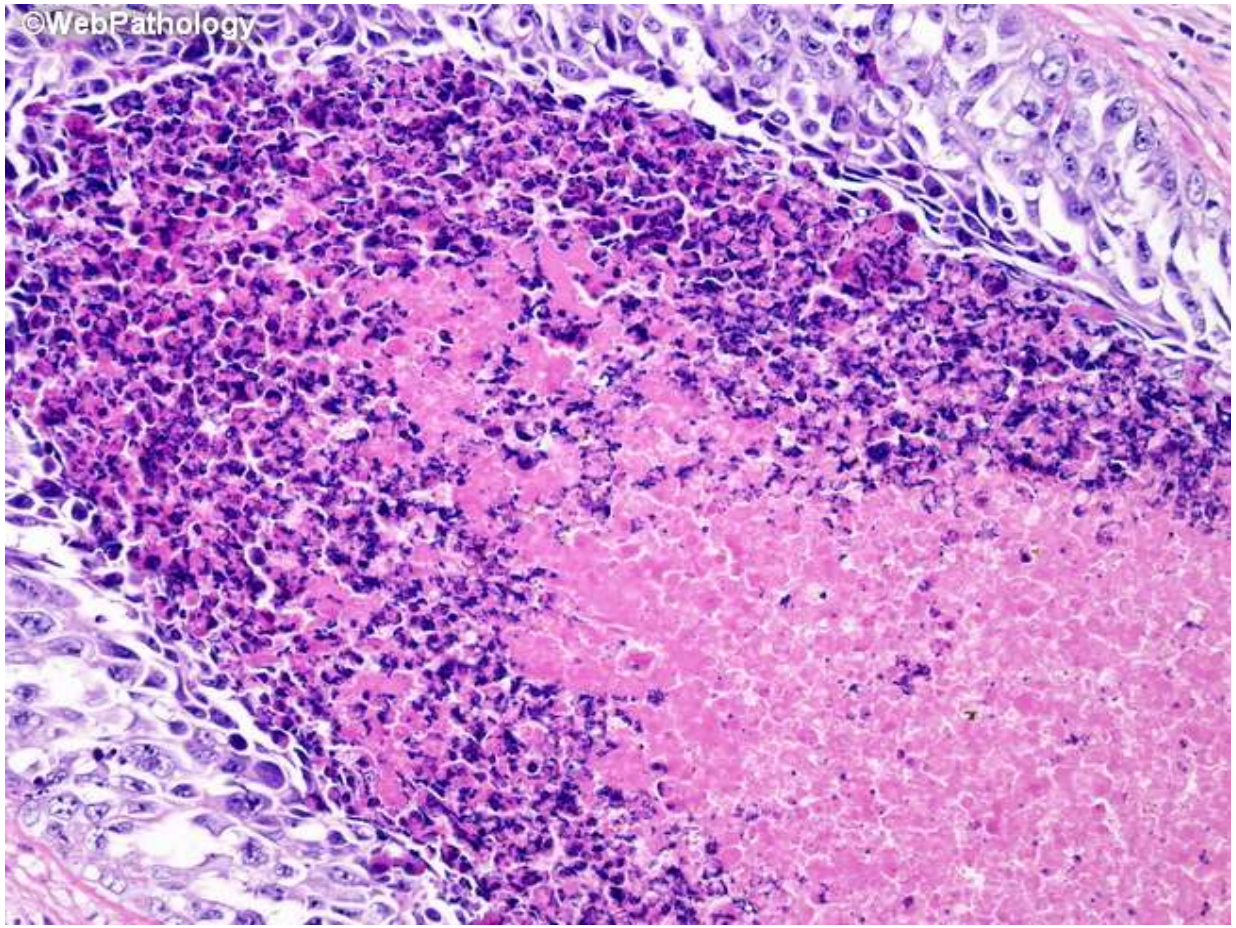


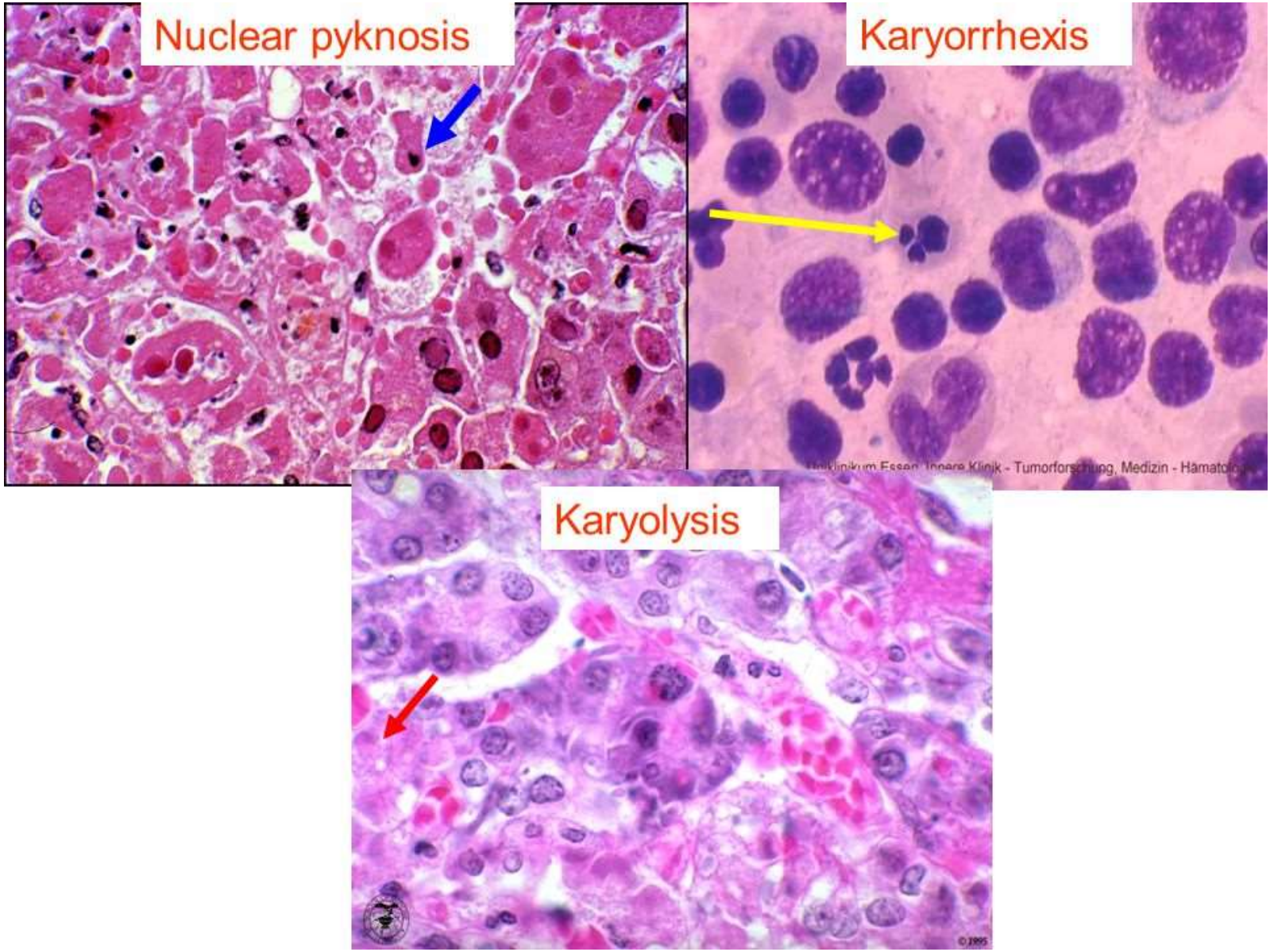


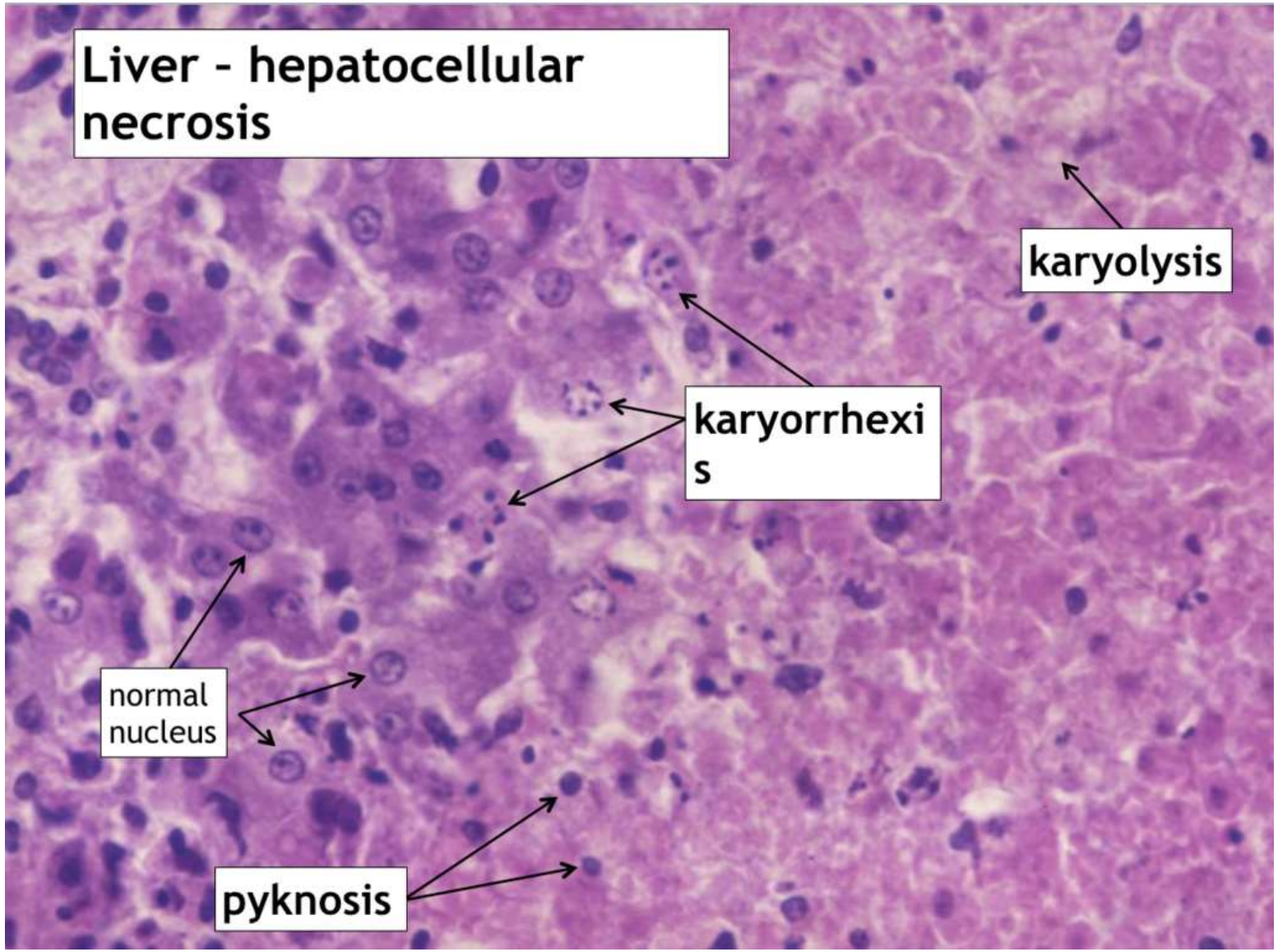
Morphological features of necrosis:
I. Grossly:



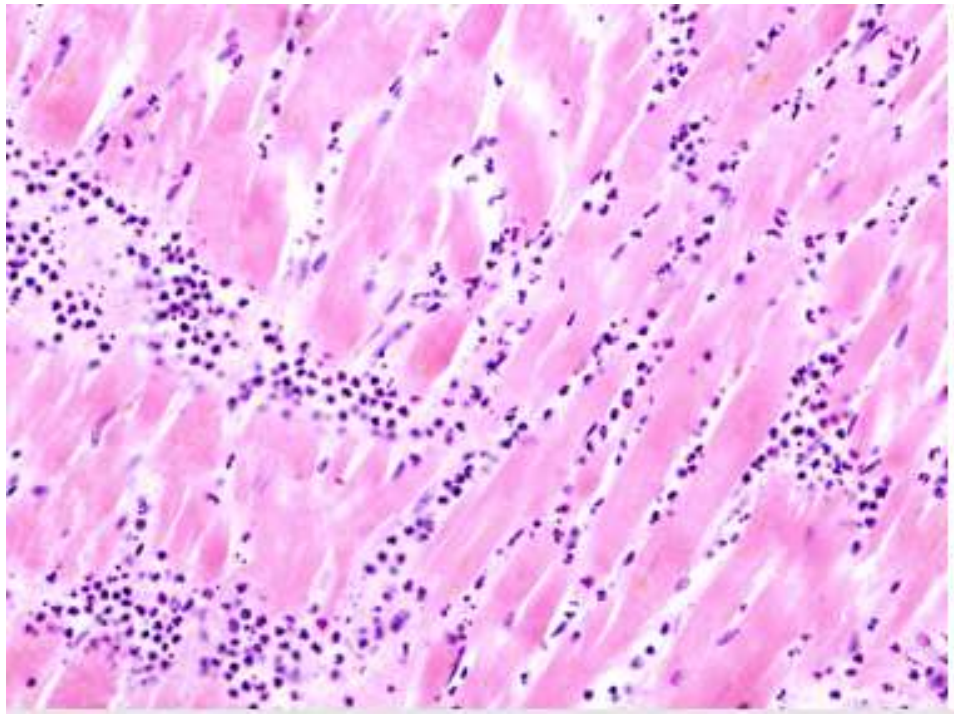
Microscopic appearance of Necrotic dead cells:

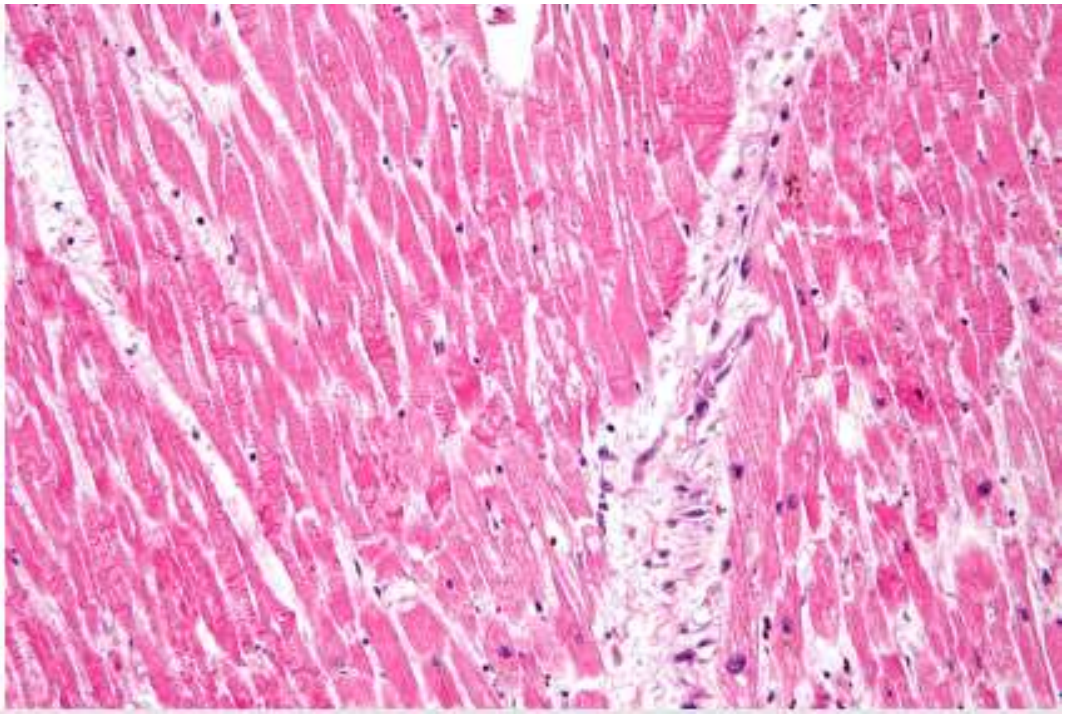



Nuclear pyknosis
Karyorrhexis
Karyolysis

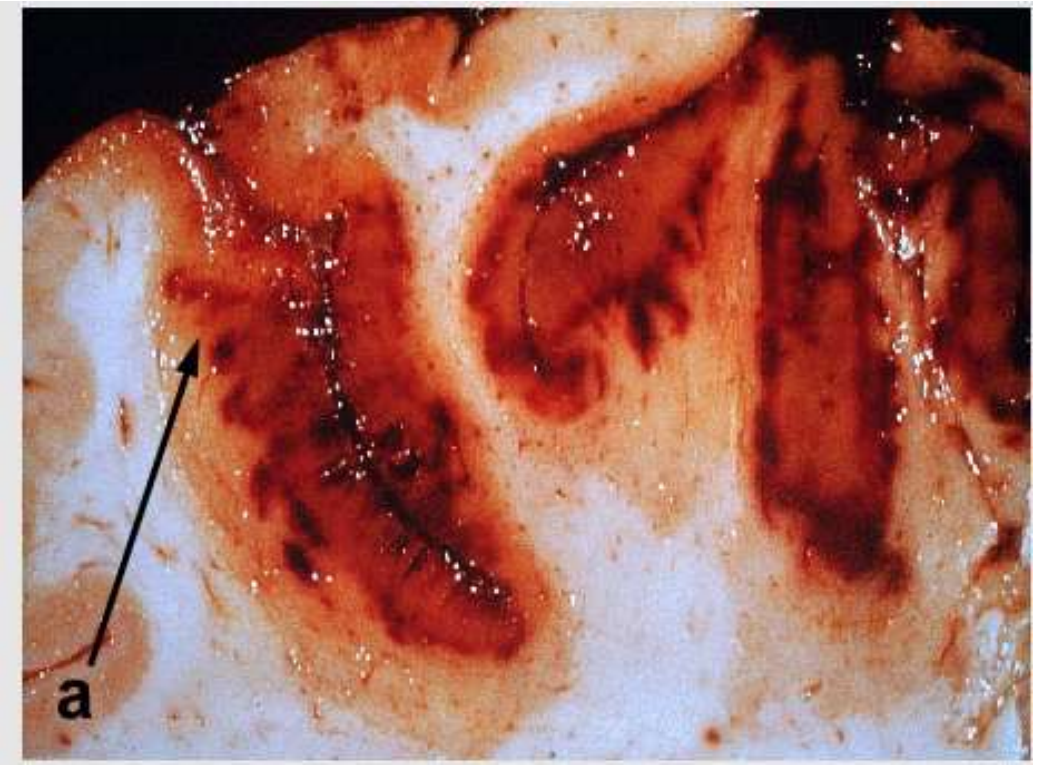

Liver - hepatocellular necrosis
karyolysis
karyorrhexis
normal nucleus
pyknosis

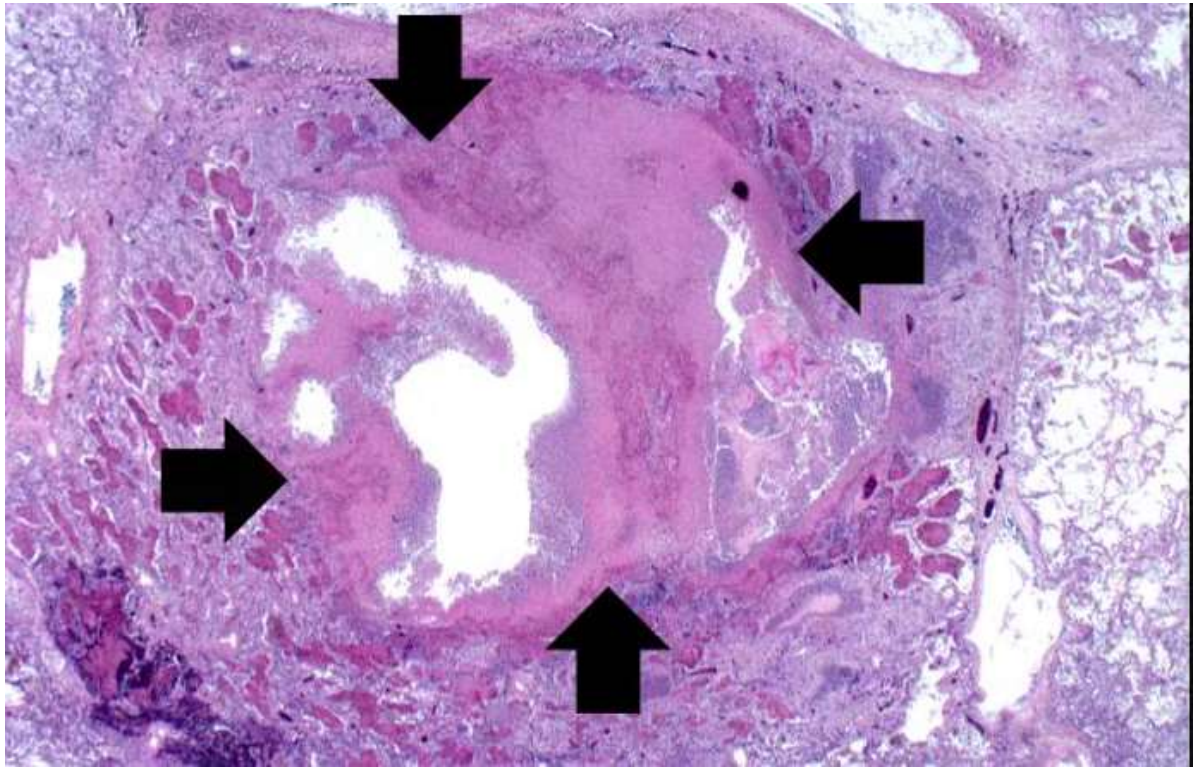
coagulative necrosis n the myocardium after infarction



