Foundation block-Pathology Practical

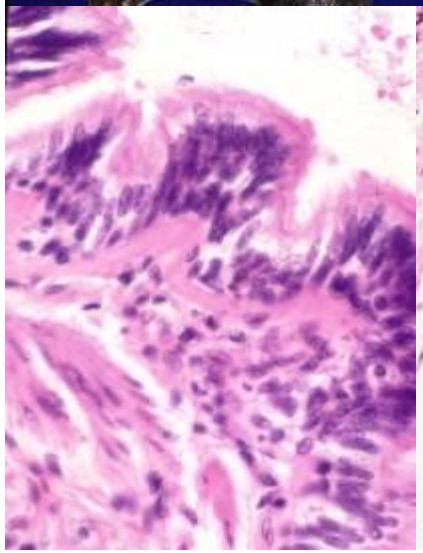
Cell injury and inflammation

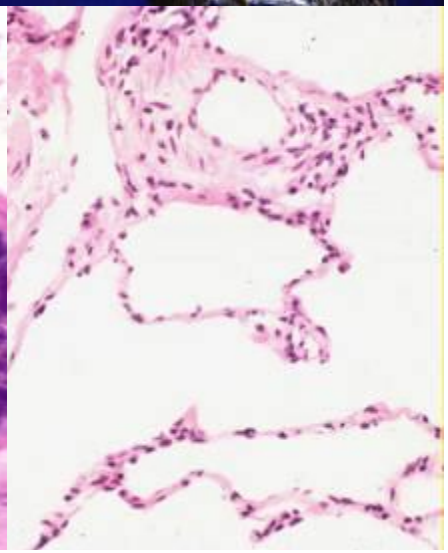
Dr. Shaesta Naseem

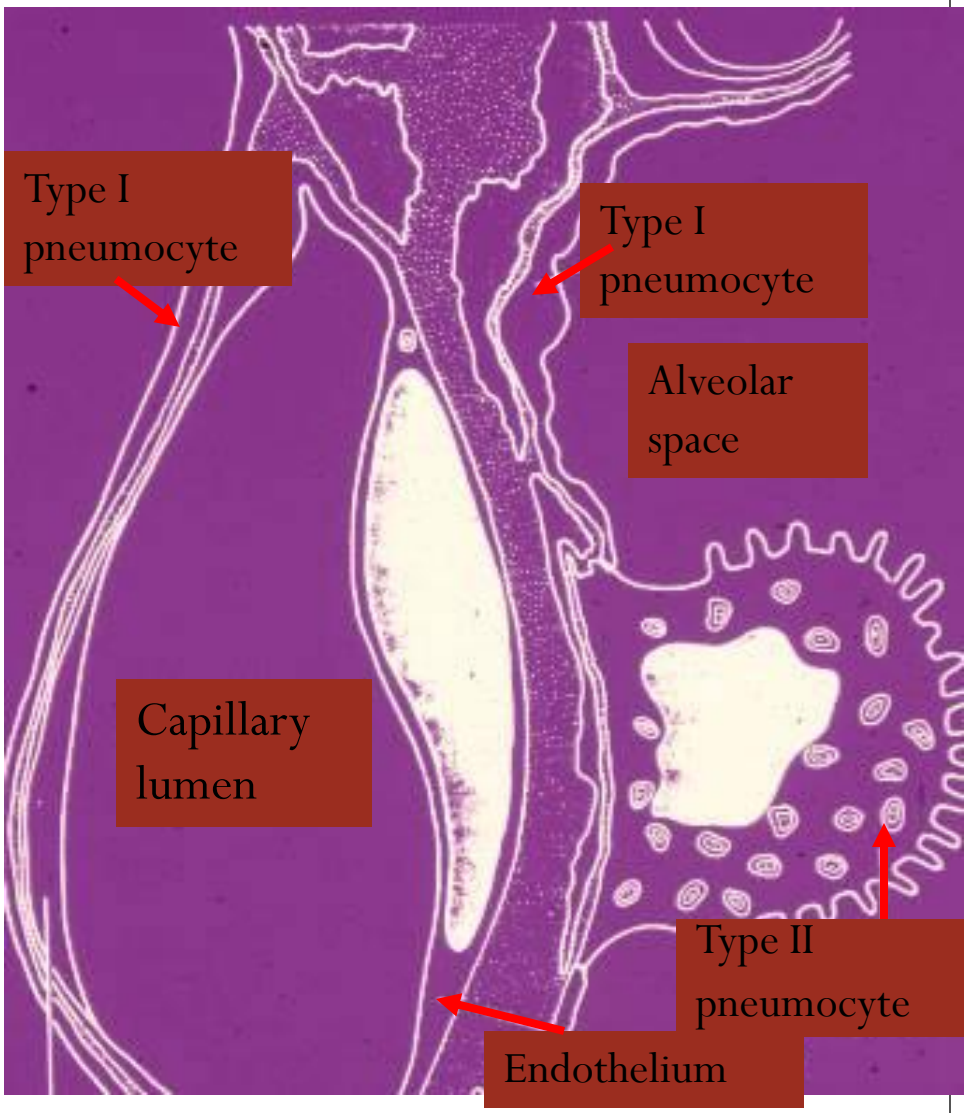
18-9-14

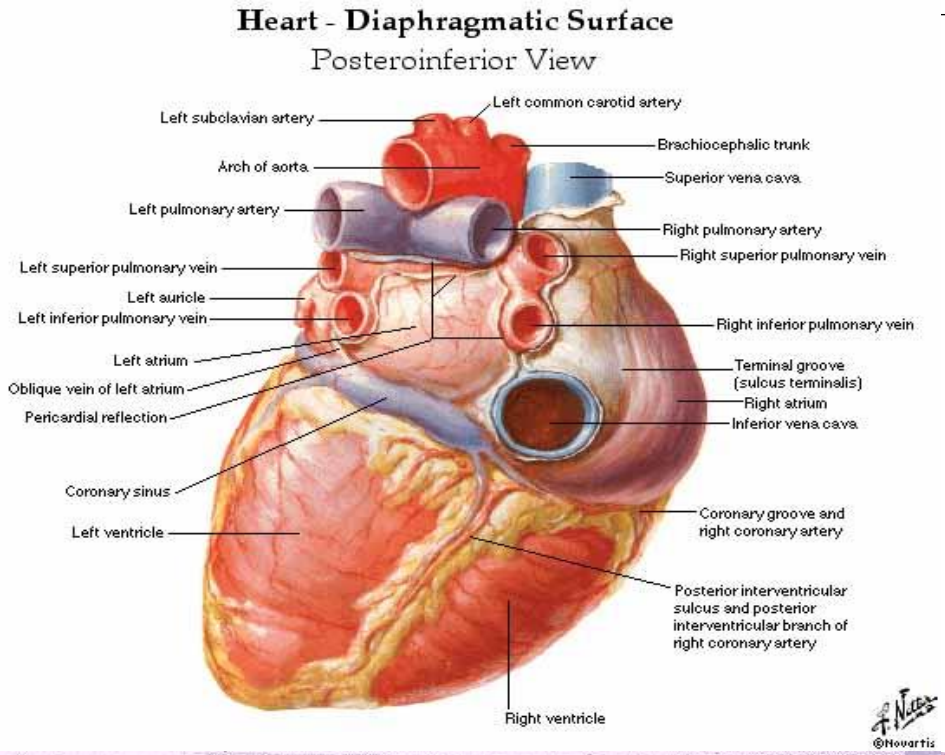
Normal anatomy and histology of organs related to this chapter

Lung



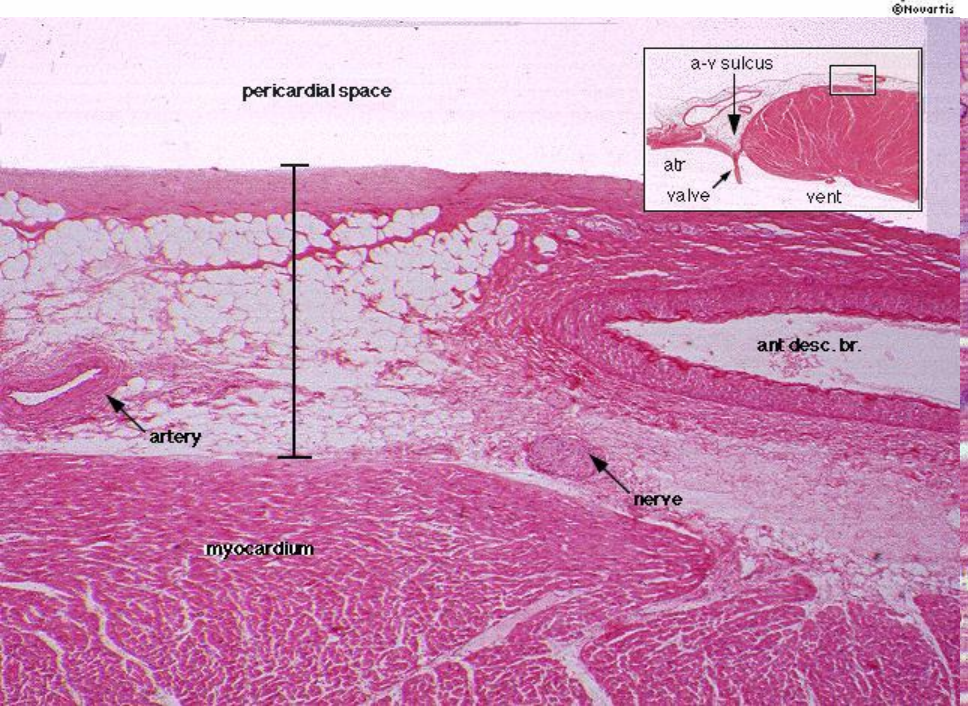


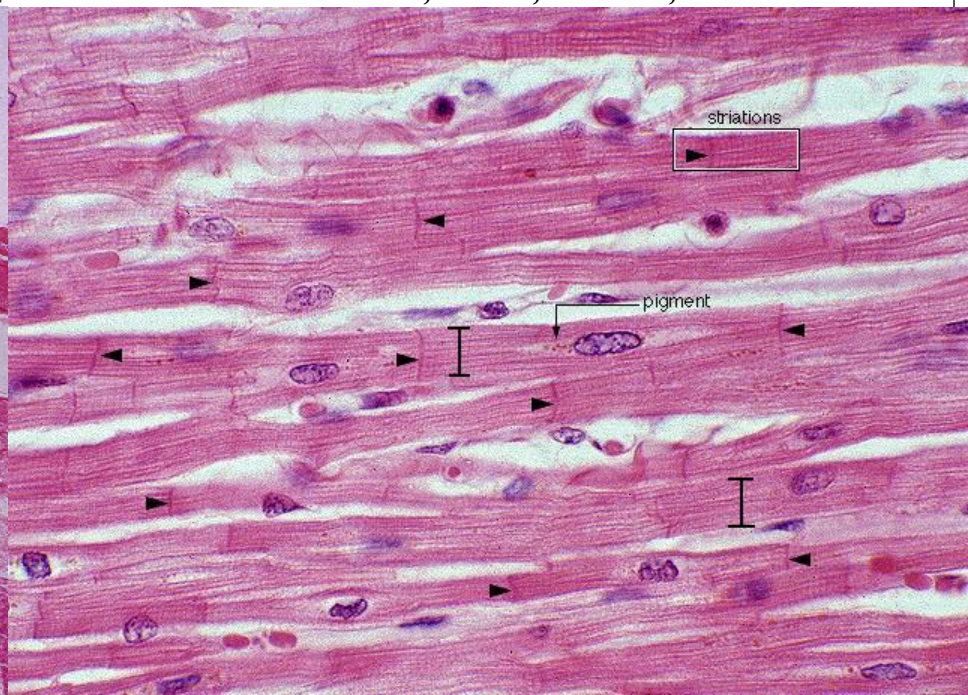

Type I pneumocyte
Type I pneumocyte
Alveolar space
Capillary lumen
Type II pneumocyte
Endothelium

