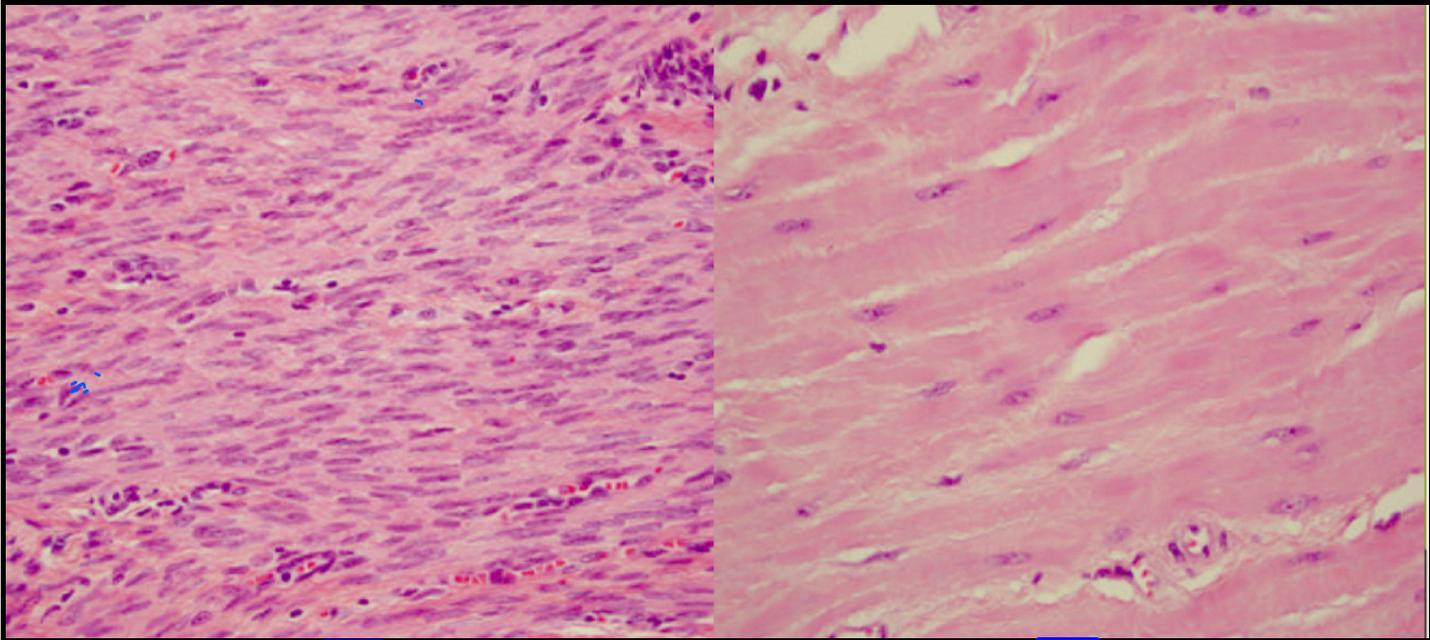
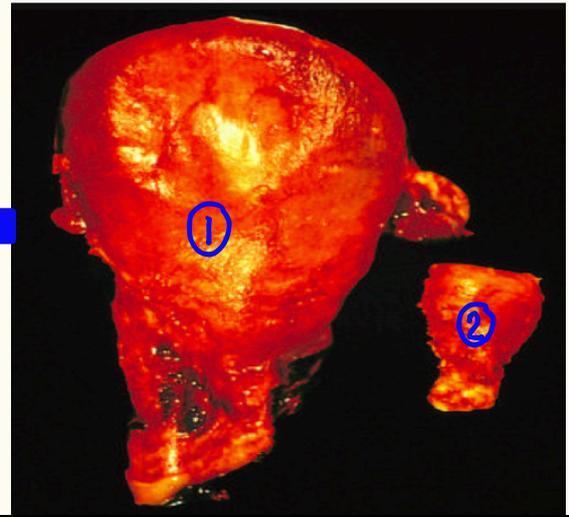


- ① Enlargement of the uterus during pregnancy due to hypertrophy and hyperplasia.
- ② The normal size of uterus .