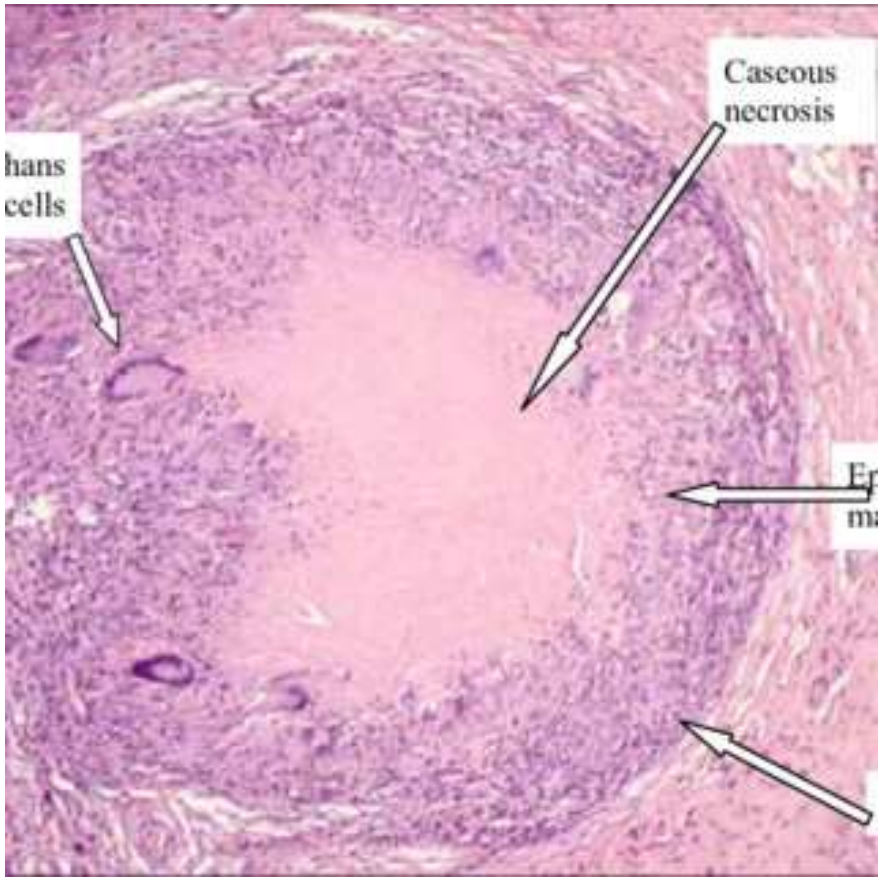


Liquefactive necrosis

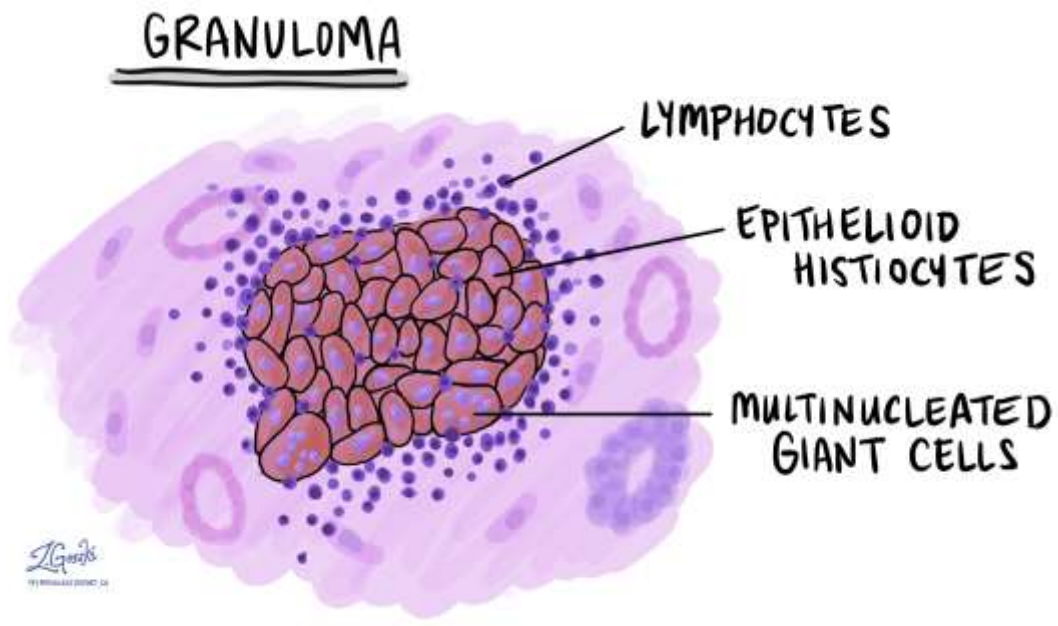


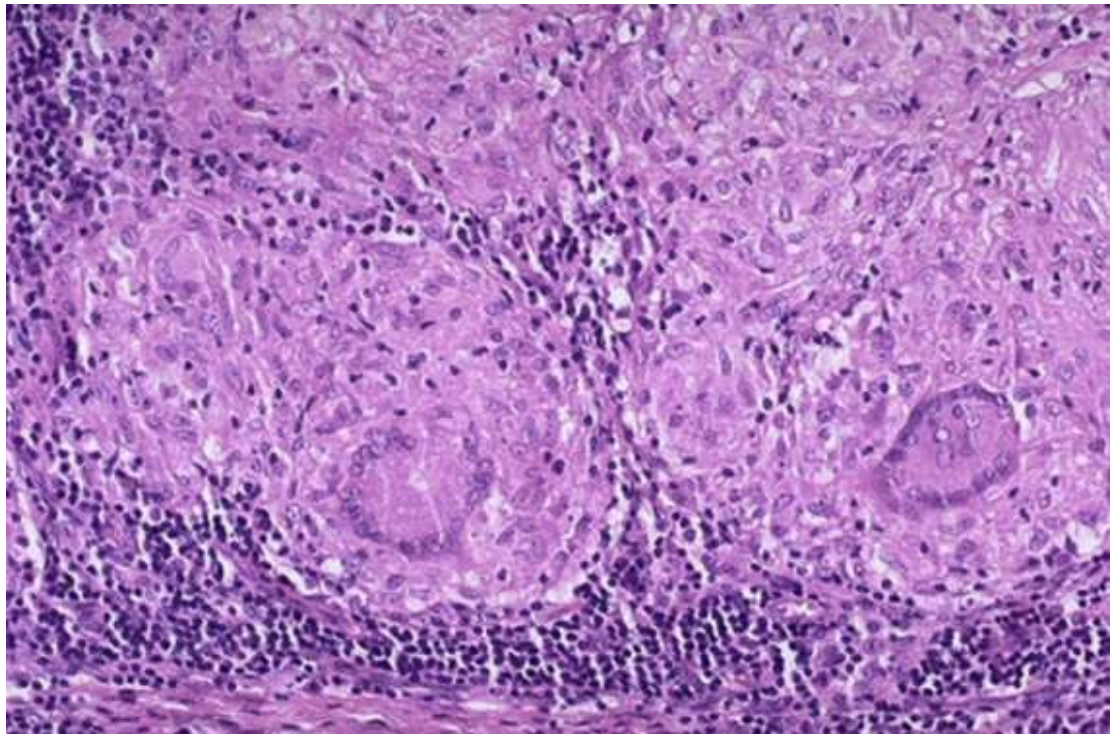


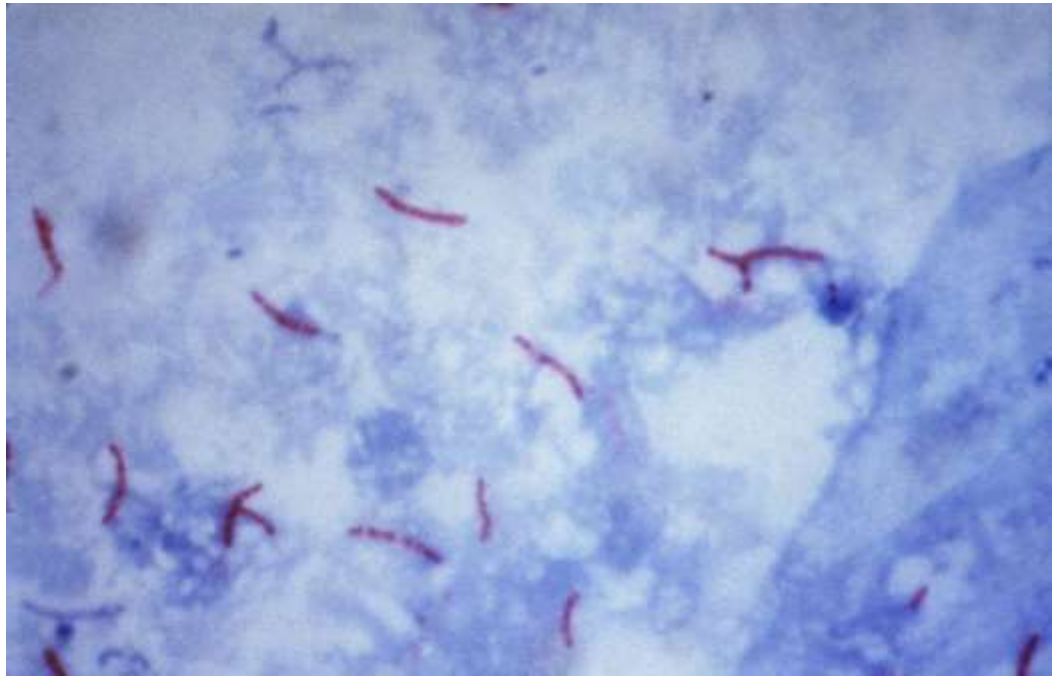
Caseous necrosis



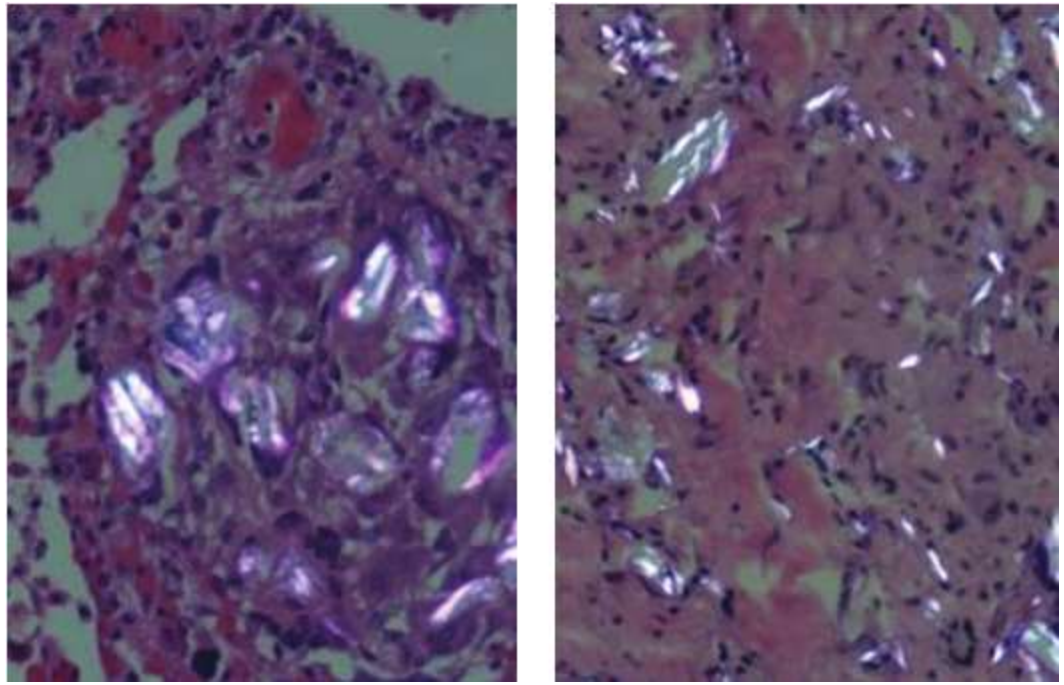
Granuloma structure







M.tuberculosis



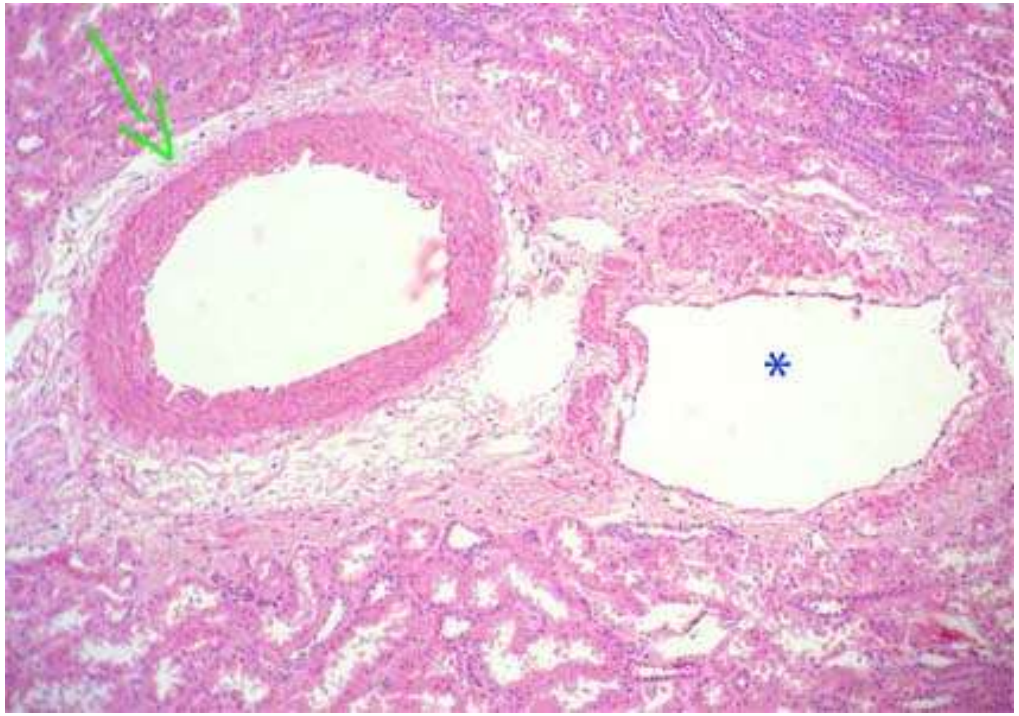
foreign bodies

Fat necrosis

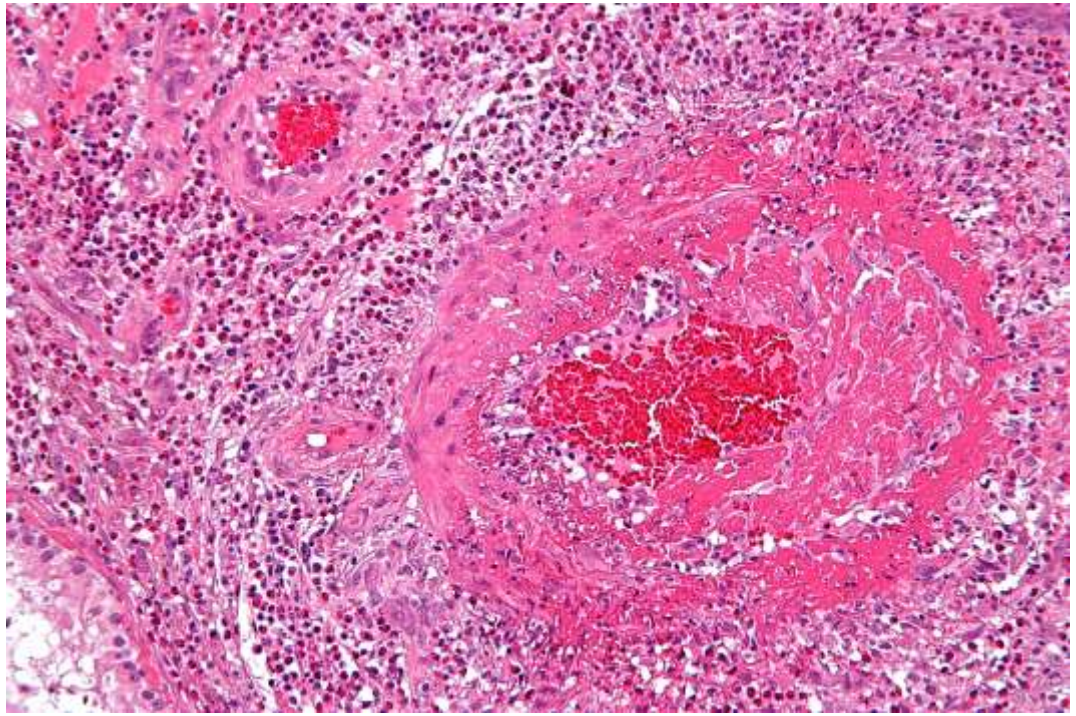
* fatty acids bind and precipitate calcium ions, forming insoluble salts.

* foamy macrophages adjacent to adipose tissue

Fibrinoid necrosis



Normal B.V



Fibrinoid necrosis

Reactions of Blood Vessels in Acute Inflammation

- Vasodilation:

- induced by histamine, acting on vascular smooth muscle
- first involves the arterioles and then leads to the opening of new capillary beds in the area.
- The result is increased blood flow, which is the cause of heat and redness (erythema) at the site of inflammation.