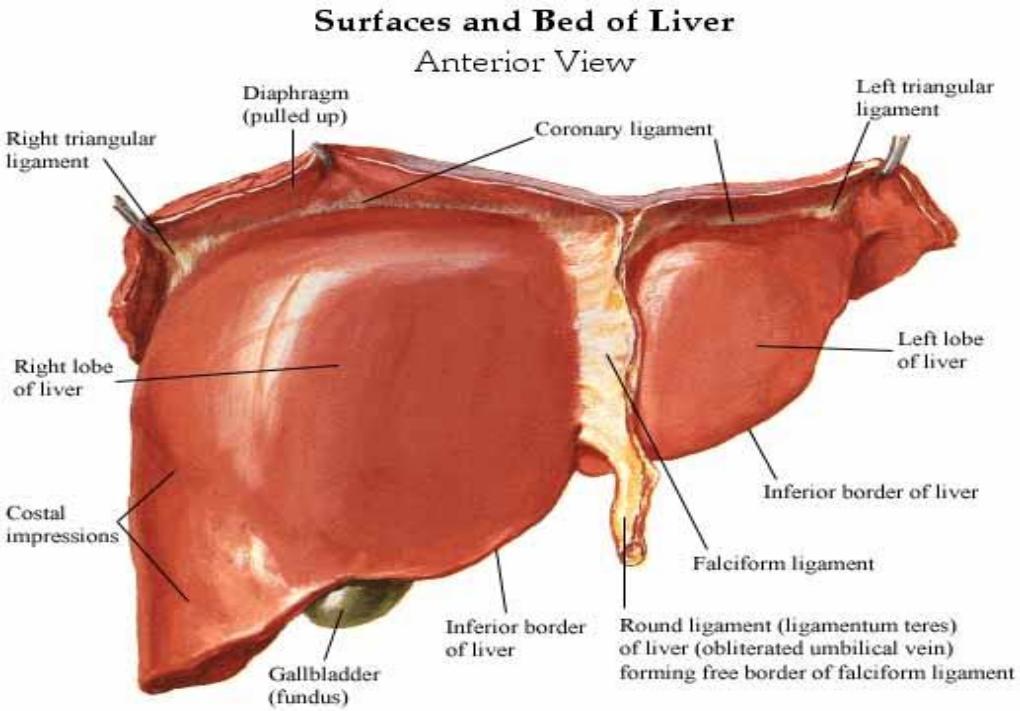


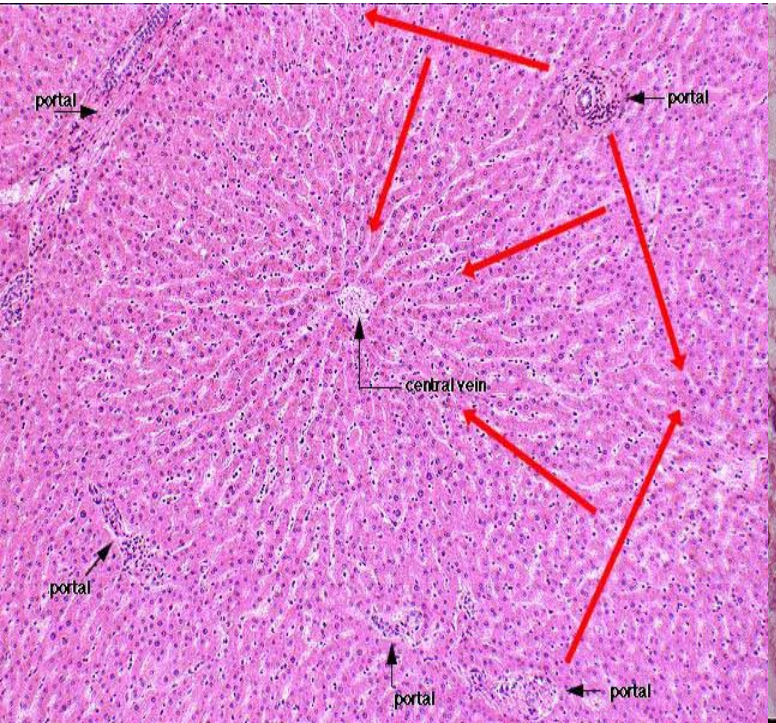
NOTE:

- The heart serves as a **mechanical pump** to supply the entire body with blood, both providing nutrients and removing waste products.
- The great vessels exit the base of the heart.
- Blood flow: body→vena cava→right atrium→right ventricle→lungs→left atrium→left ventricle→body
- The heart consists of 3 layers – the **endocardium**, **myocardium**, and **epicardium**. The **epicardium** (bottom left) consists of arteries, veins, nerves, connective

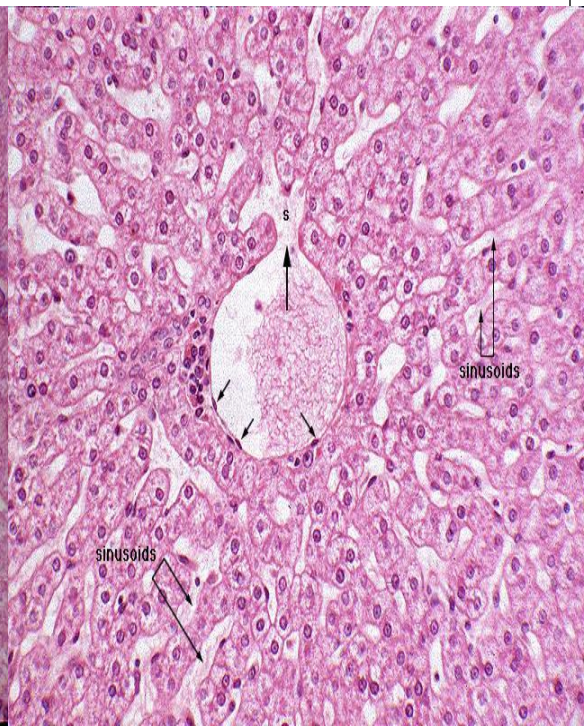


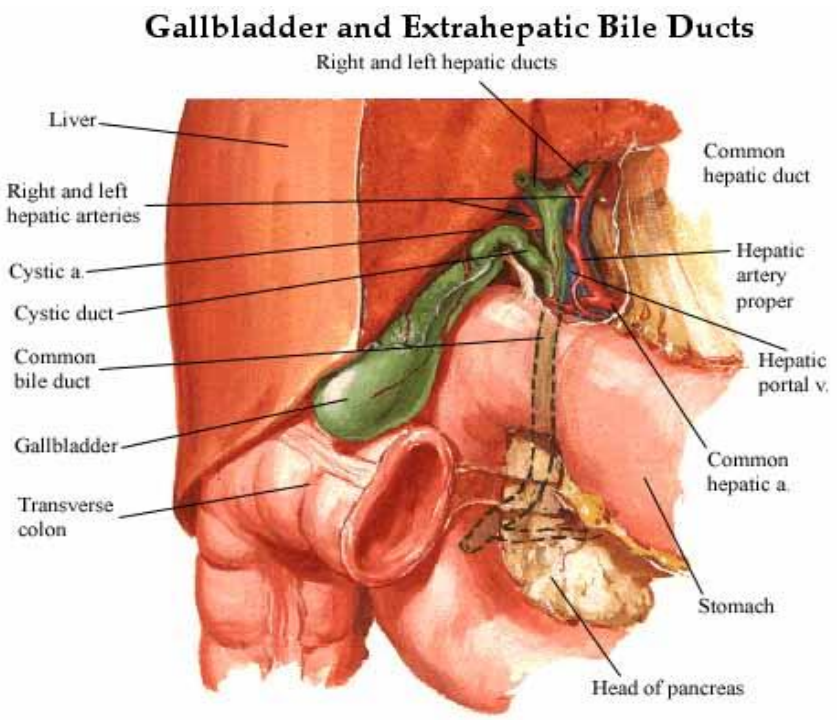


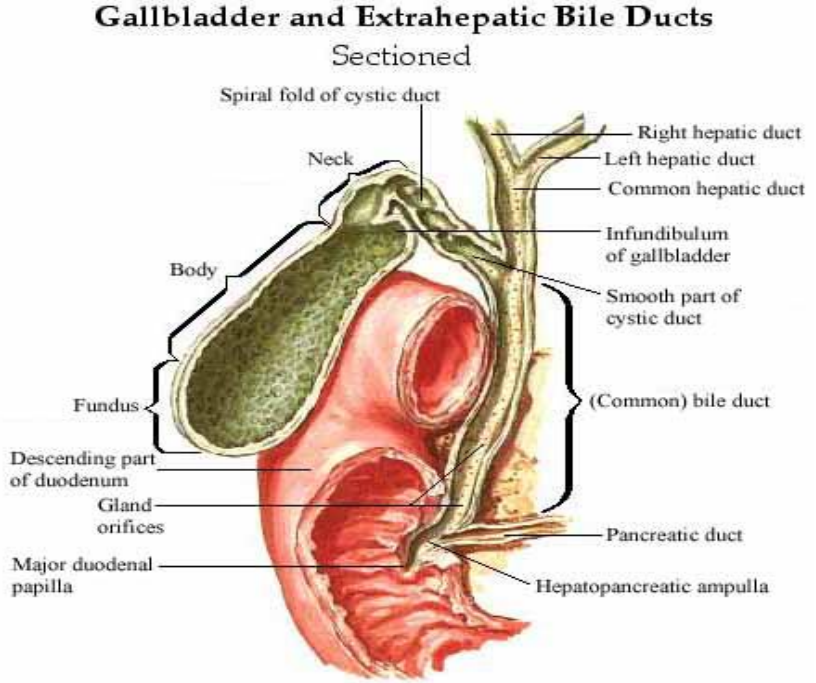

Surfaces and Bed of Liver
Anterior View
Diaphragm (pulled up)
Coronary ligament
Left triangular ligament
Right triangular ligament
Left lobe of liver
Right lobe of liver
Inferior border of liver
Costal impressions
Falciform ligament
Inferior border of liver
Round ligament (ligamentum teres) of liver (obliterated umbilical vein) forming free border of falciform ligament
Gallbladder (fundus)


portal
portal
central vein
portal
portal
portal


hepatic arteriole
bile duct
port. venule
? lymph
portal vein
portal c.t.