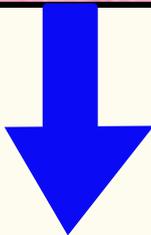
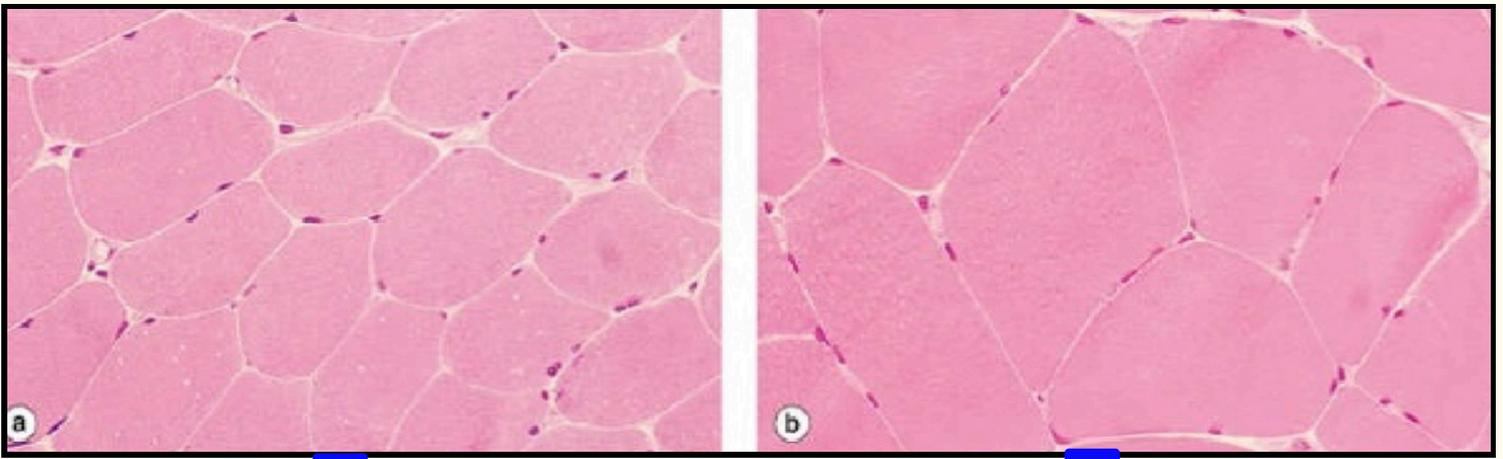


normal smooth muscles in the uterus

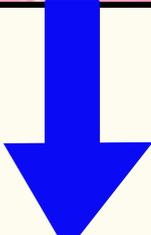


* abnormal uterus cells:
- each fiber of smooth muscles becomes Larger.
- the cytoplasm becomes larger too.