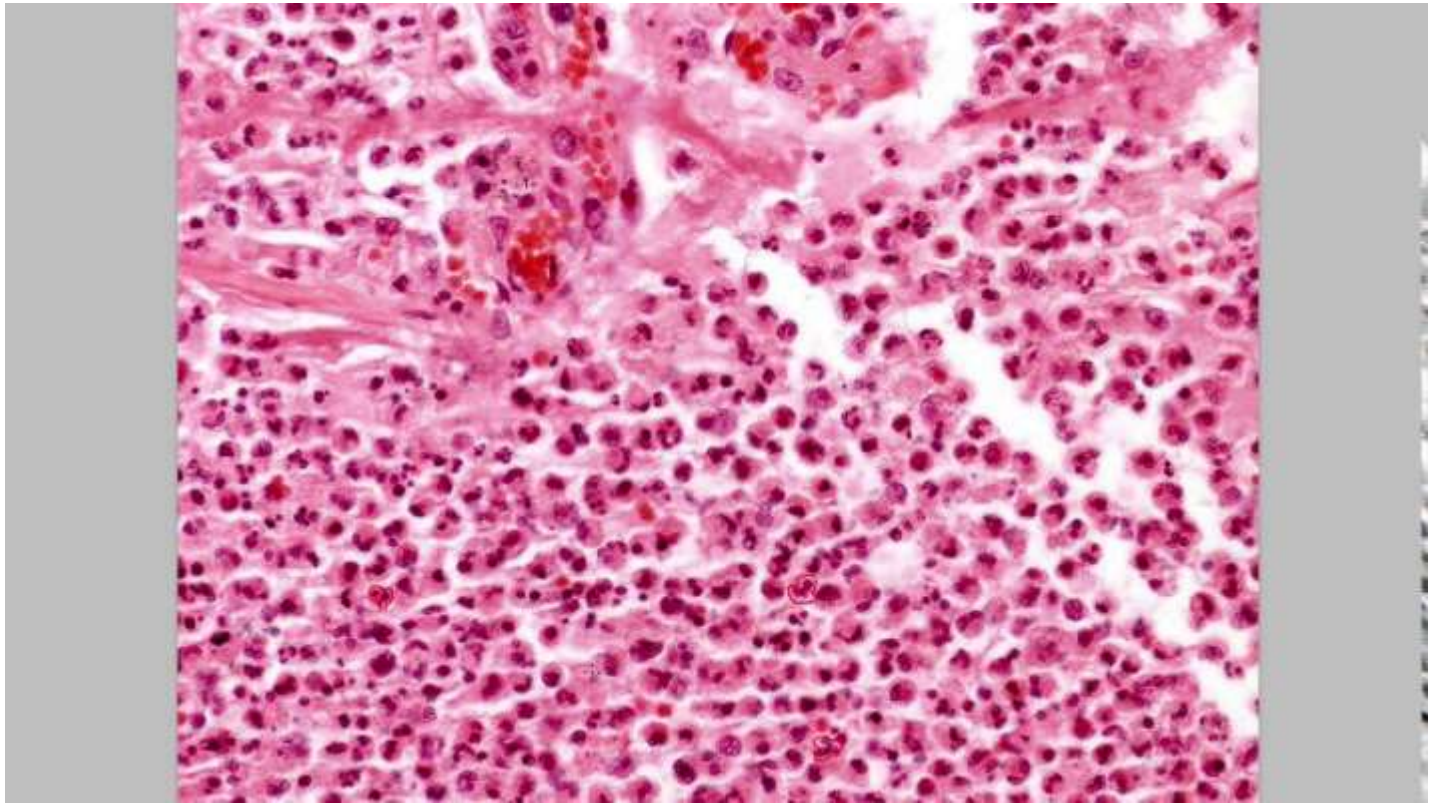
- Edema
- Edema denotes an excess of fluid in the interstitial tissue or serous cavities.

Lymphangitis and lymphadenitis.

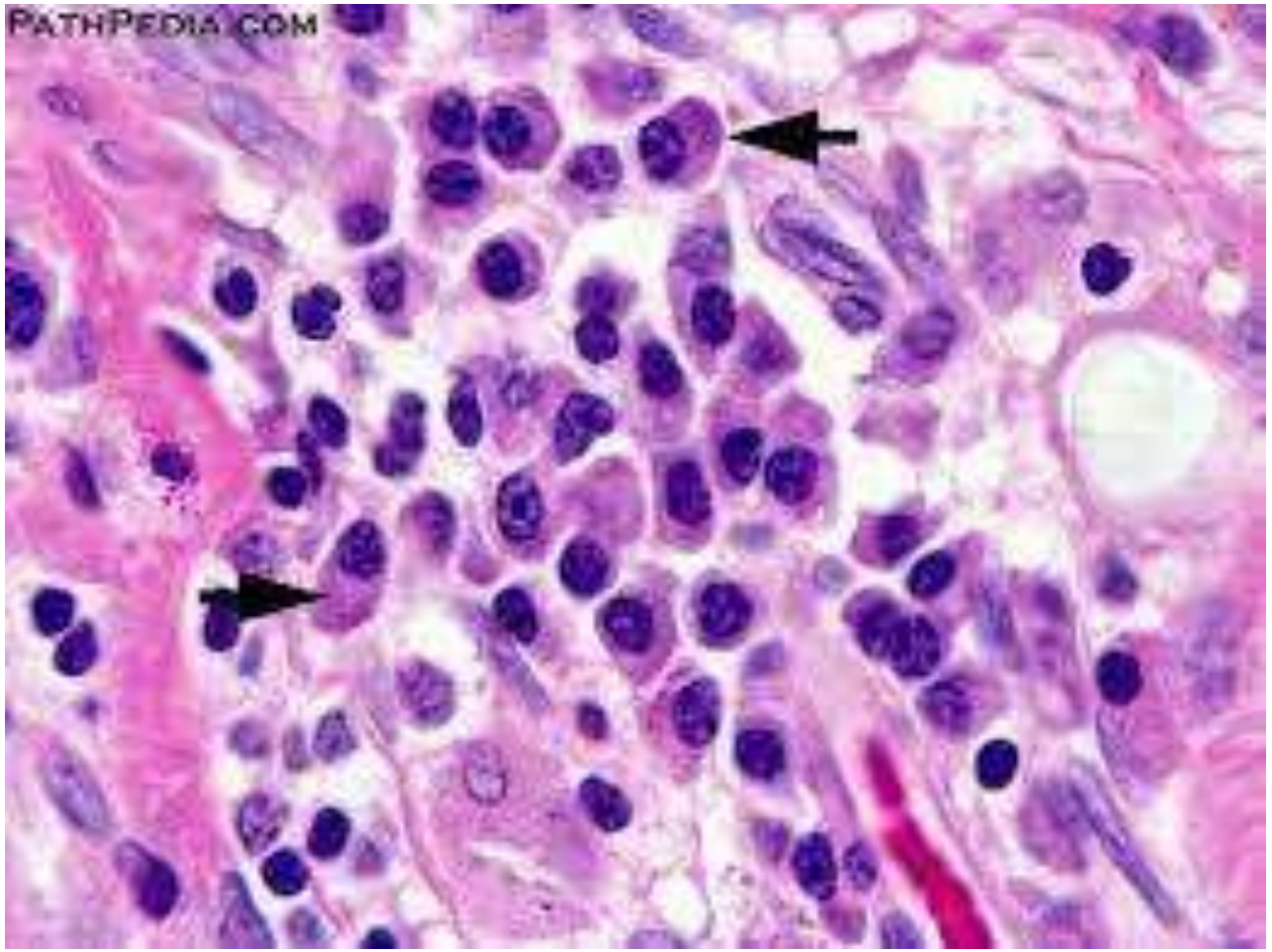
- This streaking follows the course of the lymphatic channels and indicates the presence of lymphangitis

- painful enlargement of the draining lymph nodes, indicating lymphadenitis.

Acute inflammation



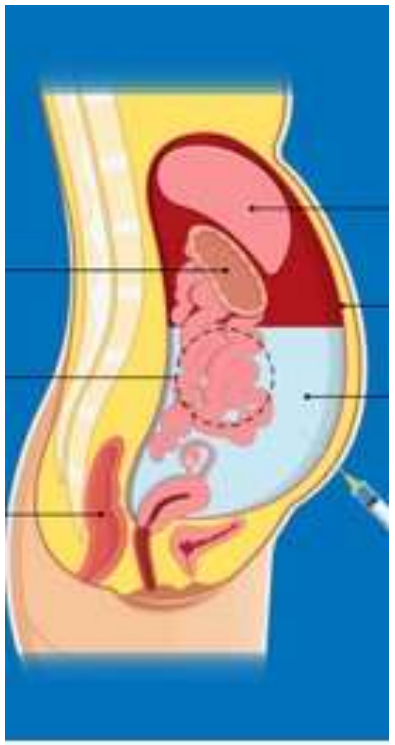
Chronic inflammation



cachexia

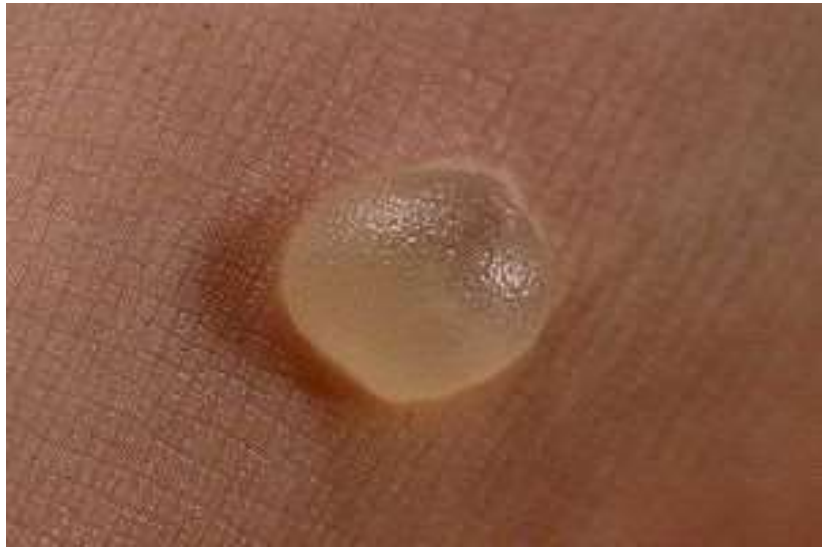
- Pathologic state characterized by weight loss, muscle atrophy, and anorexia that accompanies some chronic infections and cancers. Explained by sustained production of TNF.

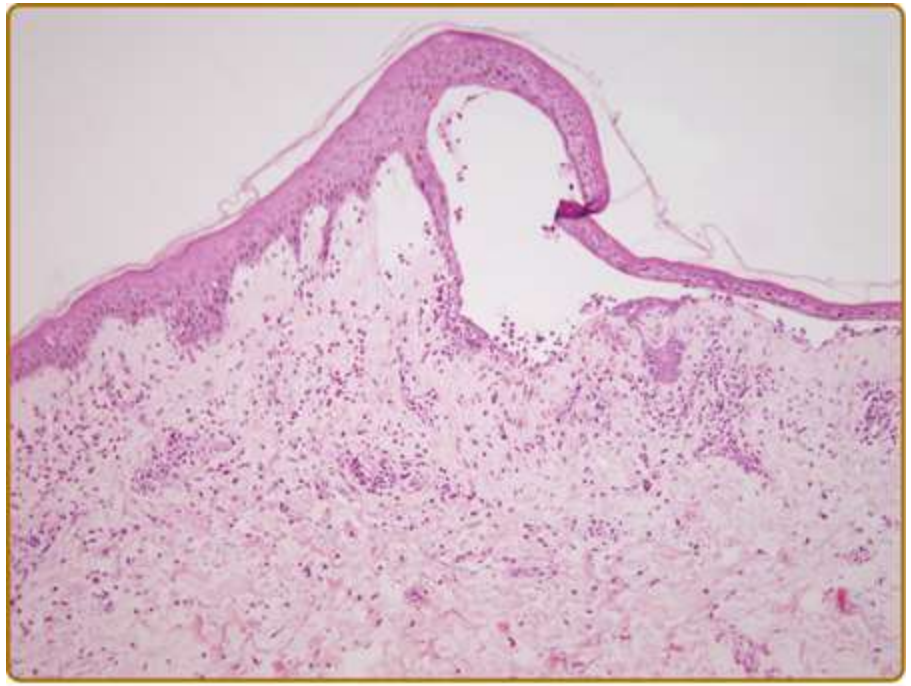
❖Peritoneal effusion an example of serous inflammation



❖skin blister

- Resulting from a burn or viral infection.
- Represents accumulation of serous fluid within or immediately beneath the damaged epidermis of the skin