s
sinusoids
sinusoids

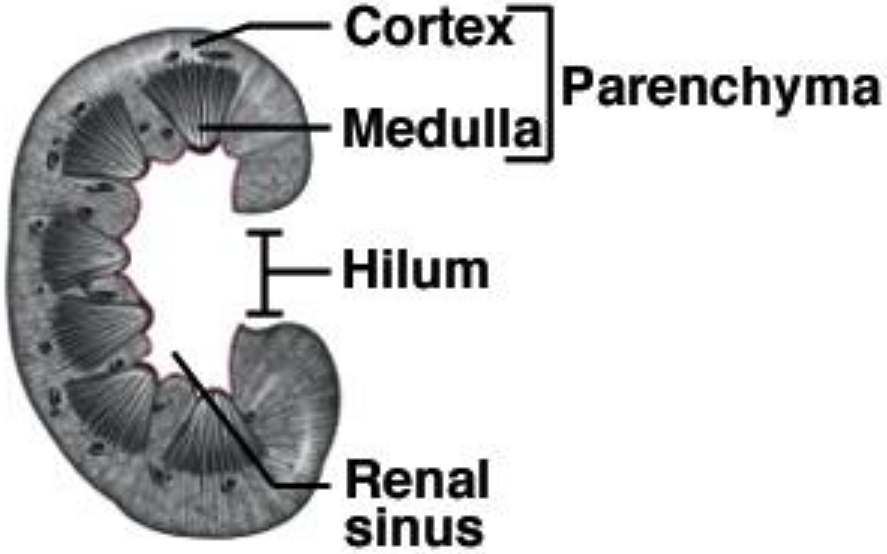

Gallbladder and Extrahepatic Bile Ducts
Right and left hepatic ducts
Liver
Common hepatic duct
Right and left hepatic arteries
Hepatic artery proper
Cystic a.
Cystic duct
Hepatic portal v.
Common bile duct
Gallbladder
Common hepatic a.
Transverse colon
Stomach
Head of pancreas

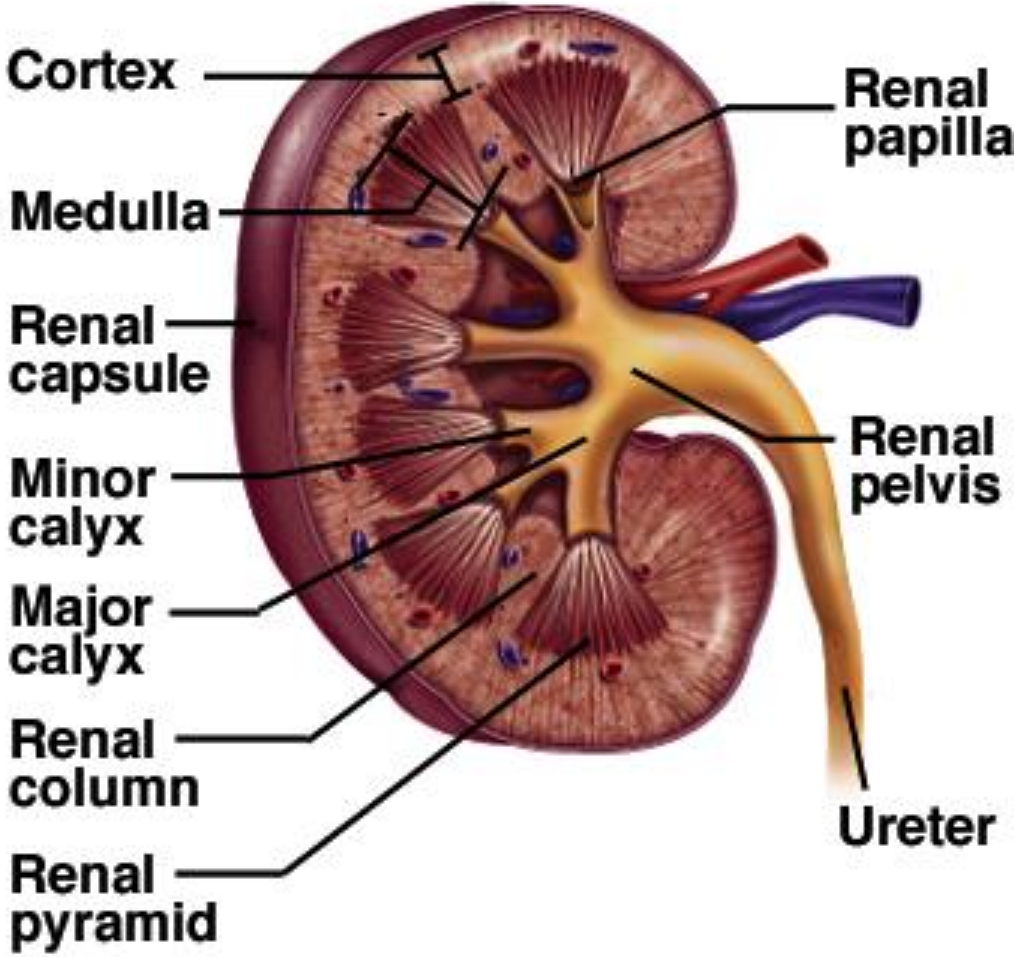

Gallbladder and Extrahepatic Bile Ducts
Sectioned
Spiral fold of cystic duct
Right hepatic duct
Neck
Left hepatic duct
Common hepatic duct
Infundibulum of gallbladder
Body
Smooth part of cystic duct
Fundus
(Common) bile duct
Descending part of duodenum
Gland orifices
Pancreatic duct
Major duodenal papilla
Hepatopancreatic ampulla


lumen
lumen
muscularis
adventitia (serosa)

APPENDIX

Anatomy of Kidney





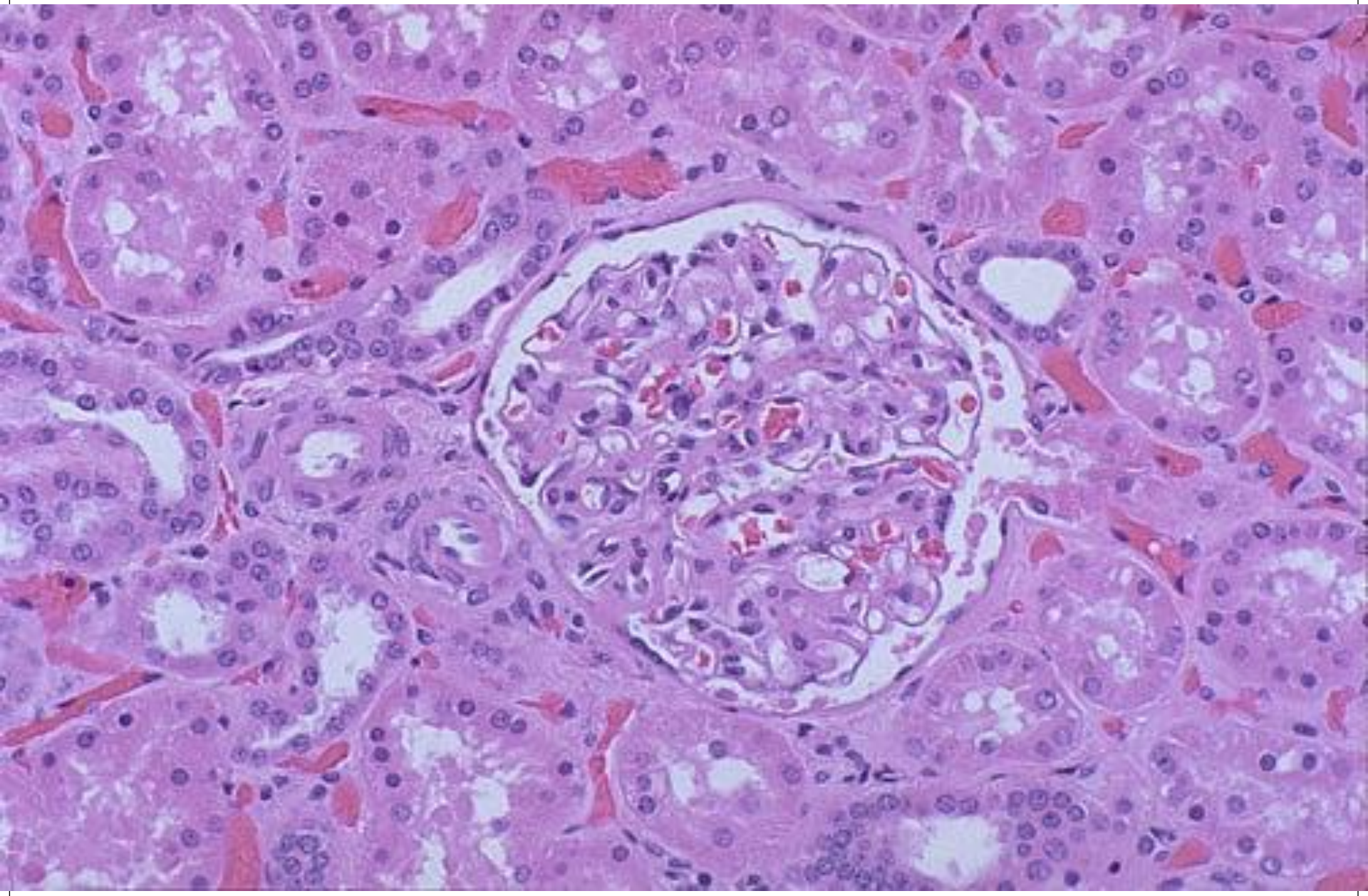


Figure 26.6

SKIN

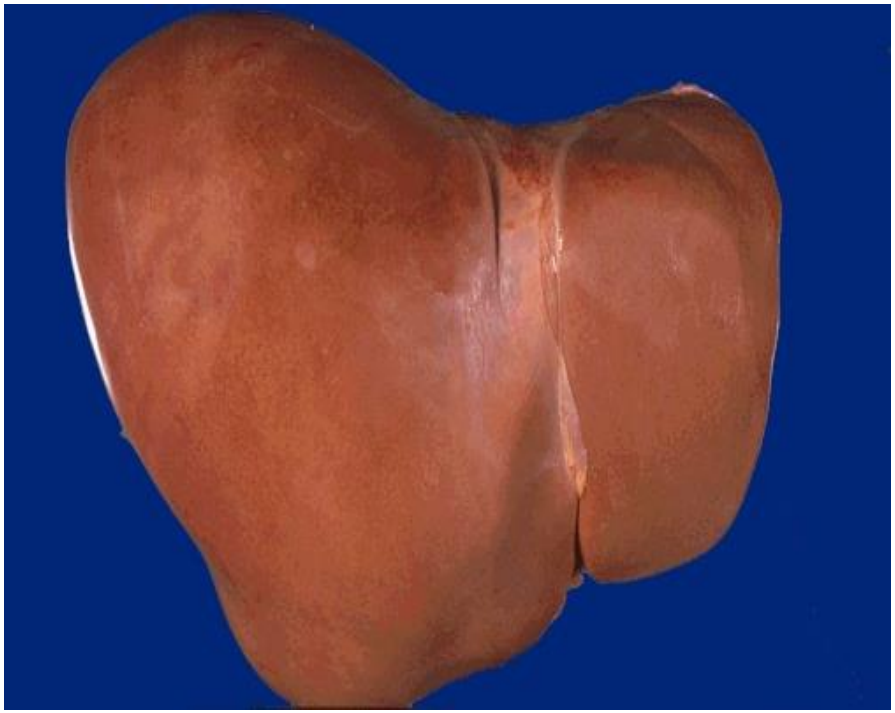
CNS

CELL INJURY

Gross and Histopathology

1- FATTY LIVER (STEATOSIS)