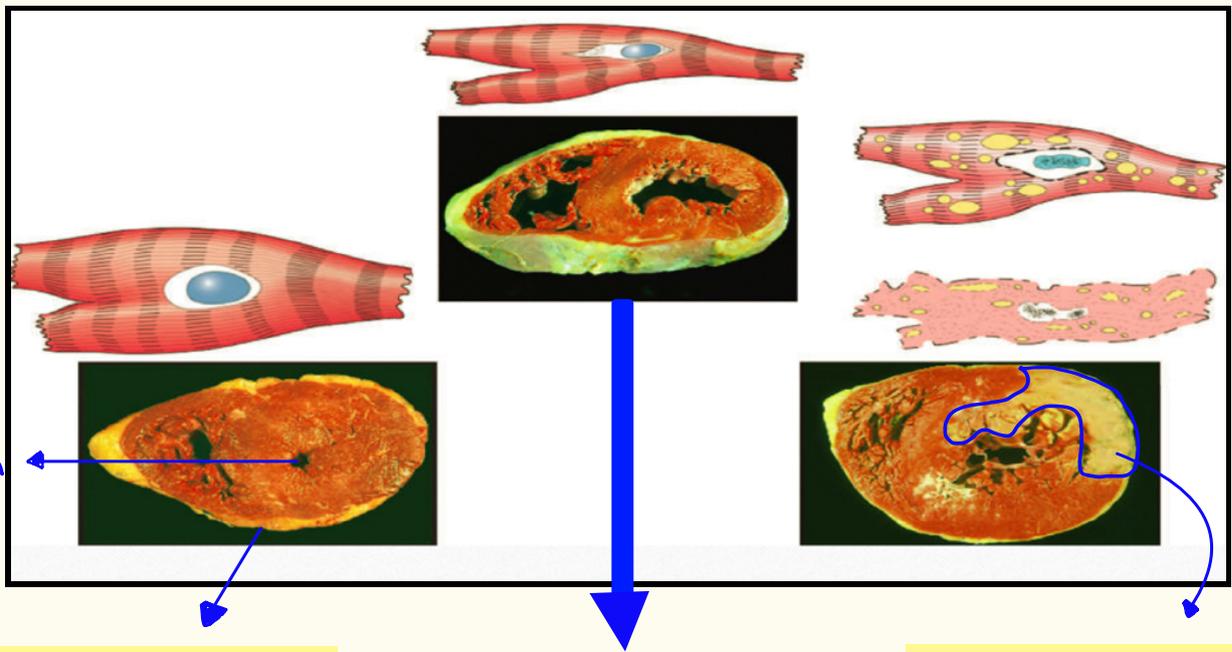




normal skeletal muscles



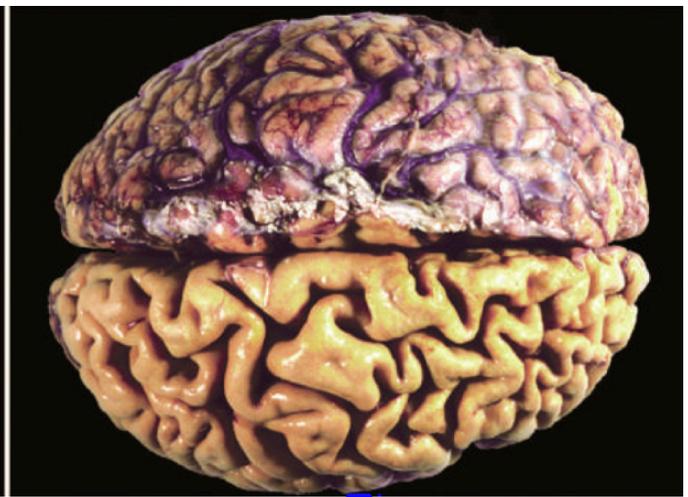
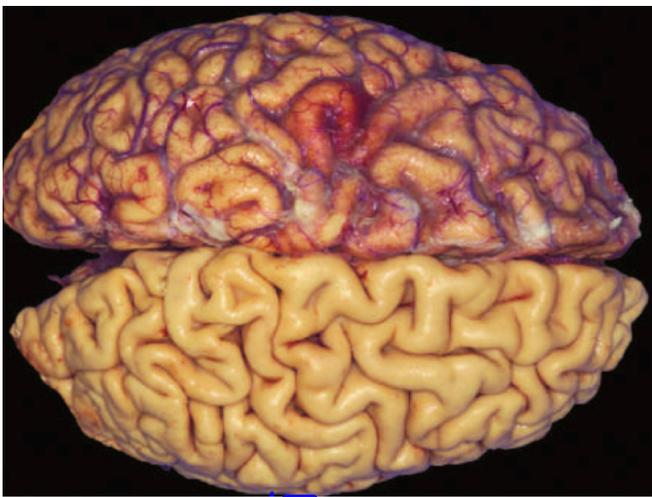
In response to increased workload the striated muscle cell undergo hypertrophy. ONLY HYPERTROPHY because of adult muscle cells are unable to divide.



- the lumen becomes narrow.
 - The thickness of cardiac muscle increase more than normal due to **ONLY HYPERTROPHY**. Because of hypertrophy the hypertension and aortic valve disease will happen

normal cell of heart

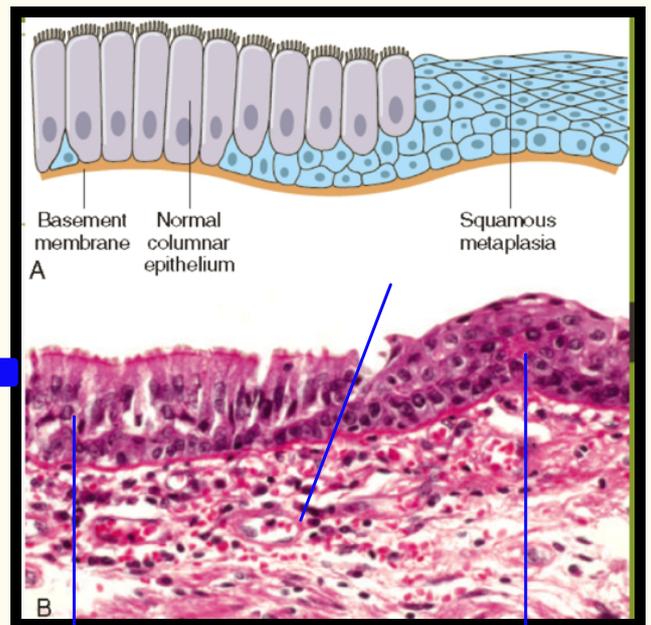
irreversible cell injury (necrosis)



this shape of brain belongs to a young man

while this belongs to an old man with atherosclerotic disease. Atrophy of brain is caused by aging and reduced blood supply

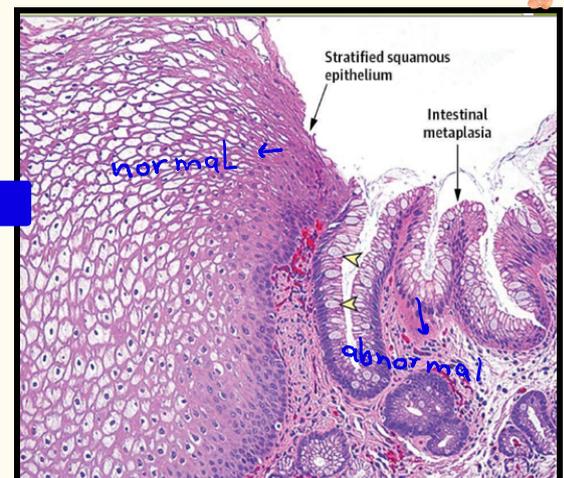
In the respiratory epithelium of habitual cigarette smokers the normal ciliated columnar epithelial cells of trachea and bronchi → Metaplasia → stratified squamous epithelial cells.