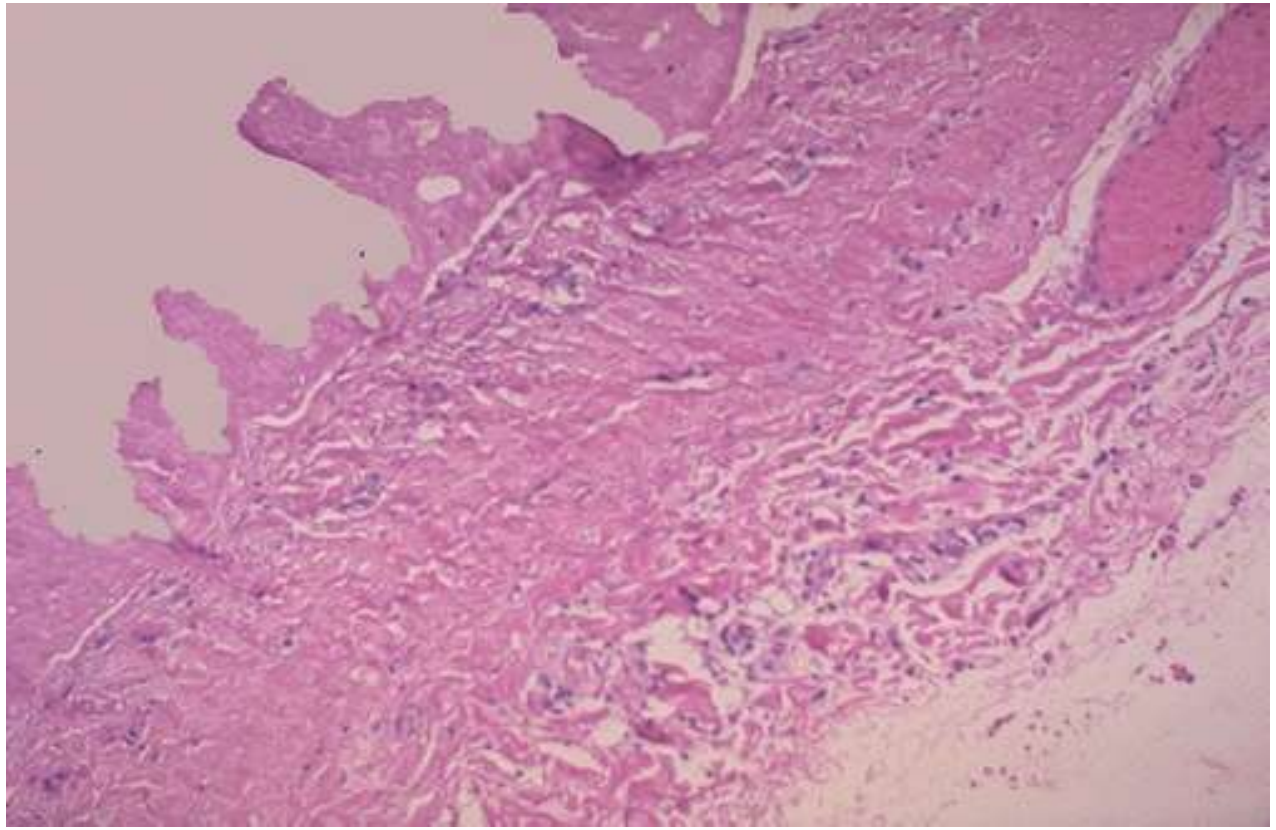




❖Fibrinous inflammation: Grossly

Normally, the visceral **pericardium** is **translucent**

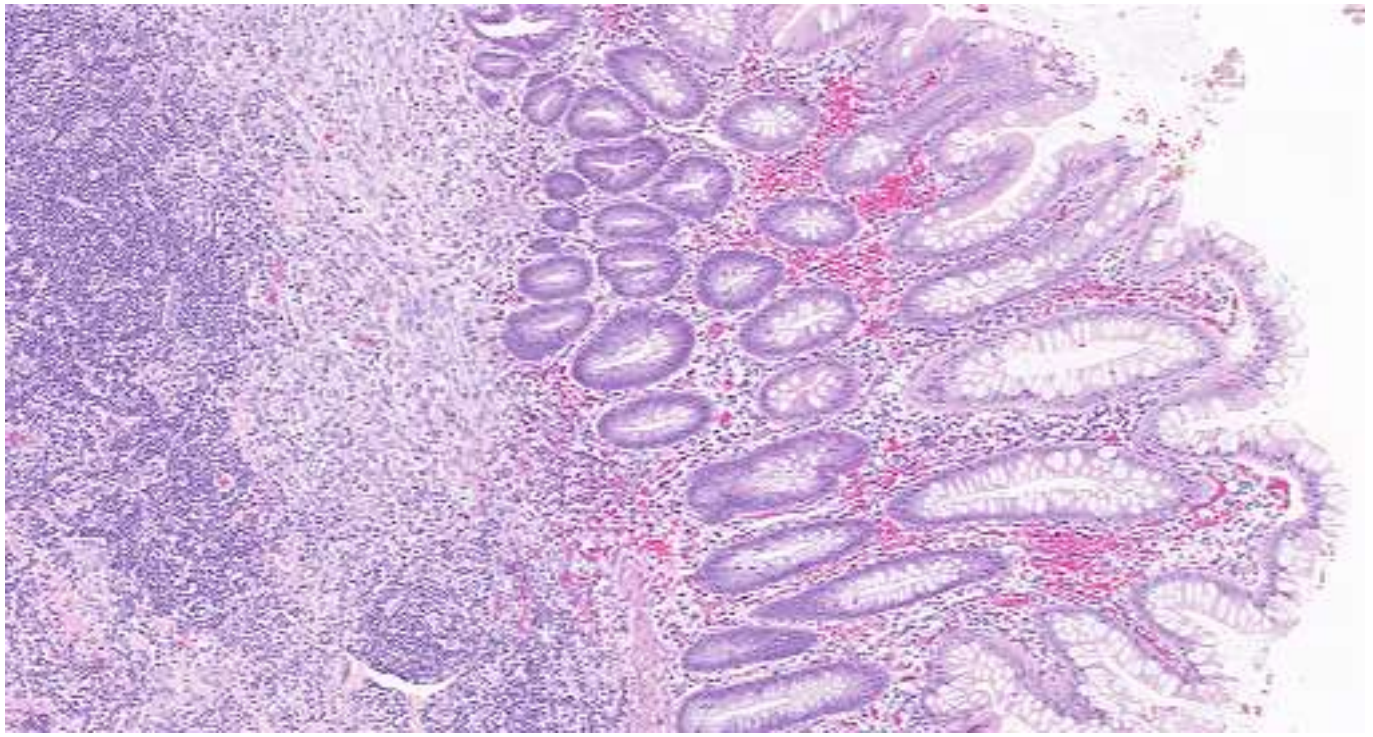
The **pericardial surface** is **dry** with a **coarse granular appearance** caused by **fibrinous exudate**



the pericardial surface here shows strands of pink fibrin extending outward. There is underlying inflammation.
fibrin appears as an eosinophilic meshwork of threads

A common example of an acute suppurative inflammation is acute appendicitis

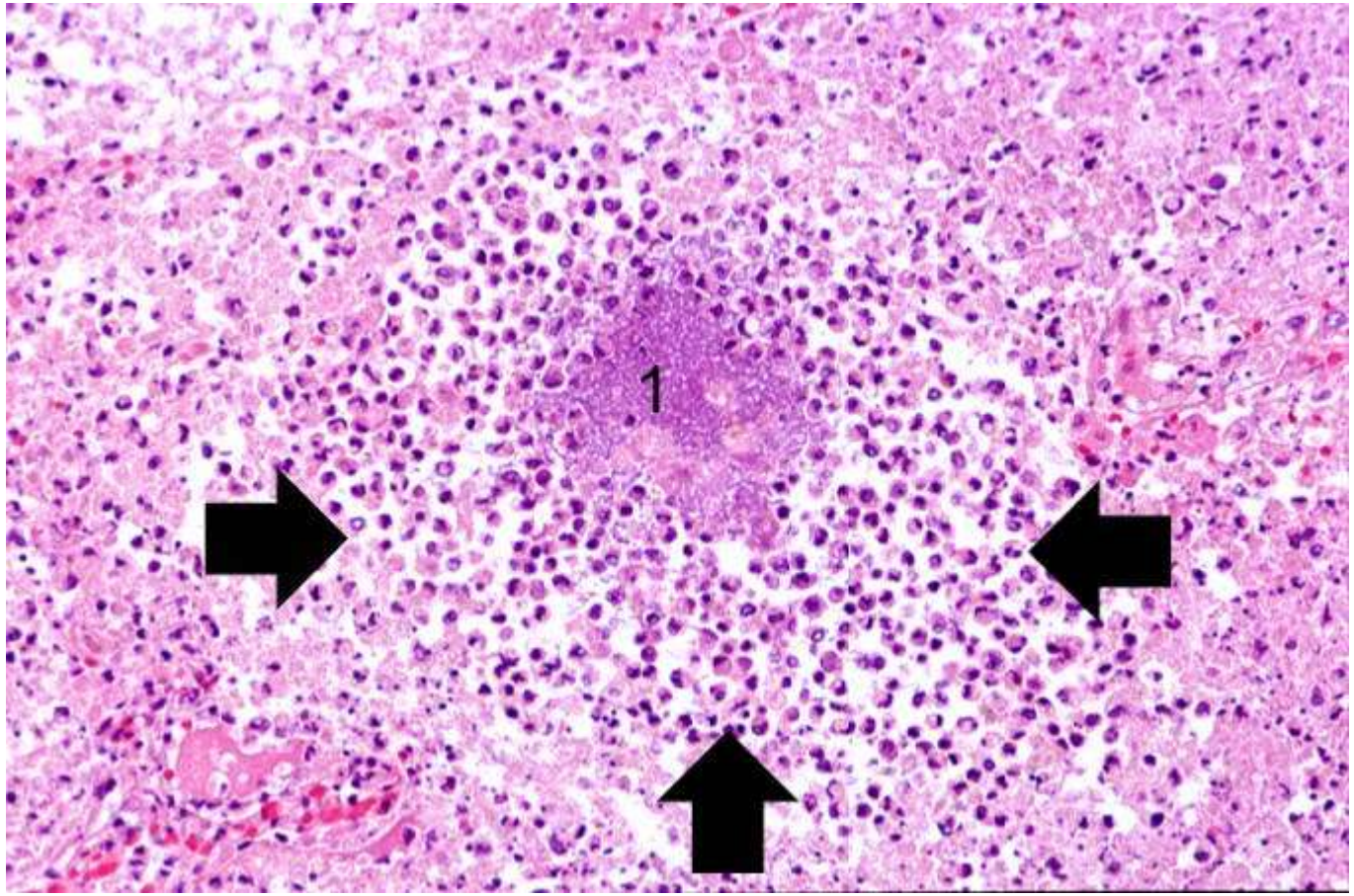
Acute appendicitis



Acute inflammation with predominance of neutrophils; involves some or all layers of the appendiceal wall.

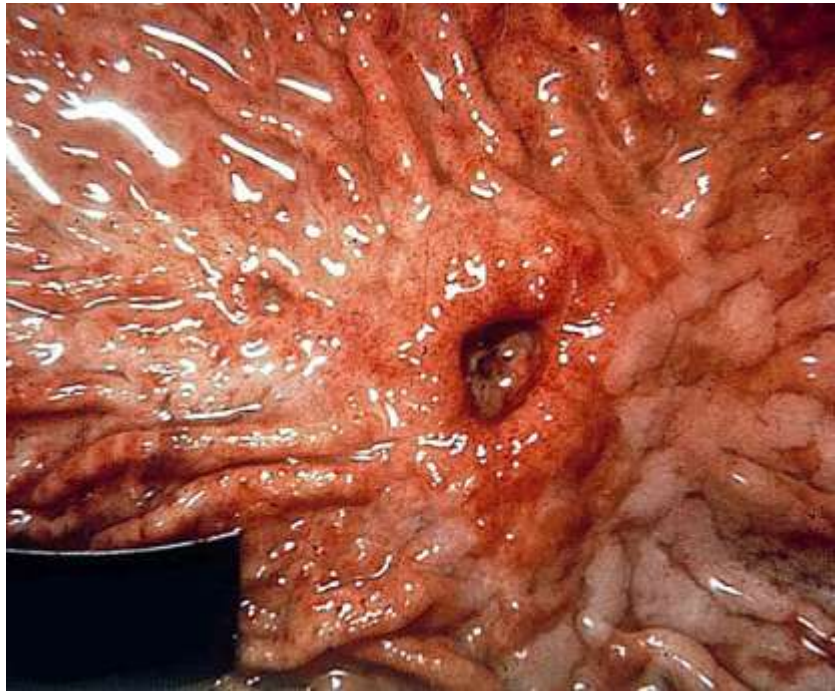
- Abscesses:
- Localized collections of pus caused by suppuration buried in a tissue, an organ, or a confined space.
- They are produced by seeding of pyogenic bacteria into a tissue . In time the abscess may become walled off and ultimately replaced by connective tissue

Abscesses have multiple areas:
* central region with necrotic leukocytes and tissue cells.
 * zone of preserved neutrophils around this necrotic focus.
 *vascular dilation, parenchymal and fibroblastic proliferation.