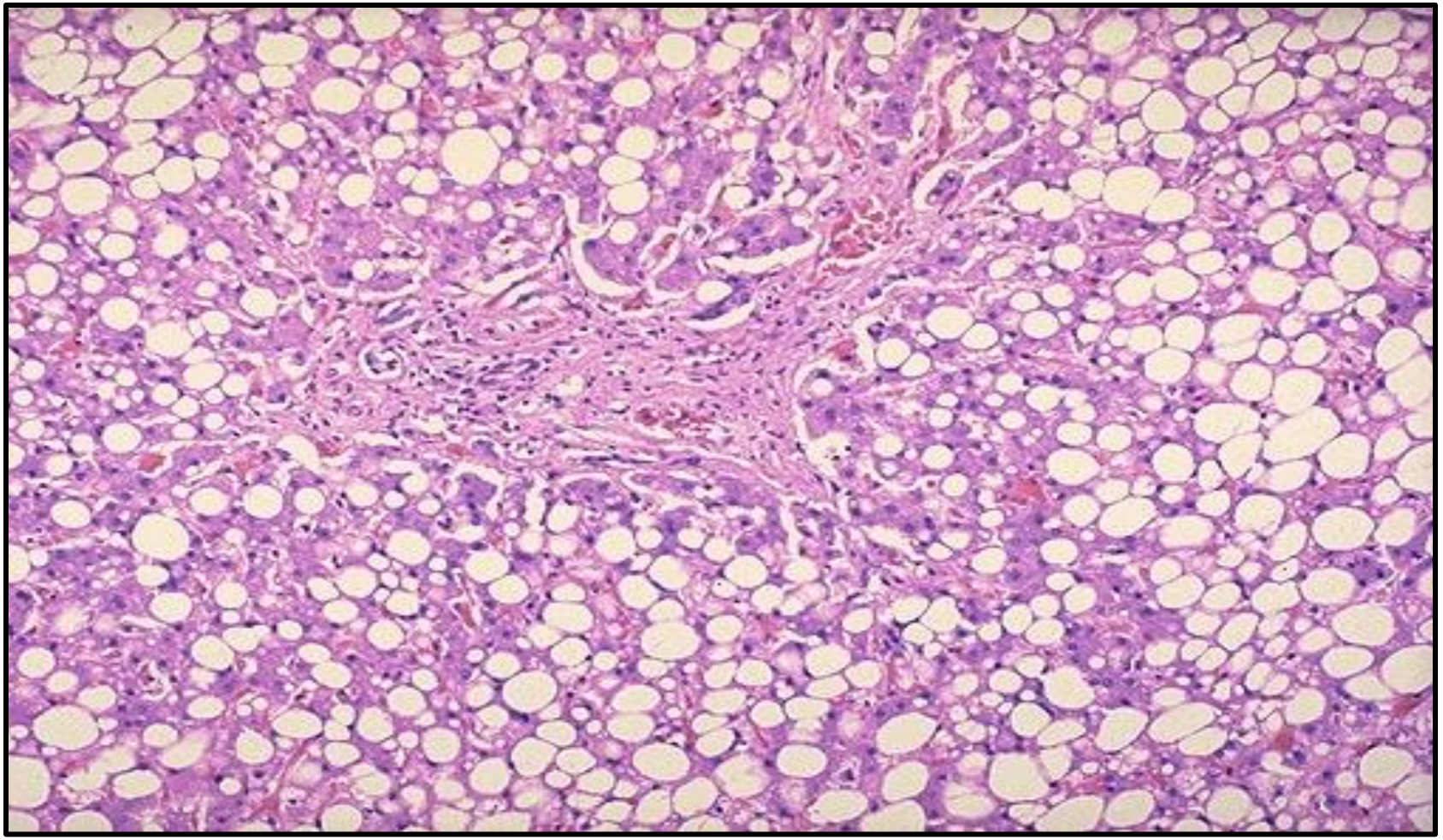
Normal Liver & Cut Section of Fatty Liver



Normal Liver :This is the external surface of a normal liver.The color is brown and the surface is smooth

Steatosis :This liver is slightly enlarged and has a pale yellow appearance, seen both on the capsule and cut surface

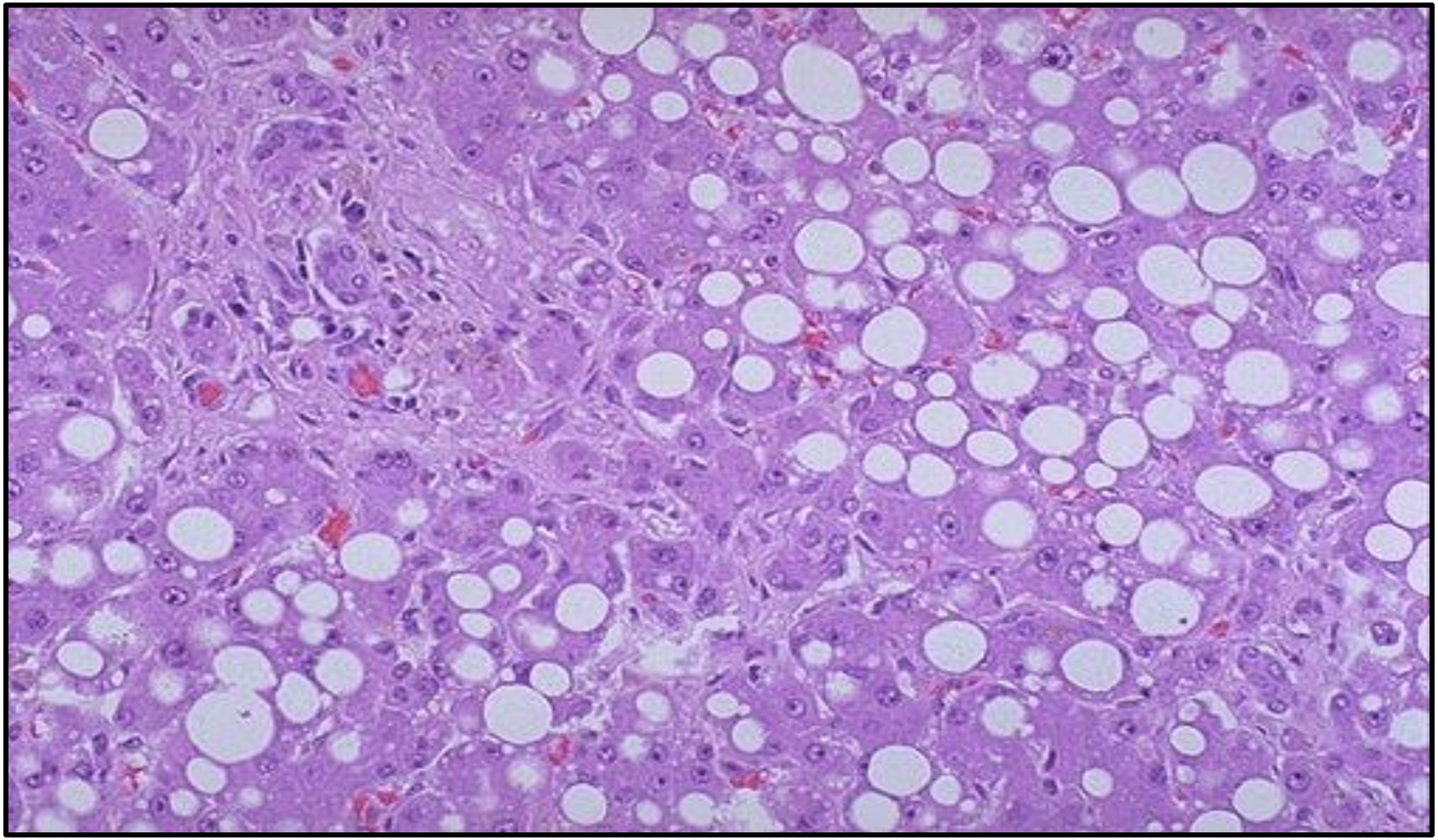
Steatosis – Fatty Liver



This is the histologic appearance of hepatic fatty change. Liver Cells containing fat vacuoles

The most common cause of fatty change in developed nations is alcoholism. Other causes are: Morbid obesity and Hepatitis C