Normal cells of trachea and bronchi

abnormal cells of trachea and bronchi

normal stratified squamous epithelium → metaplasia → gastric or intestinal -type columnar epithelium.

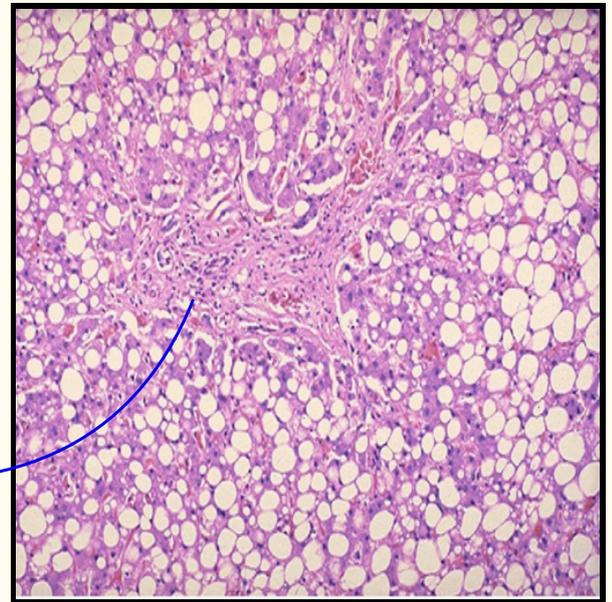


the cancer in the upper and middle part of esophagus is called squamous cell carcinoma, while the cancer in the end part of esophagus called adenocarcinoma, this condition called Barrett's esophagus syndrome

Fatty change, called **steatosis**.
Any accumulation of **triglycerides** within
parenchymal cells.
*Mostly seen in the liver, (the major organ
involved in fat metabolism) .



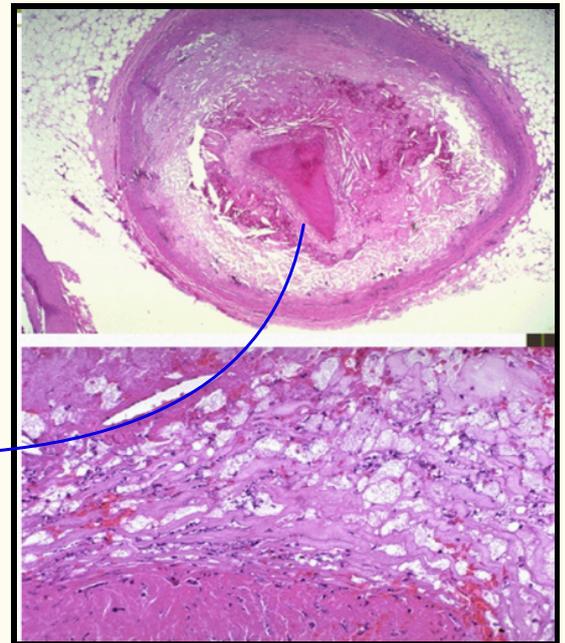
reversible cell injury



-Cholesterol and Cholesteryl Esters.
-Atherosclerosis is the most important.

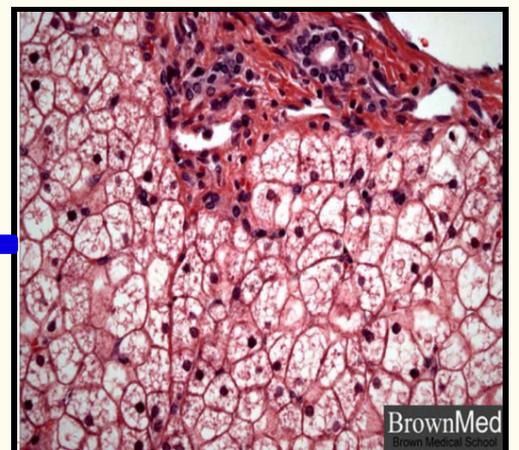


due to increase in
cholesterol level



Glycogen.