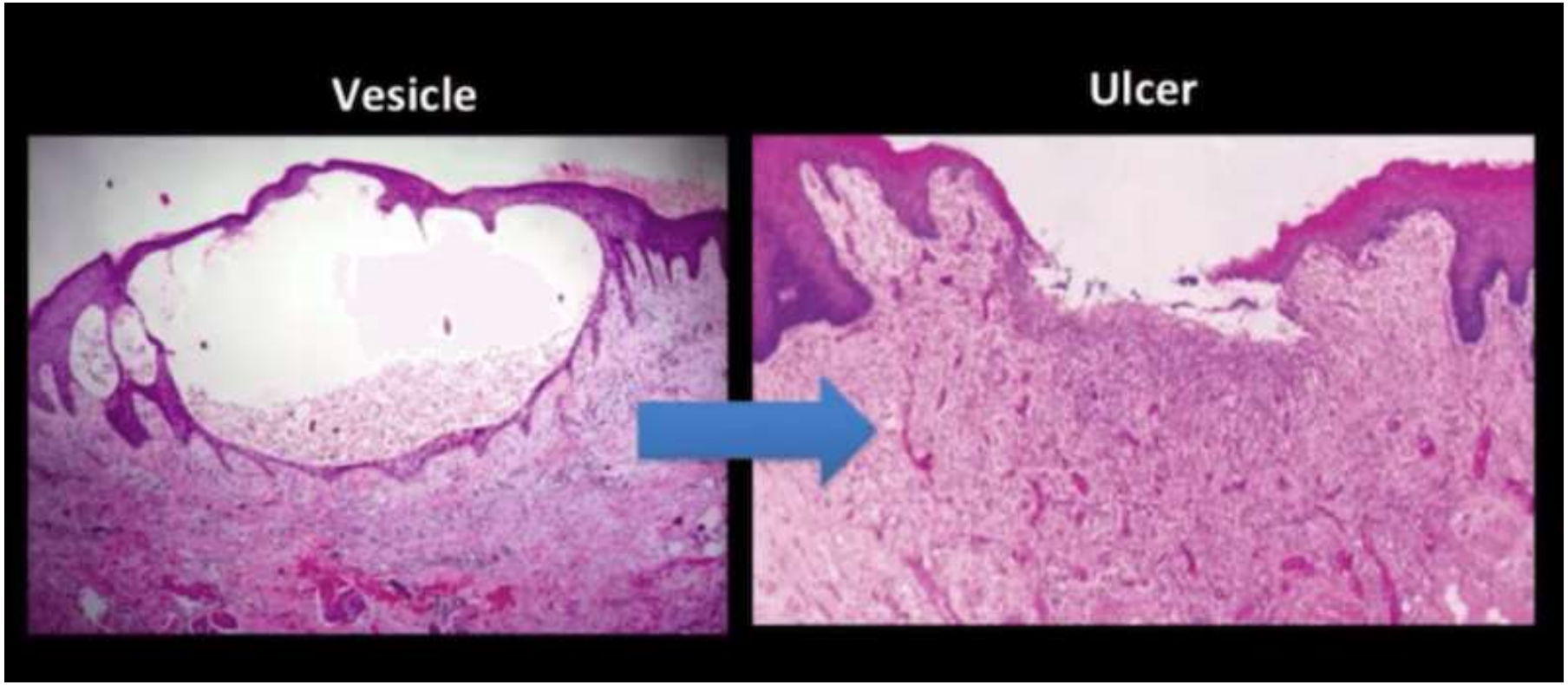


ulcer

- It is most commonly encountered in:
- (1) the mucosa of the mouth, stomach, intestines, or genitourinary tract.
- (2) the skin and subcutaneous tissue of the lower extremities in older persons

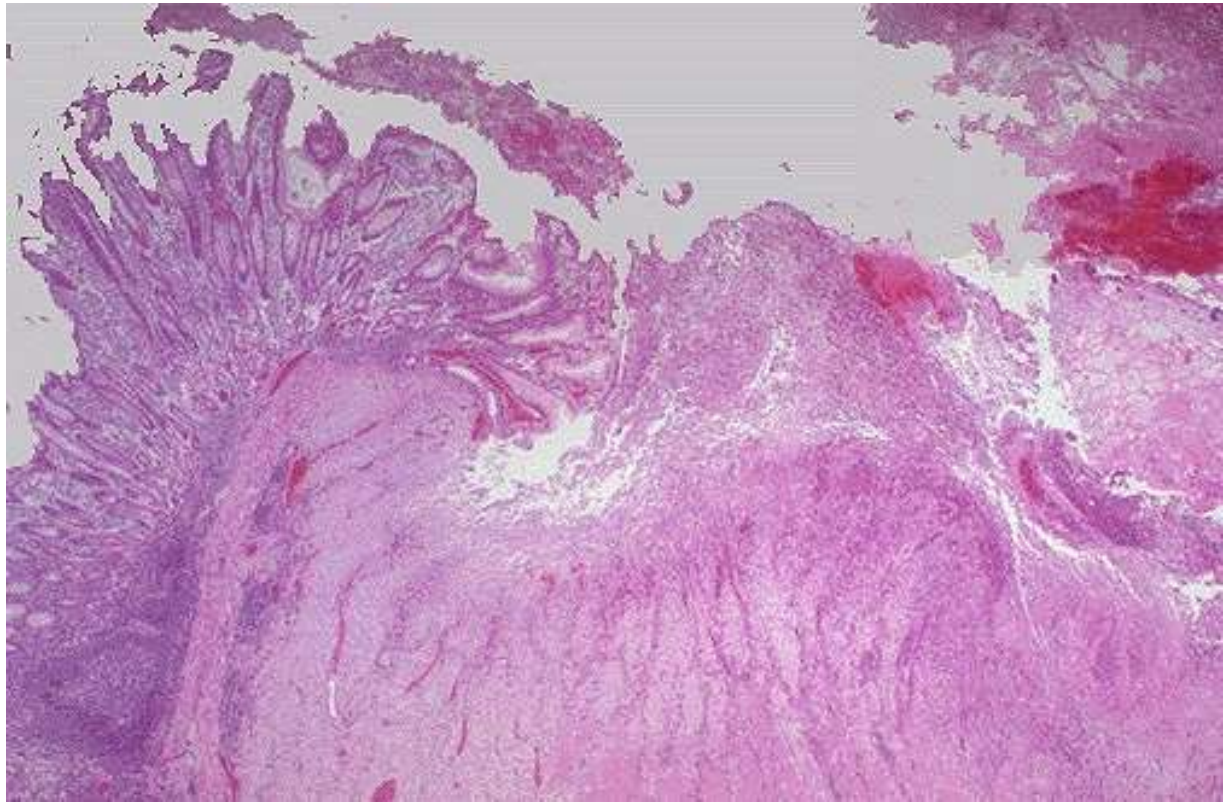


histology

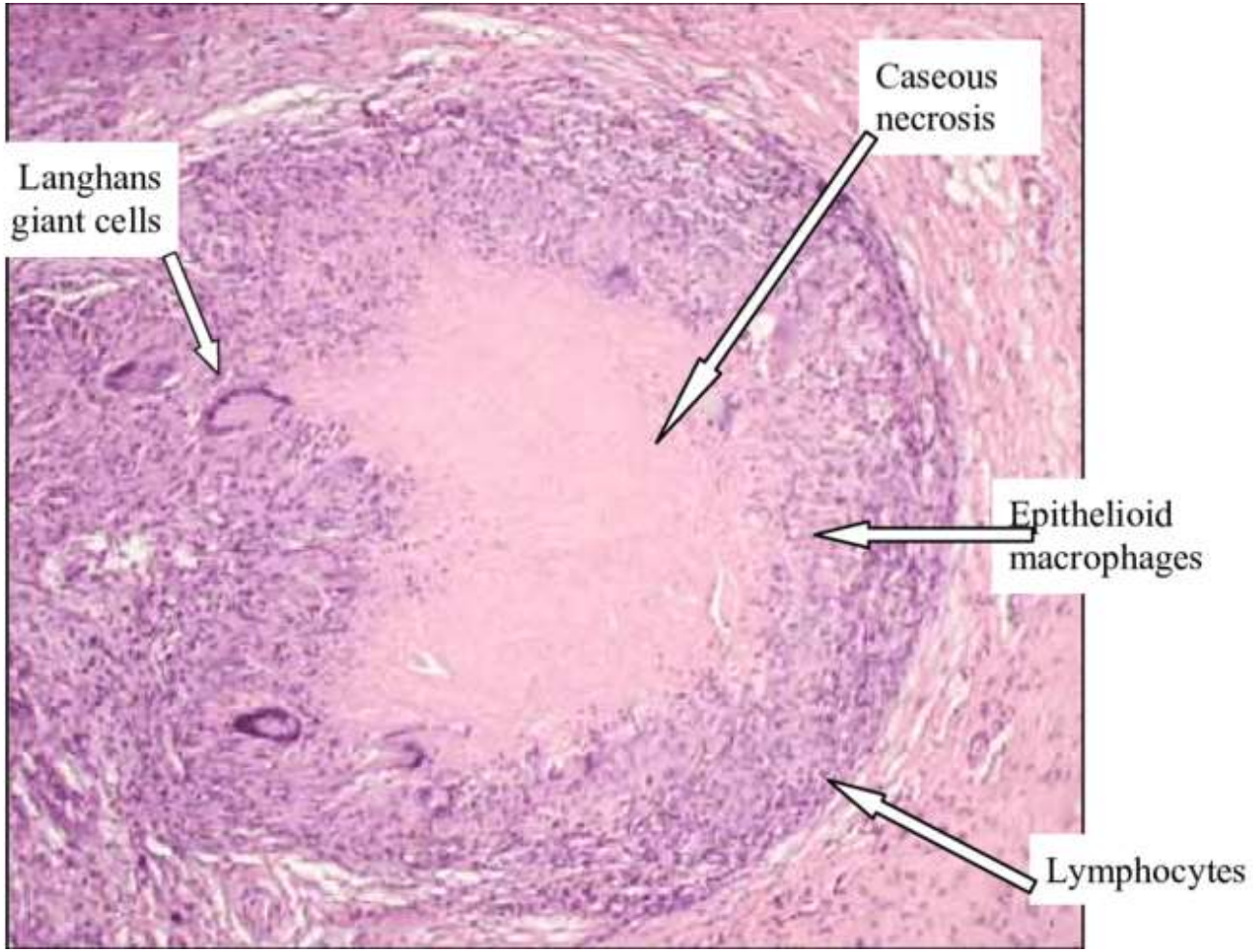


sloughing (shedding) of inflamed necrotic tissue

Microscopic features of Ulcers

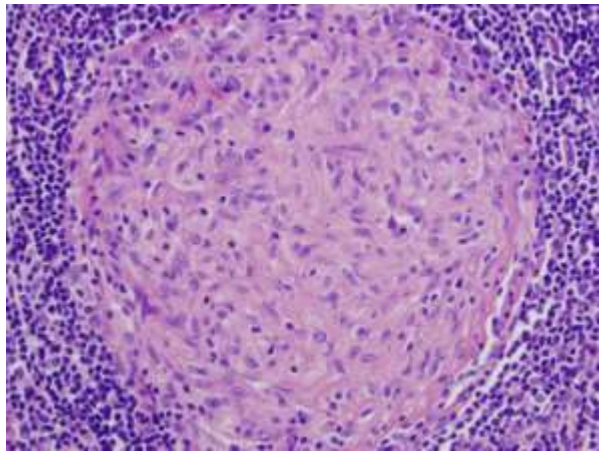


Acute stage:
Intense polymorphonuclear infiltration and vascular dilation in the margins of the defect.
With chronicity:
the margins and base of the ulcer develop fibroblast proliferation, scarring, and the accumulation of lymphocytes, macrophages, and plasma cells.


Caseous necrosis
Langhans giant cells
Epithelioid macrophages
Lymphocytes

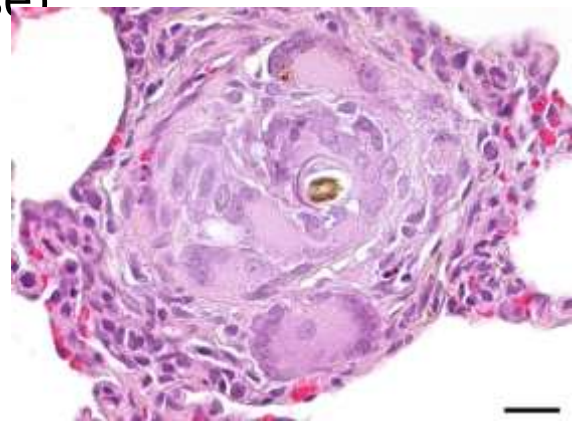
What? Where??

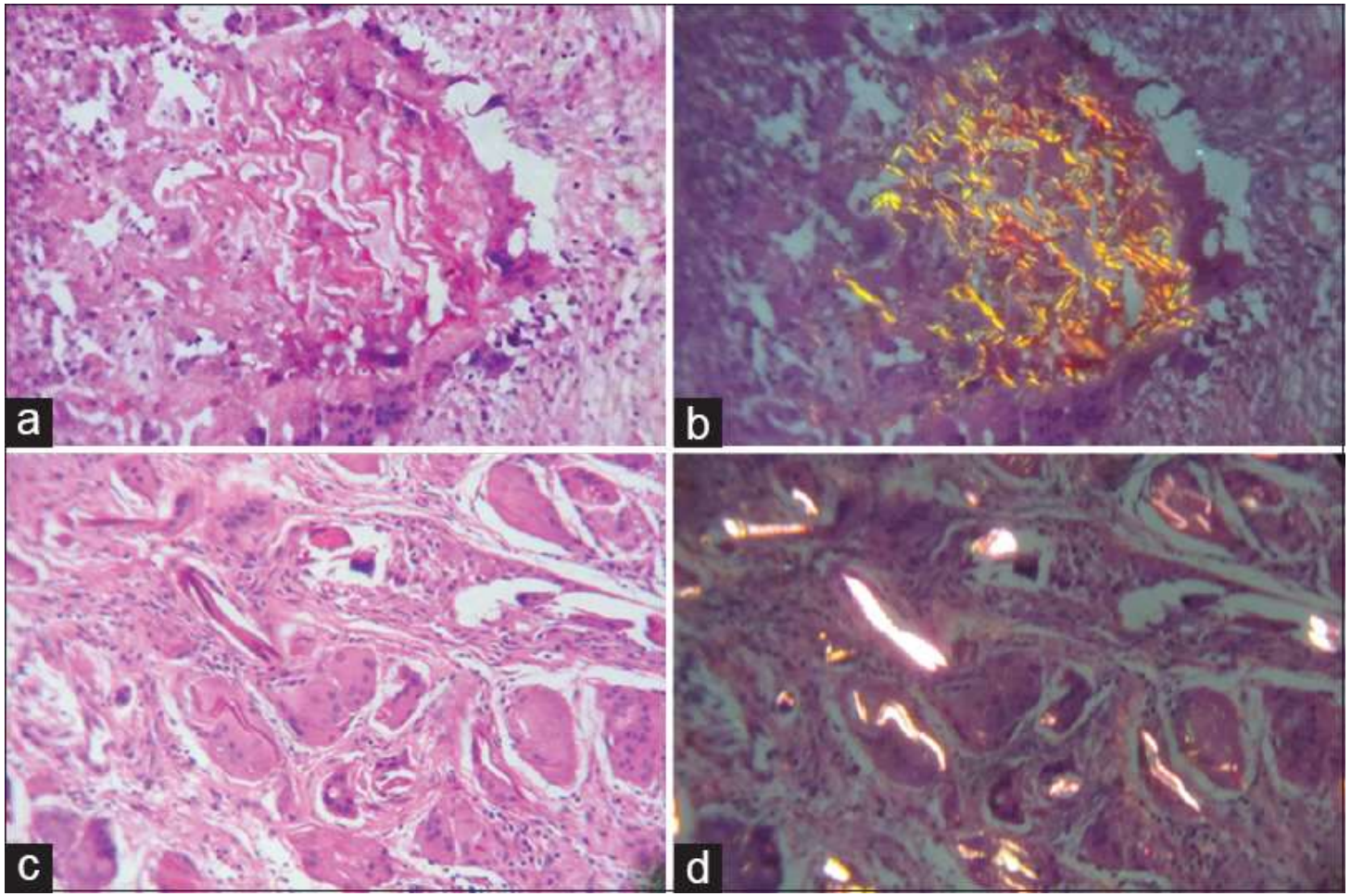
Types of granulomas:



- 1.Immune granulomas:
- caused by persistent T cell–mediated immune response.
- when the inciting agent cannot be readily eliminated.