Steatosis – Fatty Liver



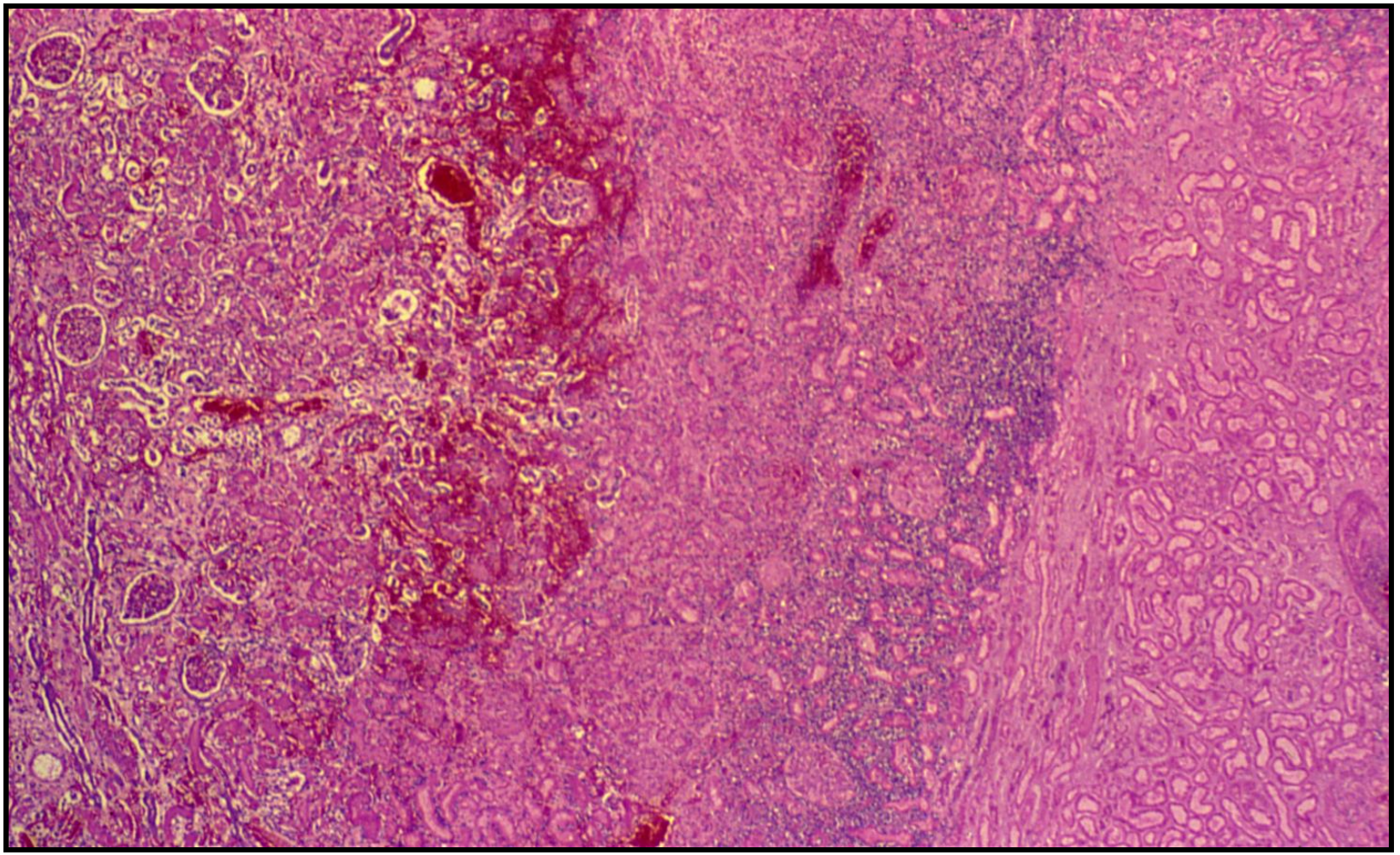
Here are seen the lipid vacuoles within hepatocytes.
The lipid accumulates when lipoprotein transport is disrupted and/or when fatty acids accumulate.
Alcohol is the most common cause

2- COAGULATIVE NECROSIS

Coagulative Necrosis of the Kidney

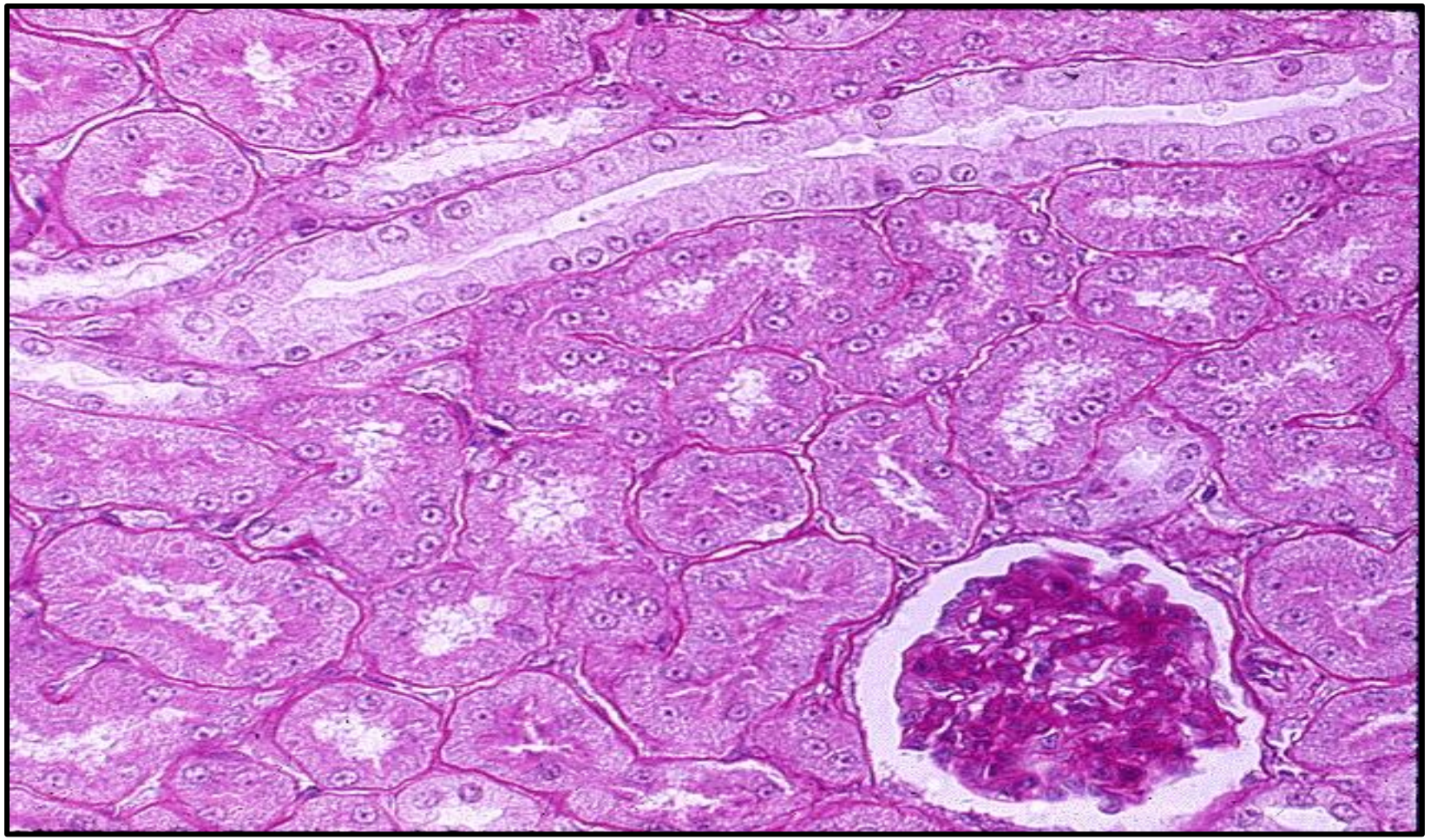
A typical pattern with ischemia and infarction of the kidney. Here, there is a wedge-shaped pale area of coagulative necrosis (infarction) in the renal cortex of the kidney.

Coagulative Necrosis of the Kidney - LPF



Coagulative necrosis of glomeruli, tubules and interstitial tissue with loss of cell nuclei. The haemorrhagic zone at the periphery of the infarct shows dilated and congested blood vessels and cellular infiltrate by neutrophils, red blood cells and lymphocytes

Coagulative Necrosis of the Kidney - HPF

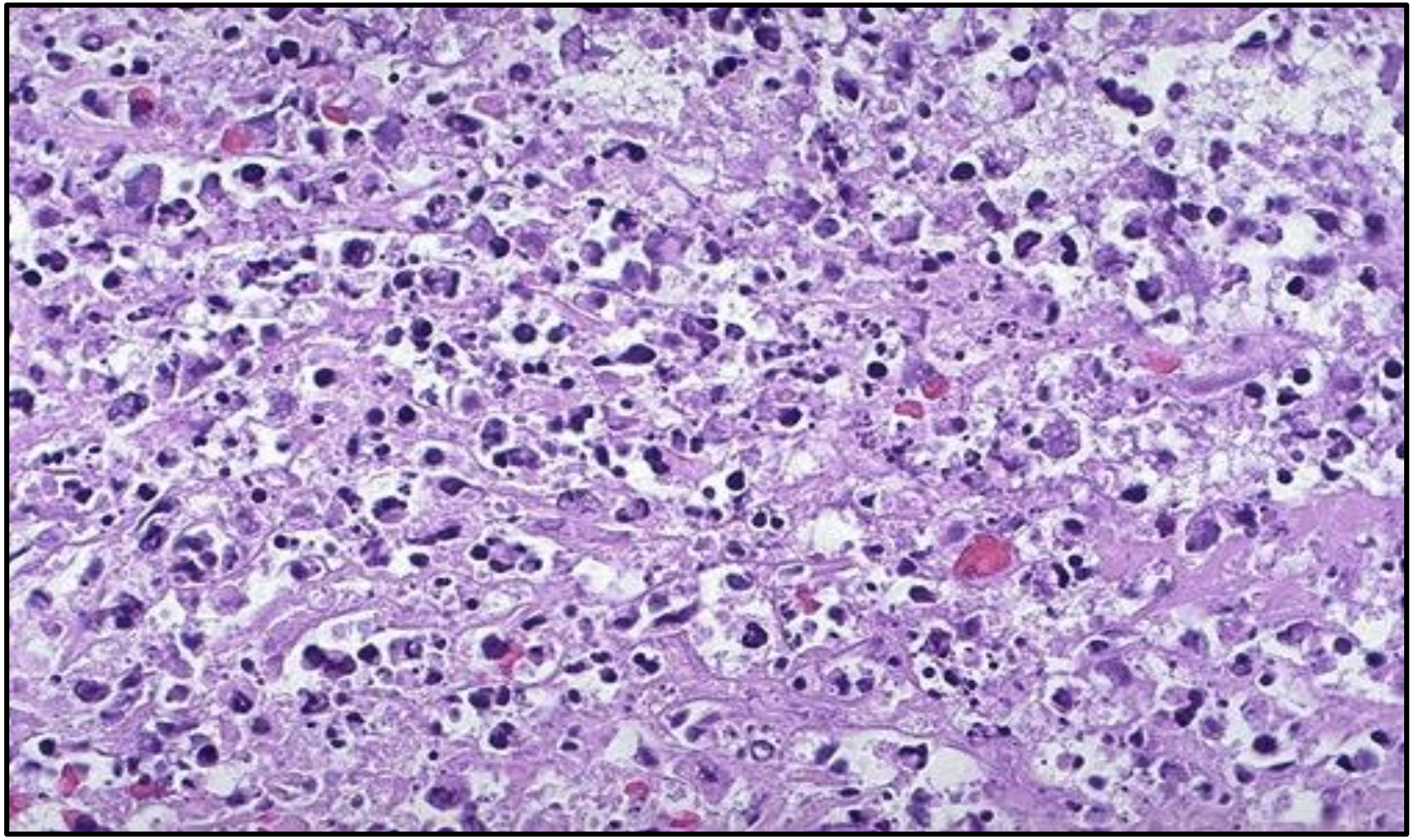


The majority of the tubules seen here are proximal convoluted tubules. The PAS stain colors the brush border of these structures a deep pink-lavender.
A pale-staining collecting duct stands out in contrast to the abundant proximal tubules