*Excessive intracellular
accumulation of **glycogen** are
associated with abnormalities in the
metabolism of glucose or glycogen.
*Glycogen also accumulates within
cells in a group of related **genetic
disorders** collectively referred to as
glycogen storage diseases.



Pigments - Carbon

• Pigments are colored substances :

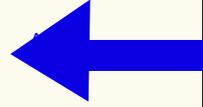
- + exogenous (from outside the body) such as **carbon**,
- + endogenous (synthesized within the body) itself, such as lipofuscin, melanin, and certain derivatives of hemoglobin.

- Aggregates of the **pigment blacken** the draining **lymph nodes and pulmonary parenchyma** (called **anthracosis**)

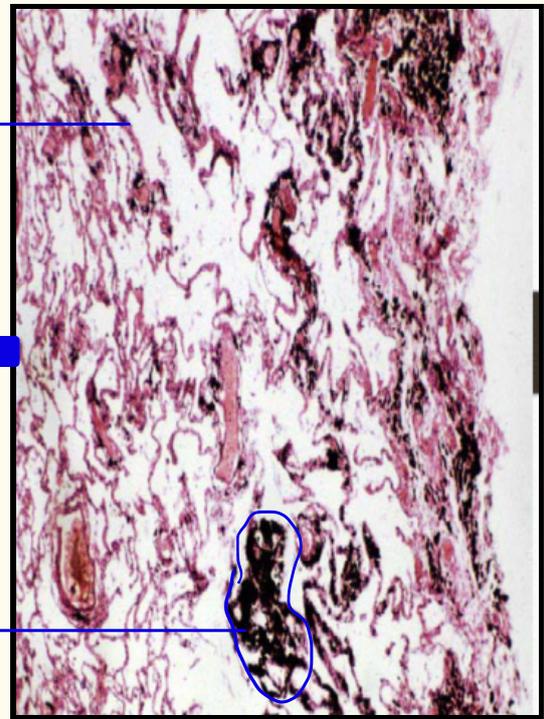
Causative → smoking



Lung tissue



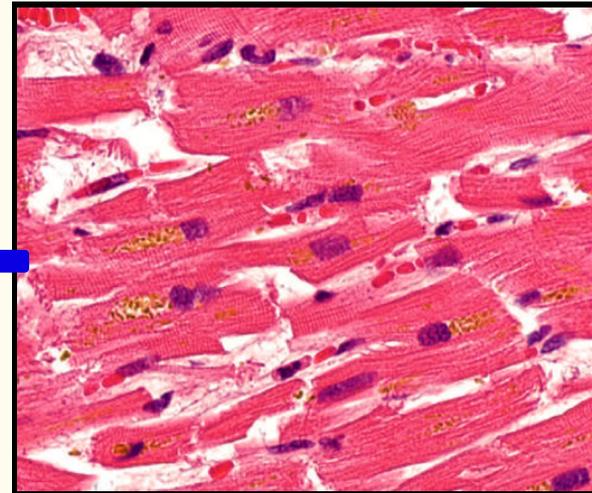
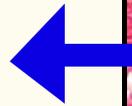
Carbon



Pigments-Lipofuscin "wear-and-tear pigment"

- An insoluble **brownish-yellow granular** intracellular material that accumulates in a variety of tissues (**heart, liver, and brain**) with **aging or atrophy**.
- Lipofuscin represents **complexes of lipid & protein** that are produced by the free radical- catalyzed peroxidation of polyunsaturated lipids of subcellular membranes.
- **It is not injurious to the cell but is a marker of past free radical injury.**

Causative →aging and atrophy

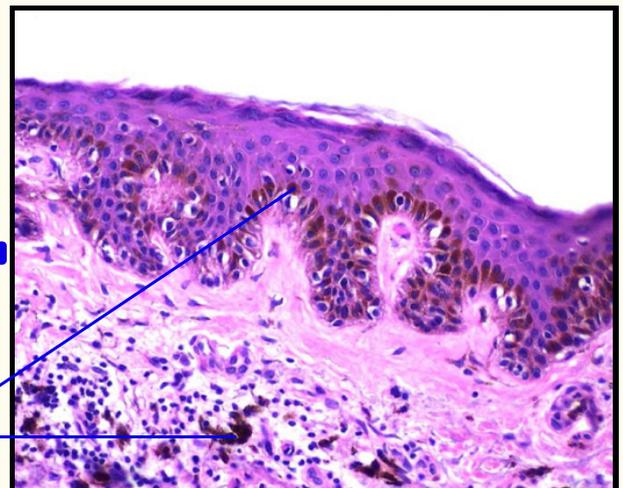


Pigments - Melanin.

An endogenous, **brown-black pigment** that is synthesized by melanocytes located in the epidermis.