- **2.Foreign body granulomas:**
- seen in response to inert foreign bodies, in the absence of T cell– mediated immune responses.
- May form around materials such as talc (associated with intravenous drug abuse), sutures, or other fibers



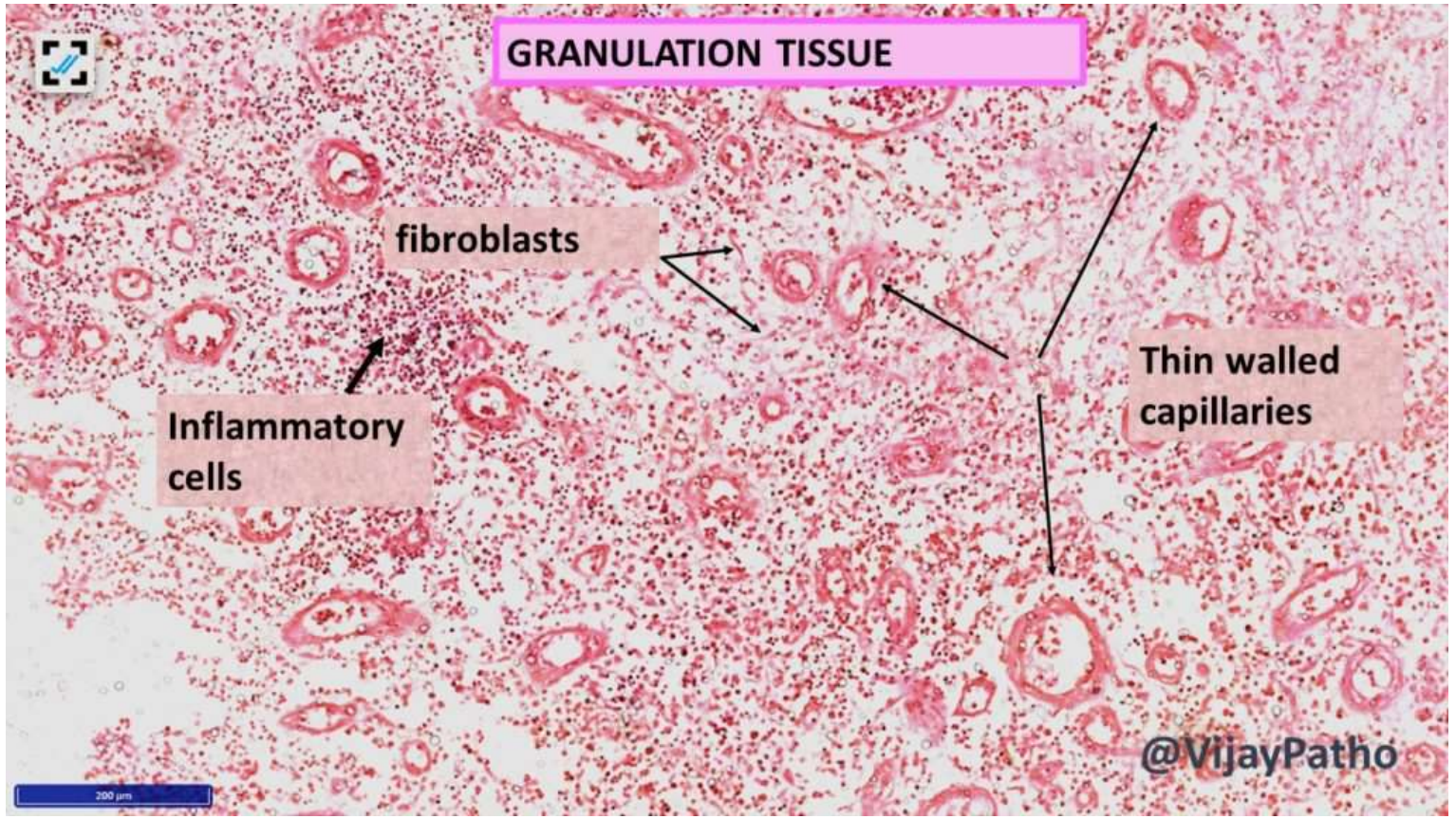


The foreign material can usually be identified in the center of the granuloma, particularly if viewed with polarized light, in which it may appear refractile.

The term scar is most used in connection to wound healing in the skin.

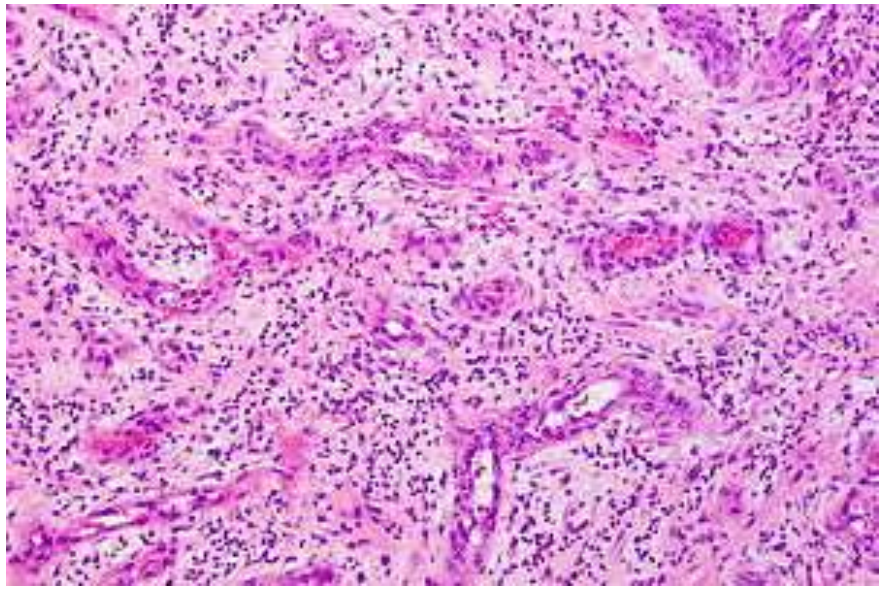
Replacement of parenchymal cells in any tissue by collagen, as in the heart after myocardial infarction.

- The combination of proliferating fibroblasts, loose connective tissue, new blood vessels and scattered chronic inflammatory cells, forms a **granulation tissue.**



Granulation tissue.

pink, soft, granular gross appearance, such as that seen beneath the scab of a skin wound.



proliferating fibroblasts, loose connective tissue, new blood vessels and scattered chronic inflammatory cells

- 1.Venous leg ulcers:

- Seen in elderly people as a result of chronic venous hypertension, which may be caused by severe varicose veins or congestive heart failure.

- These ulcers fail to heal because of poor delivery of oxygen to the site of the ulcer.

2.Arterial ulcers:

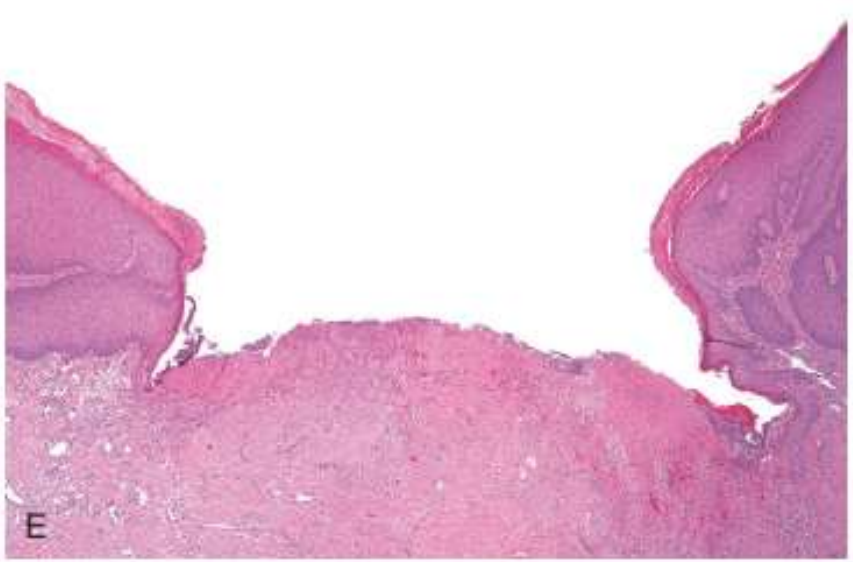
- develop in individuals with atherosclerosis of peripheral arteries, especially associated with diabetes.

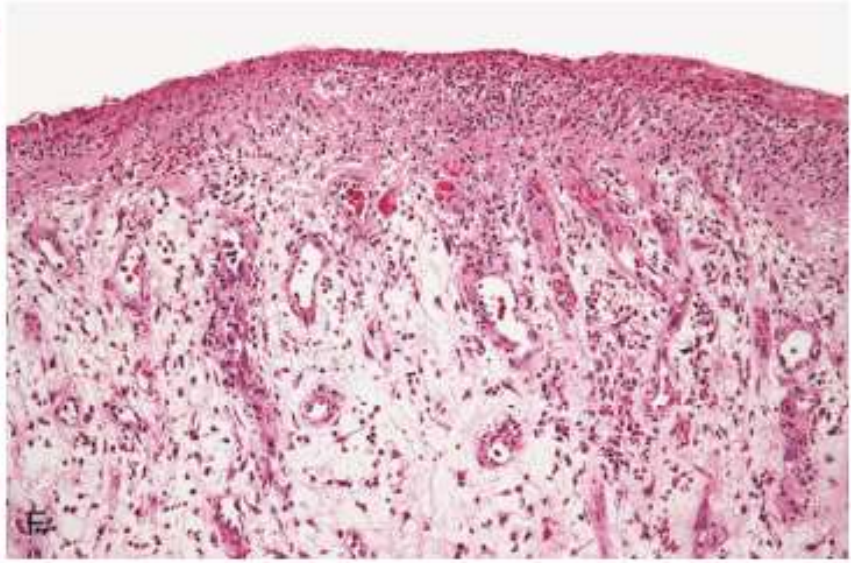
3. Pressure sores :

- are areas of skin ulceration and necrosis of underlying tissues.
- caused by prolonged compression of tissues against a bone, for example, in bedridden. The lesions are caused by mechanical pressure and local ischemia.