Coagulative Necrosis of the Spleen

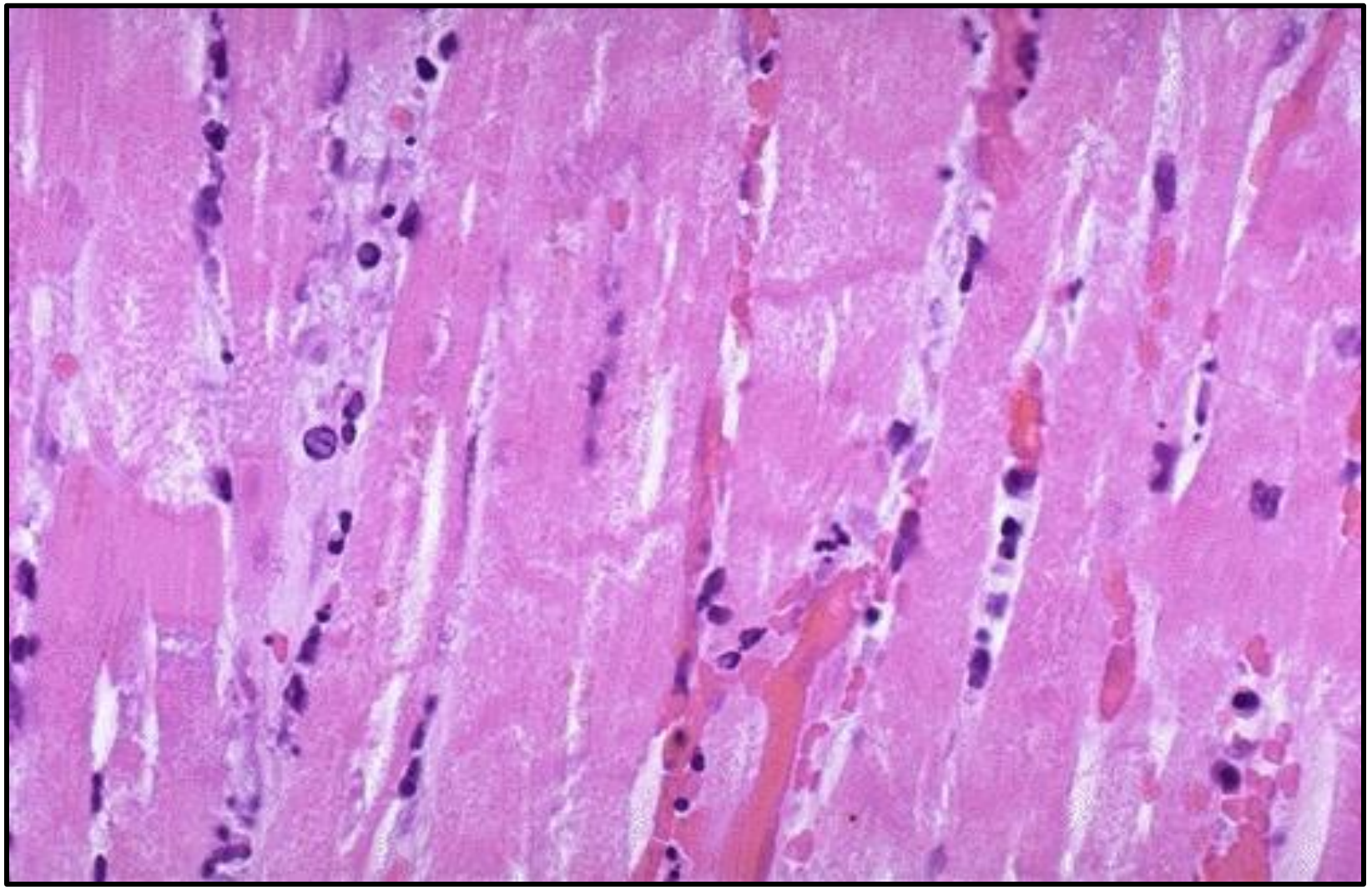
Two large infarctions (areas of coagulative necrosis) are seen in this sectioned spleen

Coagulative Necrosis of Infarcted Myocardium



Many nuclei have become pyknotic (shrunken and dark) and have then undergone karyorrhexis (fragmentation) and karyolysis (dissolution). The cytoplasm and cell borders are not recognizable.

Coagulative Necrosis of Infarcted Myocardium



The nuclei of the myocardial fibers are being lost.
The cytoplasm is losing its structure, because no well-defined cross-striations are seen.

3- Liquefactive Necrosis

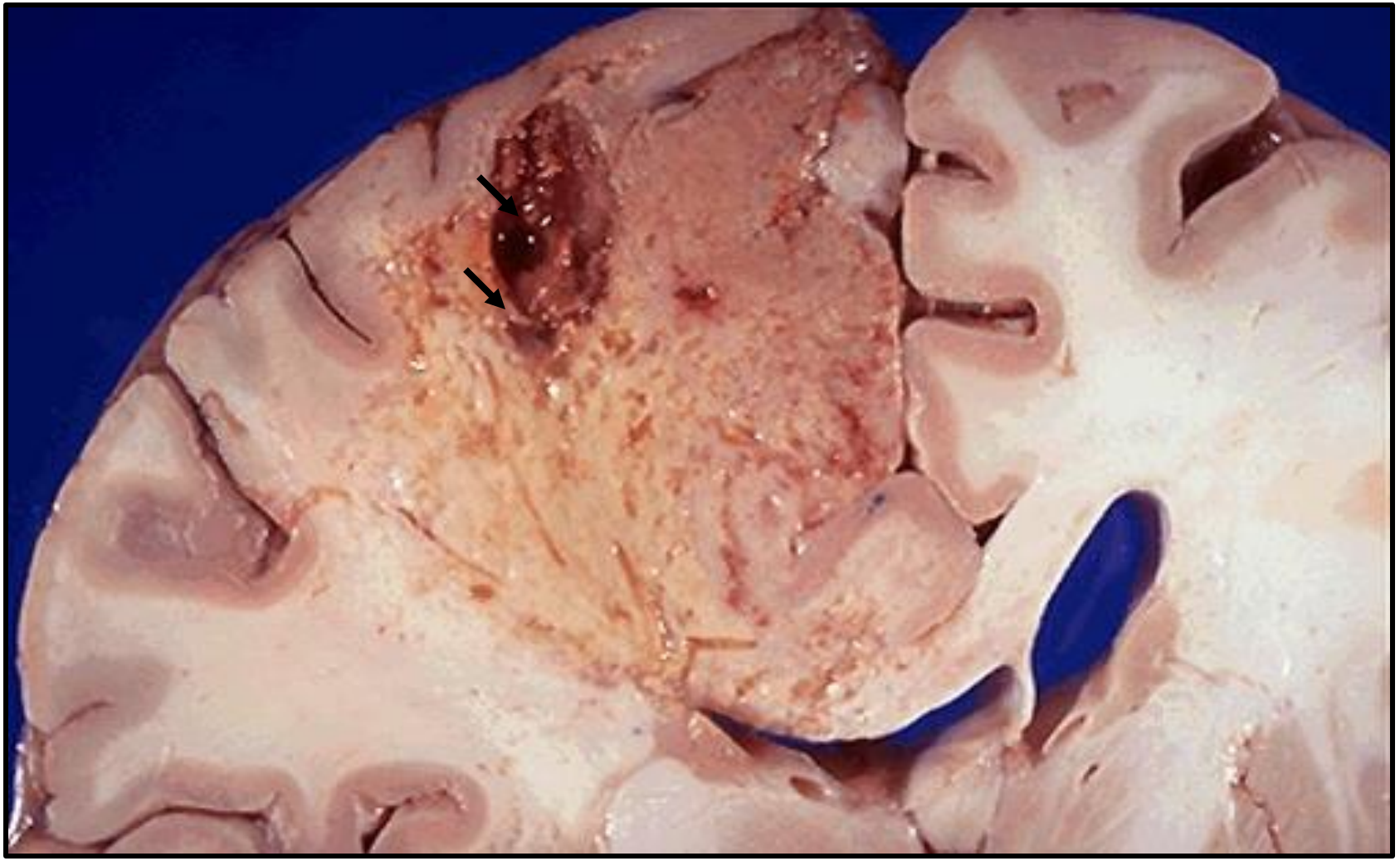
Liquefactive Necrosis of the Brain

Liquefactive necrosis

Cystic or cavity formation

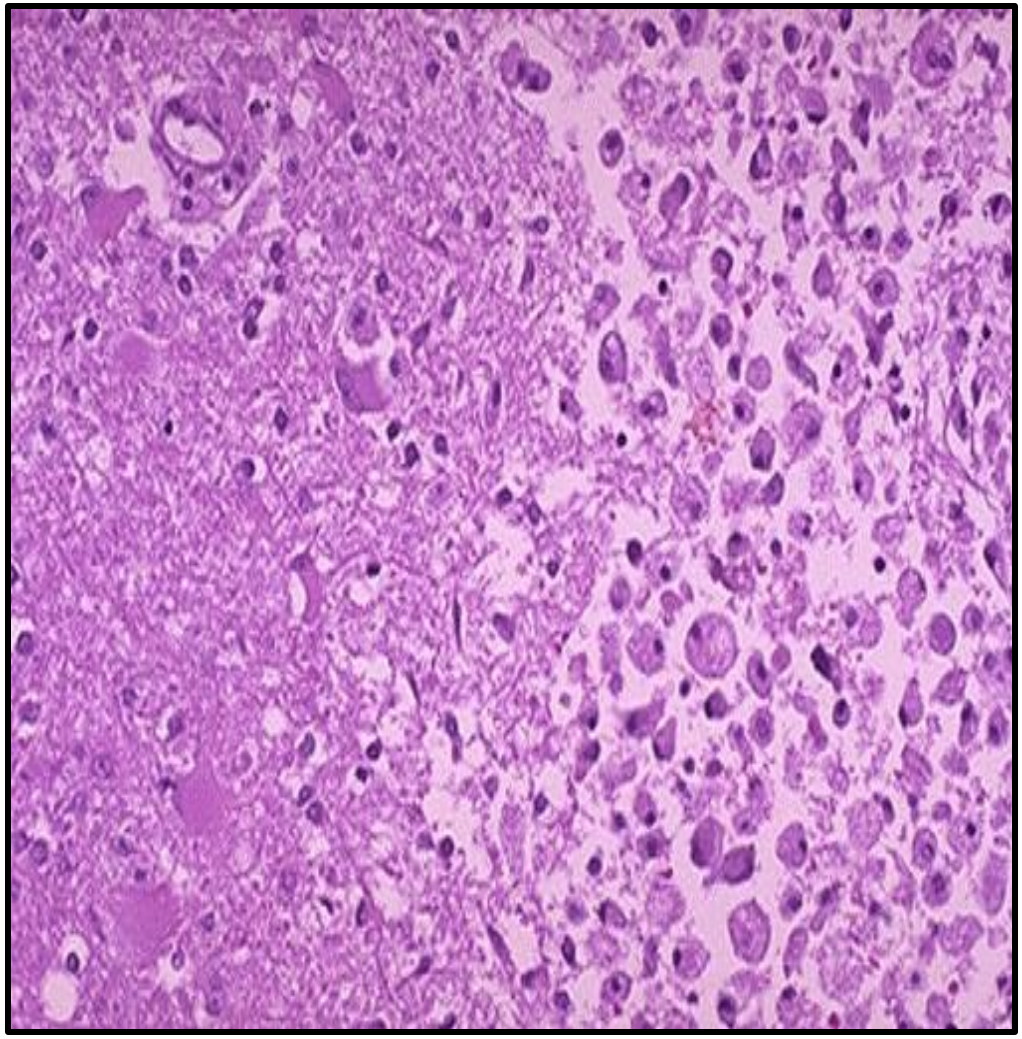
Grossly, the cerebral infarction at the upper right here demonstrates liquefactive necrosis. Brain infarction leading to ischemia is the most common cause of such type of lesions

Liquefactive Necrosis of the Brain



Liquefactive necrosis in brain leads to resolution with cystic spaces. The necrotic area is found in the upper right quadrant of the visual field.