Melanin

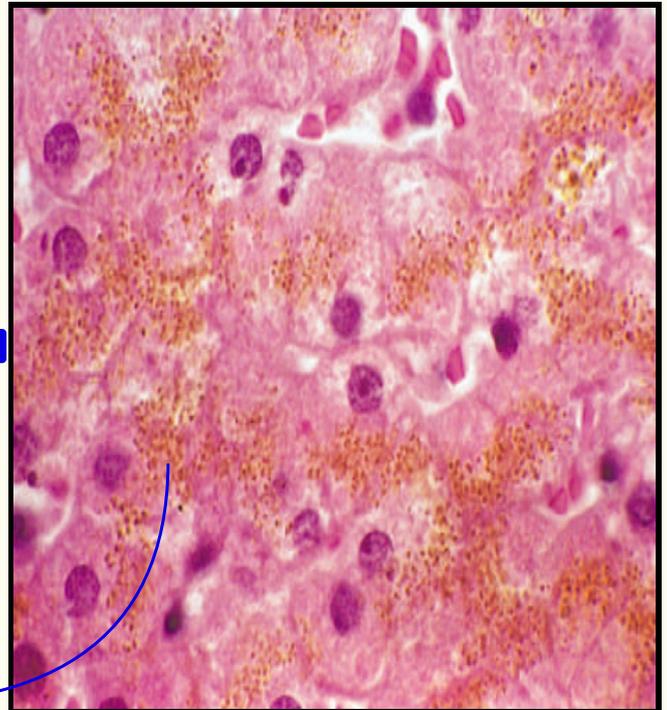


Pigments - Hemosiderin.

A hemoglobin-derived granular pigment that is **golden yellow to brown**.

Accumulates in tissues when there is a local or systemic excess of iron.

Hemosiderin pigment represents large aggregates of these ferritin micelles, readily visualized by light and electron microscopy



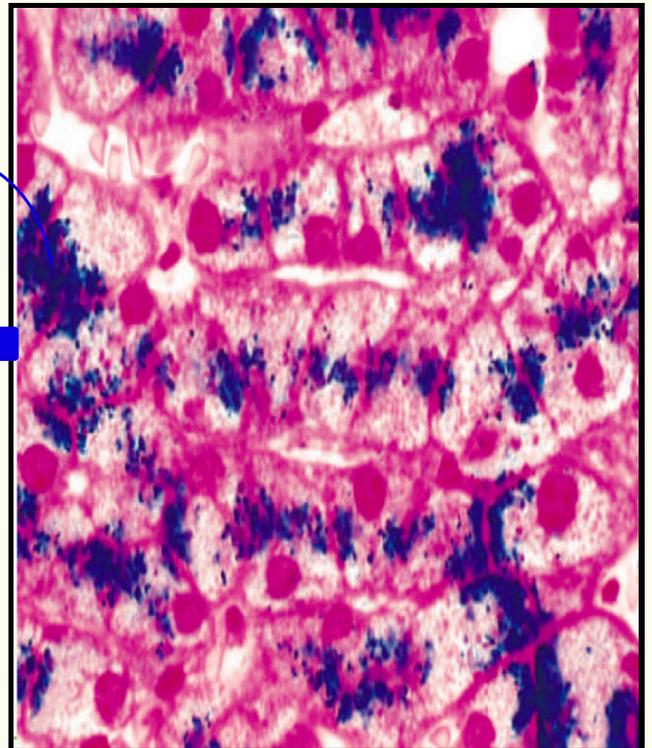
small viscous

Pigments - Hemosiderin.

the iron can be unambiguously identified by the **Prussian blue** histochemical reaction

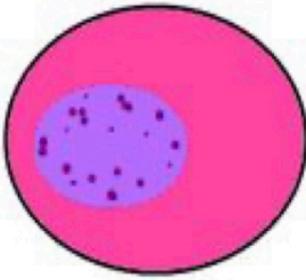
Excessive deposition of hemosiderin, called **hemosiderosis**.

more extensive accumulations of iron seen in hereditary **hemochromatosis**.



Prussian blue

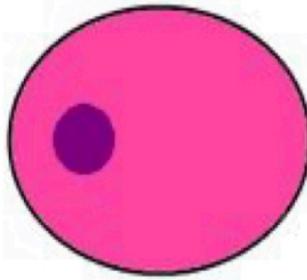
KARYOLYSIS



Nuclear fading

chromatin dissolution due to action of DNAases & RNAases

PYKNOSIS



Nuclear shrinkage

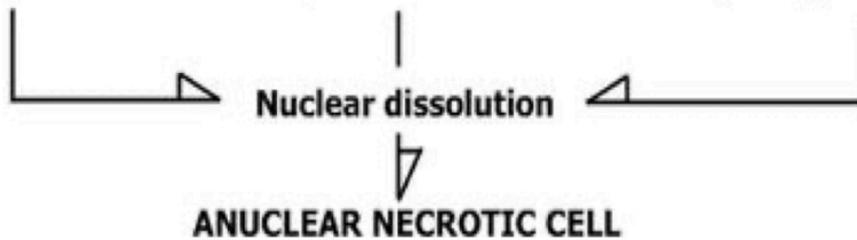
DNA condenses into shrunken basophilic mass