4.Diabetic ulcers;

- affect the lower extremities, particularly the feet. Tissue necrosis and failure to heal are the result of small vessel disease causing ischemia, neuropathy, systemic metabolic abnormalities, and secondary infections.





epithelial ulceration and extensive granulation tissue in the underlying dermis

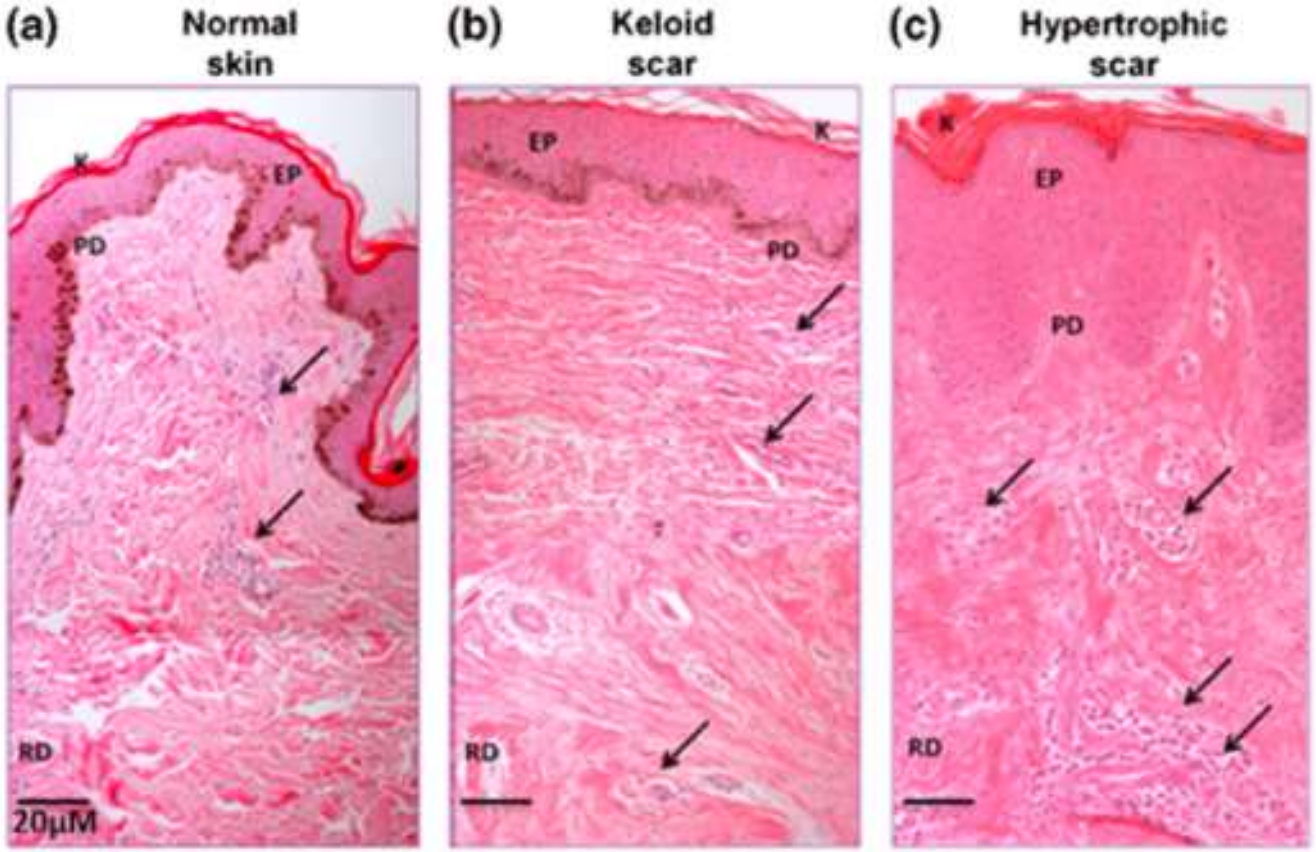
5. wound rupture (dehiscence):

- occurs most frequently after abdominal surgery and is a result of increased abdominal pressure, such as may occur with vomiting or coughing.

✓hypertrophic scar.

- **keloid:**

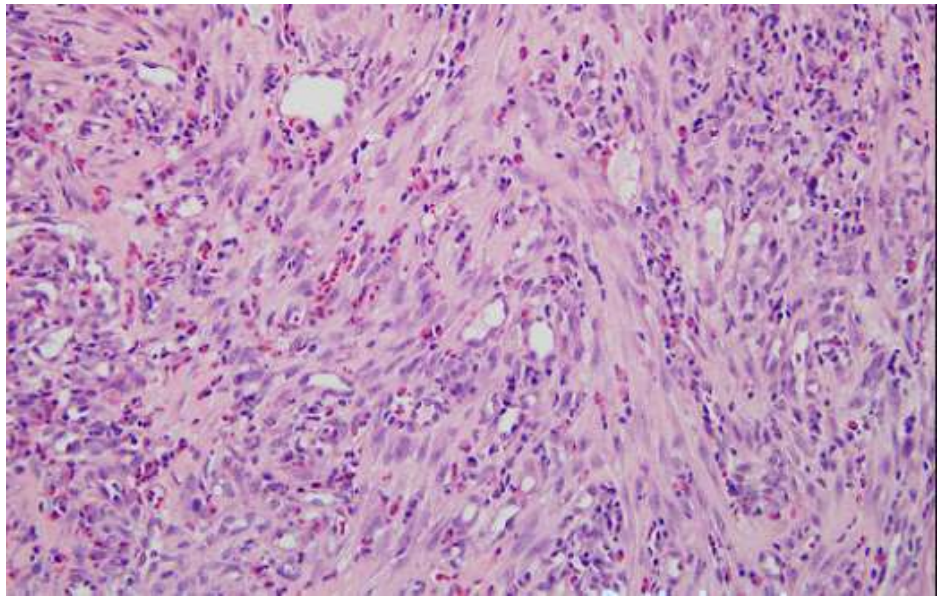
- It is a hypertrophic scar that grows beyond the boundaries of the original wound and does not regress.



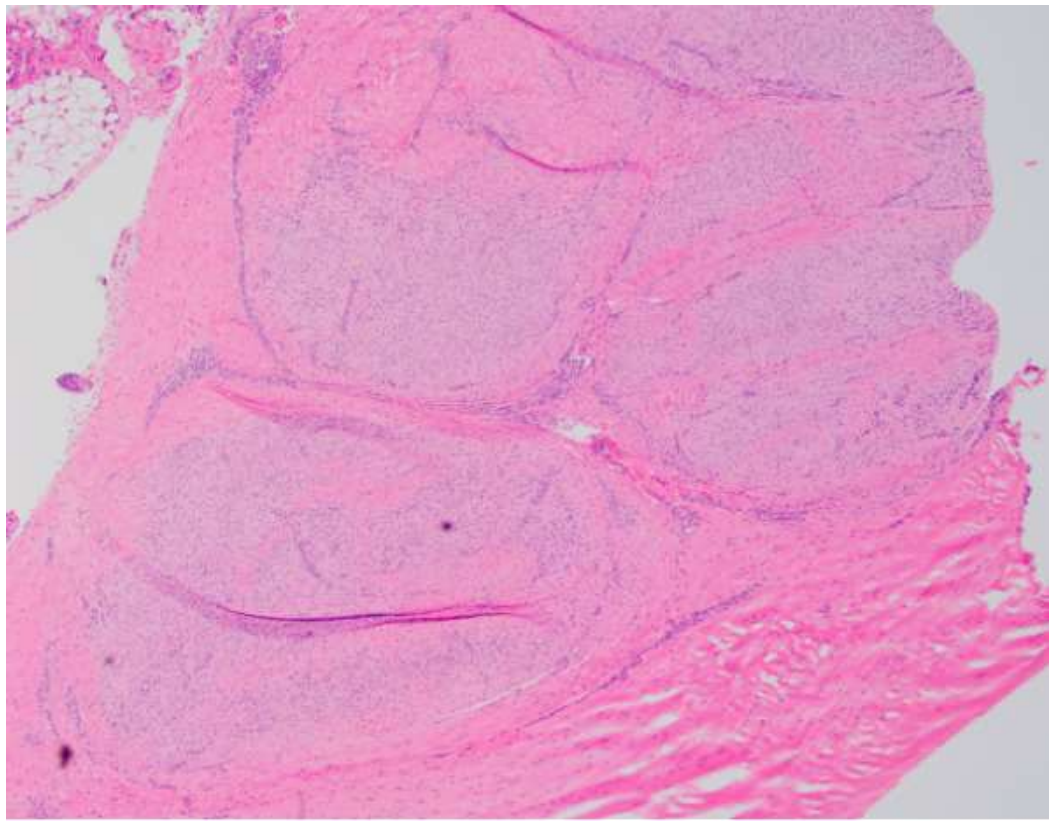
A. In normal skin, the characteristic random orientation and bundle formation of collagen fibres
B. increased number of thick collagen fibres arranged in bundles
C. The collagen fibres were arranged randomly and showed highly cellular zones

Exuberant granulation

- formation of excessive amounts of granulation tissue, which protrudes above the level of the surrounding skin and blocks reepithelialization .



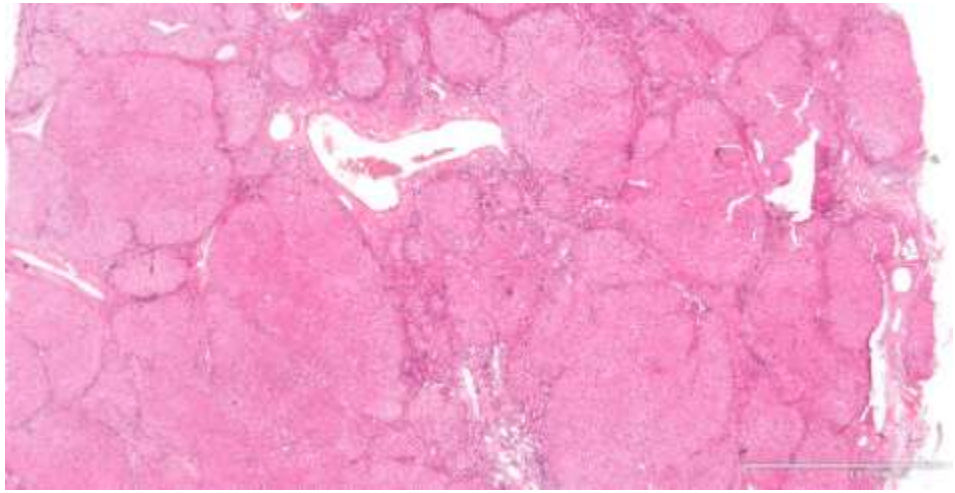
contracture



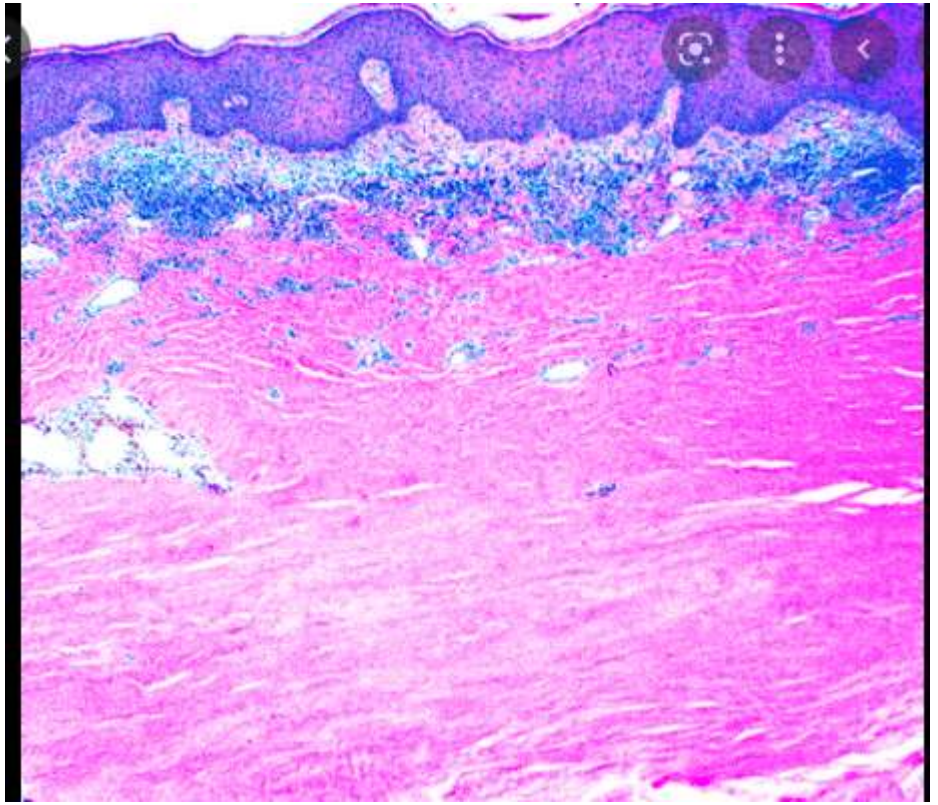
Nodule formation:
Composed of spindle cells (myofibroblasts and fibroblasts) with dense collagen.

Examples of Fibrotic parenchymal disorders

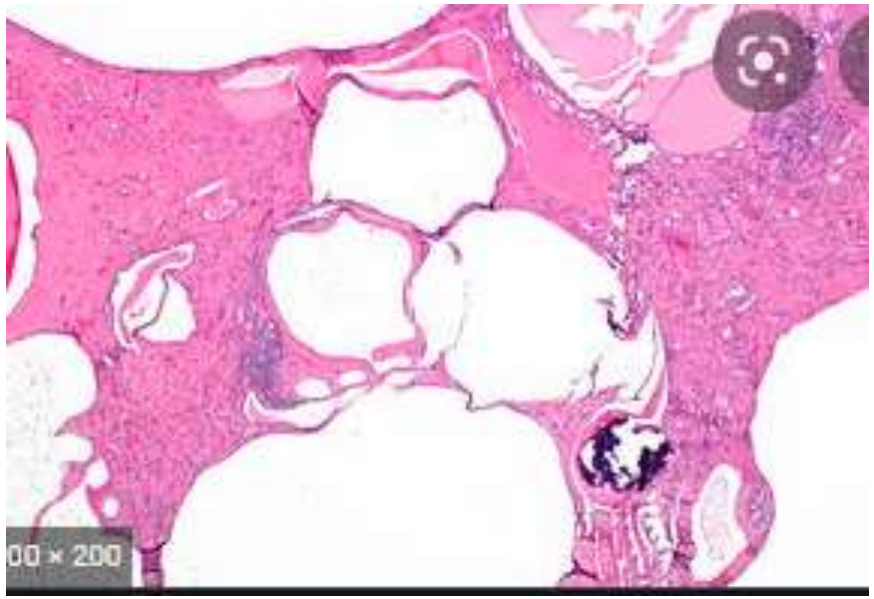
- 1. liver cirrhosis.



2.systemic sclerosis (scleroderma).



3. end-stage kidney disease.



❖fibrosing diseases of the lung.

Grossly: Honeycomb, Cystic spaces with fibrotic wall
Histology: cystic spaces lined by bronchiolar epithelium and fibrotic wall