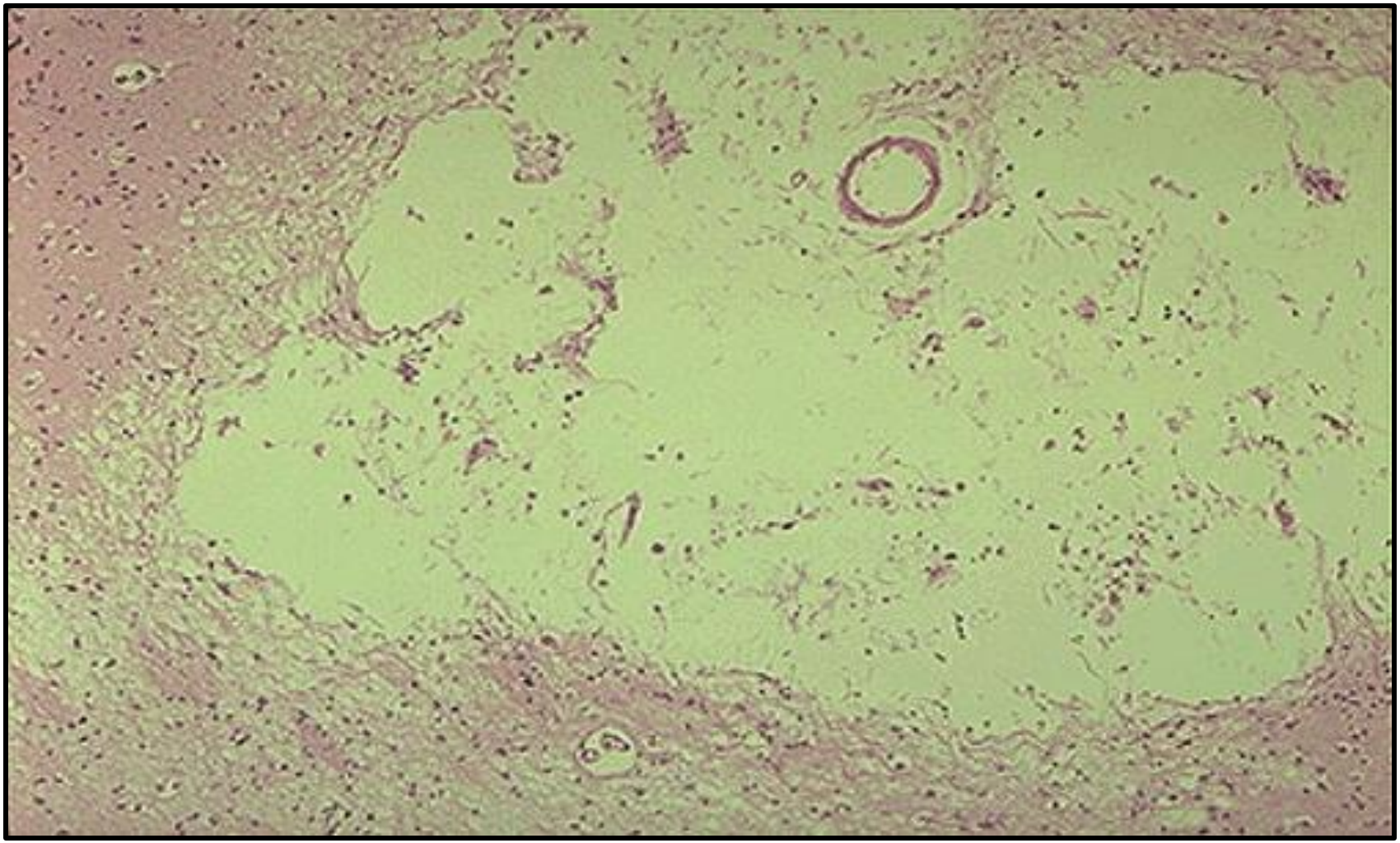
Liquefactive Necrosis of the Brain



- Macrophages
- Gliosis

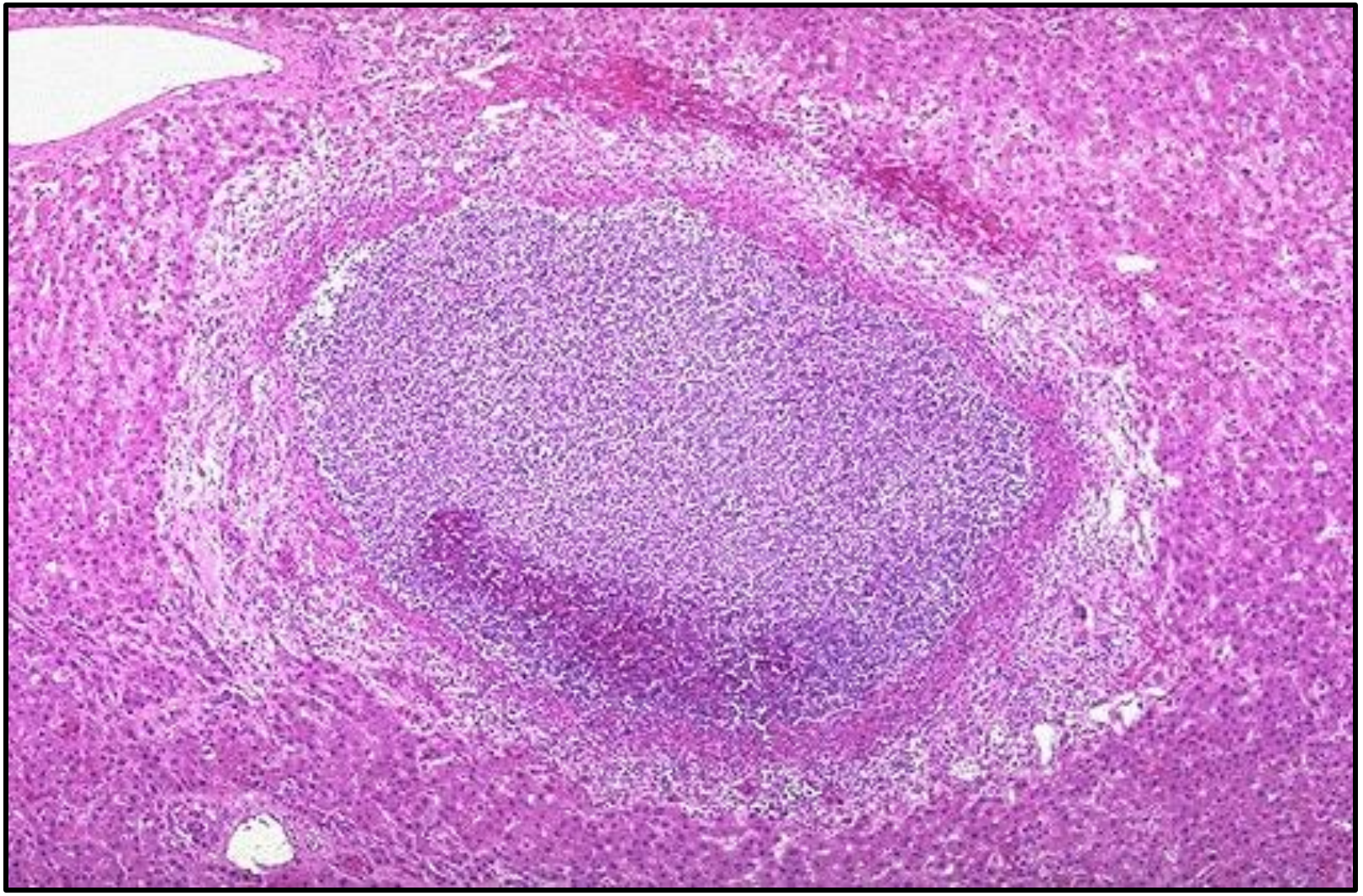
This cerebral infarction demonstrates the presence of many macrophages at the right which are cleaning up the lipid debris from the liquefactive necrosis.

Liquefactive Necrosis of the Brain



This is the microscopic appearance of a lacunar infarct. Note that it is a cystic space from the resolved liquefactive necrosis. There can be hemosiderin pigment from hemorrhage as well.