KARYORRHEXIS



Nuclear fragmentation

*Pyknotic nuclei membrane ruptures & nucleus undergoes **fragmentation***

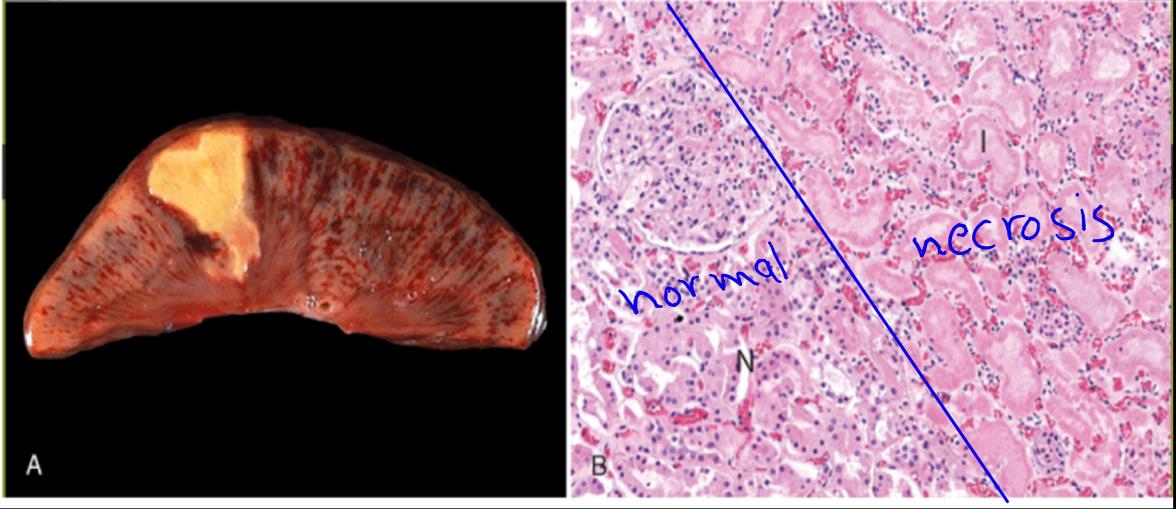


Specific Morphologic Patterns of Necrosis

- Coagulative necrosis
- Liquefactive necrosis
- Gangrenous necrosis
- Caseous necrosis

Fat necrosis

Coagulative necrosis



causative → ischemia or infarction

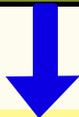
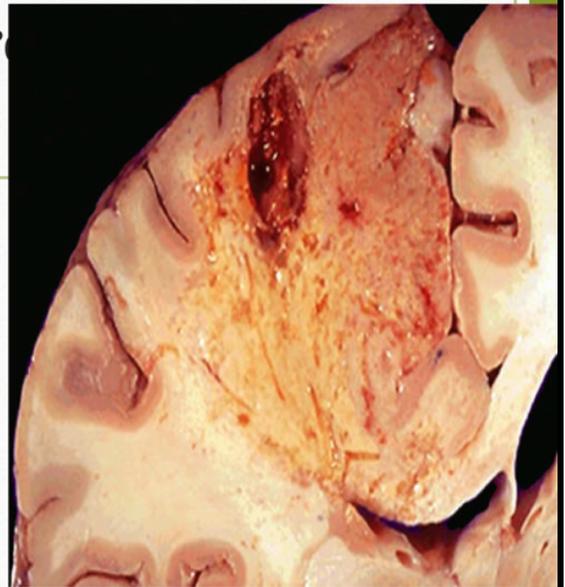
*Happened in all solid organs except the brain.

*preserve cell outline.

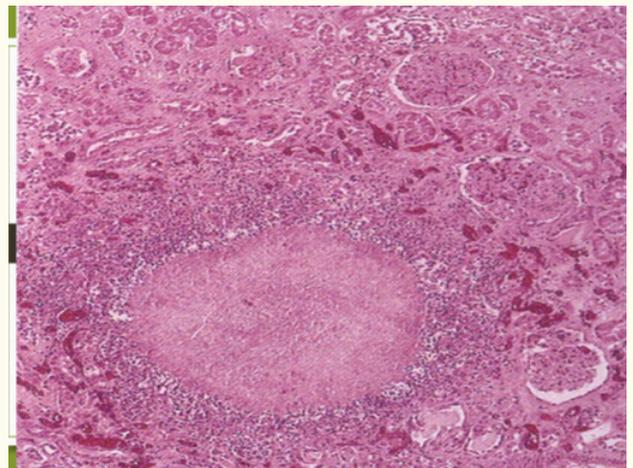


Liquefactive necrosis

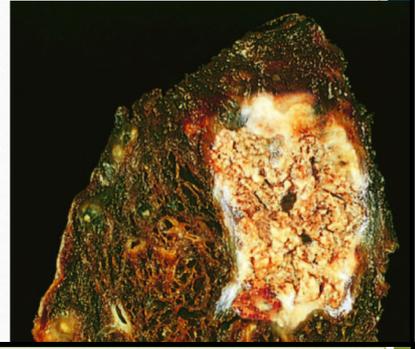
- Focal bacterial and fungal infections.
- Hypoxic & death of cells within the central nervous system.
- Microbes - rapid accumulation of inflammatory cells - enzymes of leukocytes digest ("liquefy") the tissue.
- If acute infection - creamy yellow & is called **pus**



mainly in brain



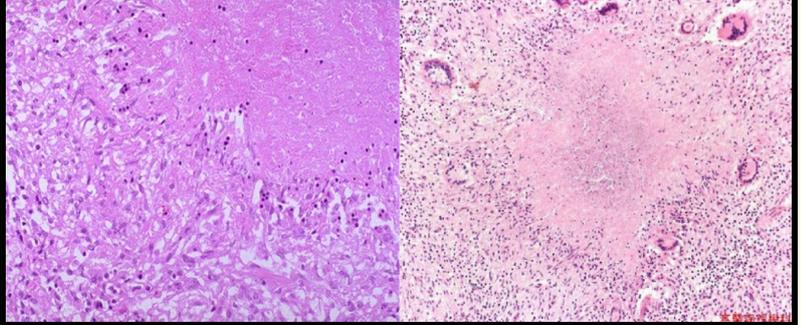
Caseous Necrosis



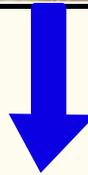
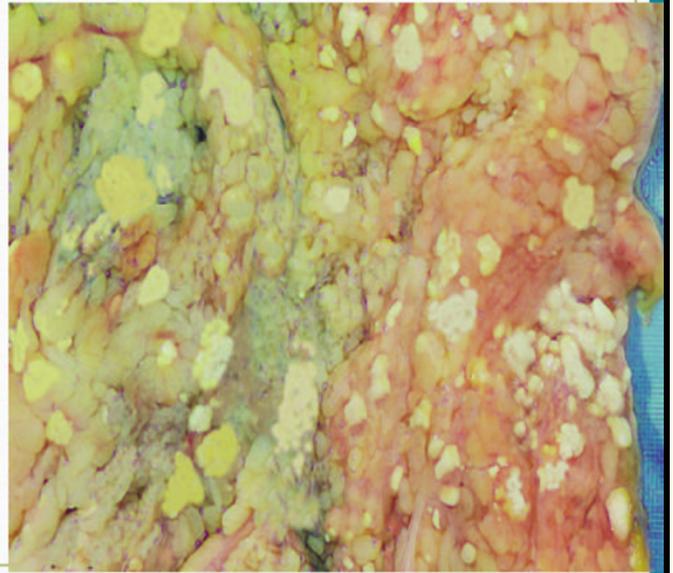
- Most often encountered in foci of tuberculous infection. (TB)
- Architecture -completely **obliterated**,
cellular outlines-cannot be discerned



Caseous Necrosis



These salts look:
+ *chalky white on gross examination.*
+ *basophilic in histological sections stained with H&E*



Fat necrosis

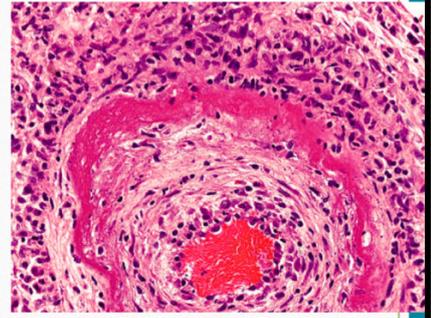
the release of activated pancreatic lipases into the substance of the **pancreas** and the peritoneal cavity (**Acute pancreatitis**)



Fibrinoid necrosis
***Severe hypertension.**



A bright pink, amorphous appearance on H&E preparations called fibrinoid (fibrin-like) by pathologists..



Gangrenous necrosis
Wet ganglia (combination
between coagulative necrosis
and liquefactive necrosis).



"Never give up. Big dreams take more time and need to a patient person."

#الفريق_الاكاديمي
#لجنة_الطب_والجراحة