Liquefactive Necrosis - Liver Abscess



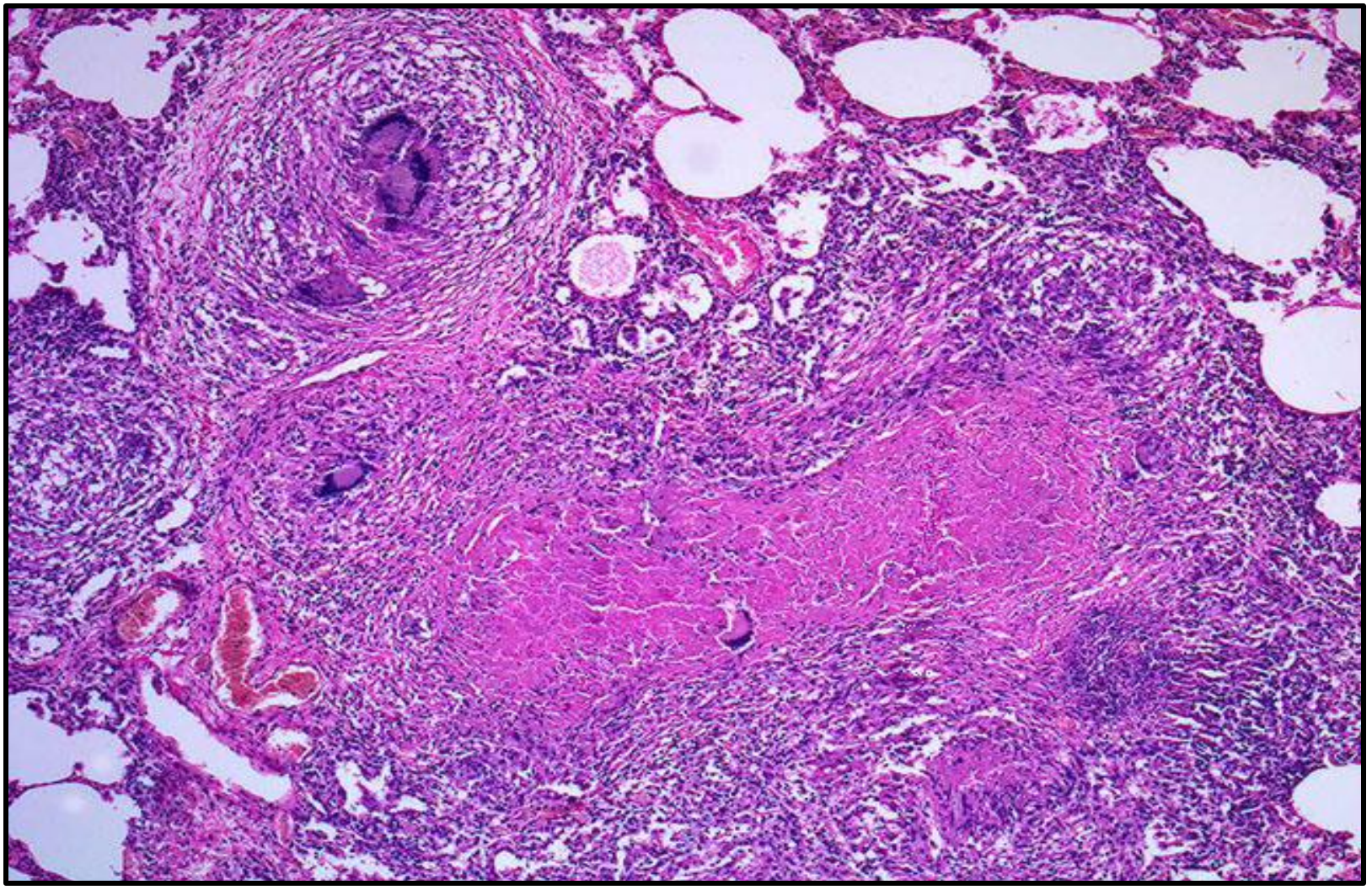
The liver shows a small abscess here filled with many neutrophils. This abscess is an example of localized liquefactive necrosis

4- Caseous Necrosis

Caseous Necrosis of the Lung "TB. Lung"

Tuberculosis of the lung, with a large area of caseous necrosis containing yellow-white and cheesy debris

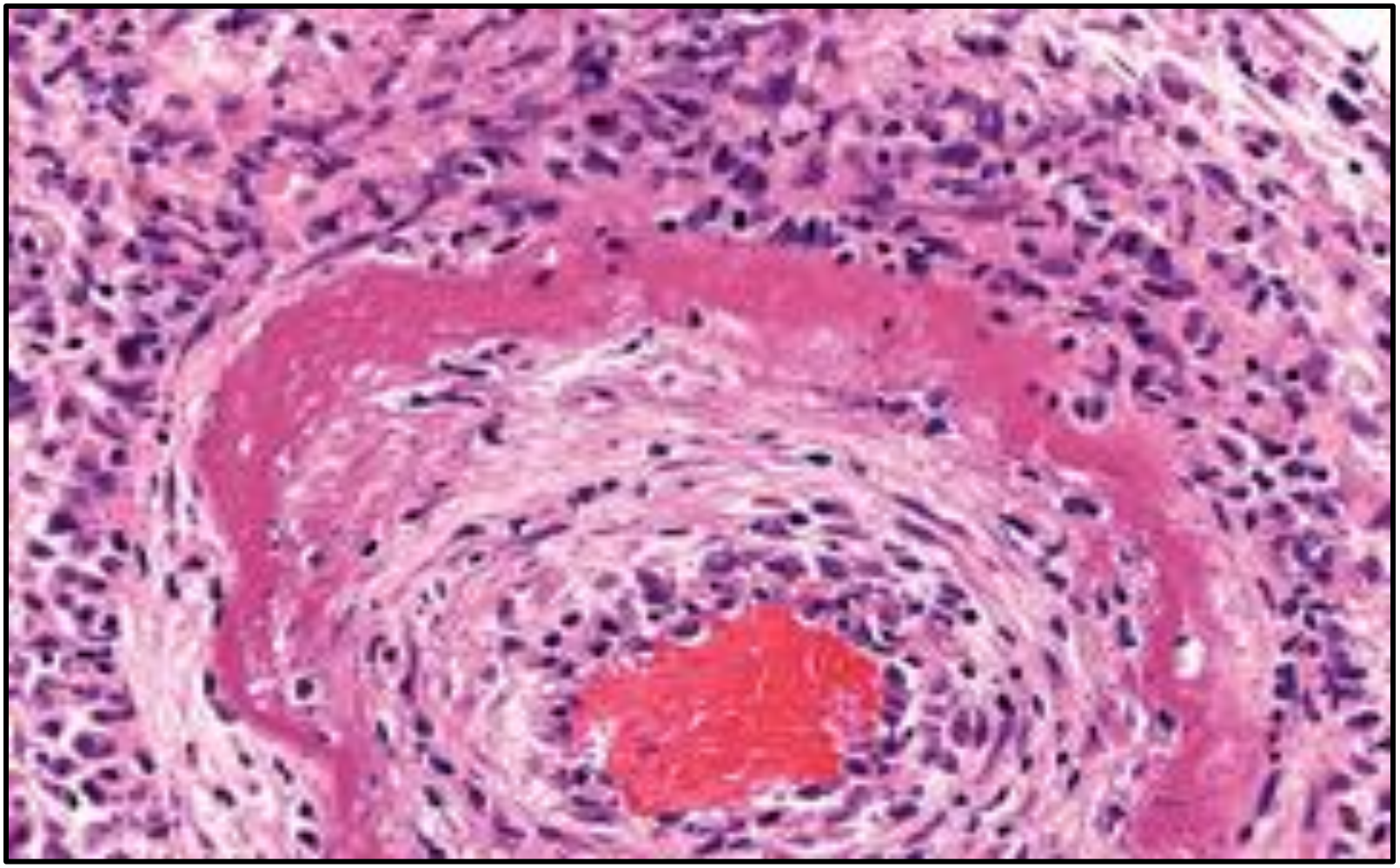
T.B. Granuloma with Central Caseous Necrosis



Multiple caseating granulomas with giant cells and caseous necrosis. Note preserved alveolar spaces at the margins of the field.

5 – Fibrinoid Necrosis

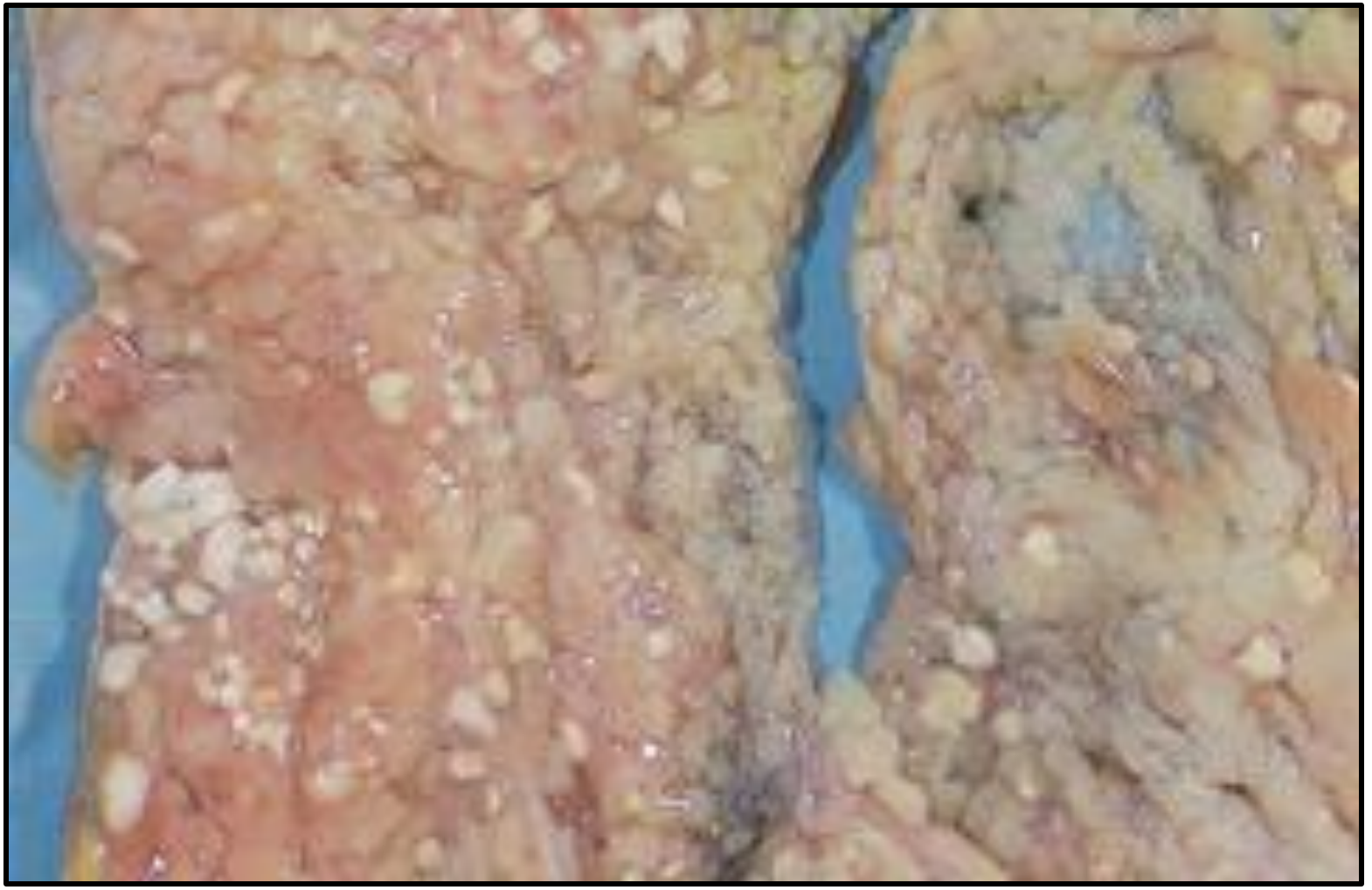
Fibrinoid Necrosis of an Artery - HPF



Fibrinoid necrosis in an artery. The wall of the artery shows a circumferential bright pink area of necrosis with inflammation (neutrophils with dark nuclei).

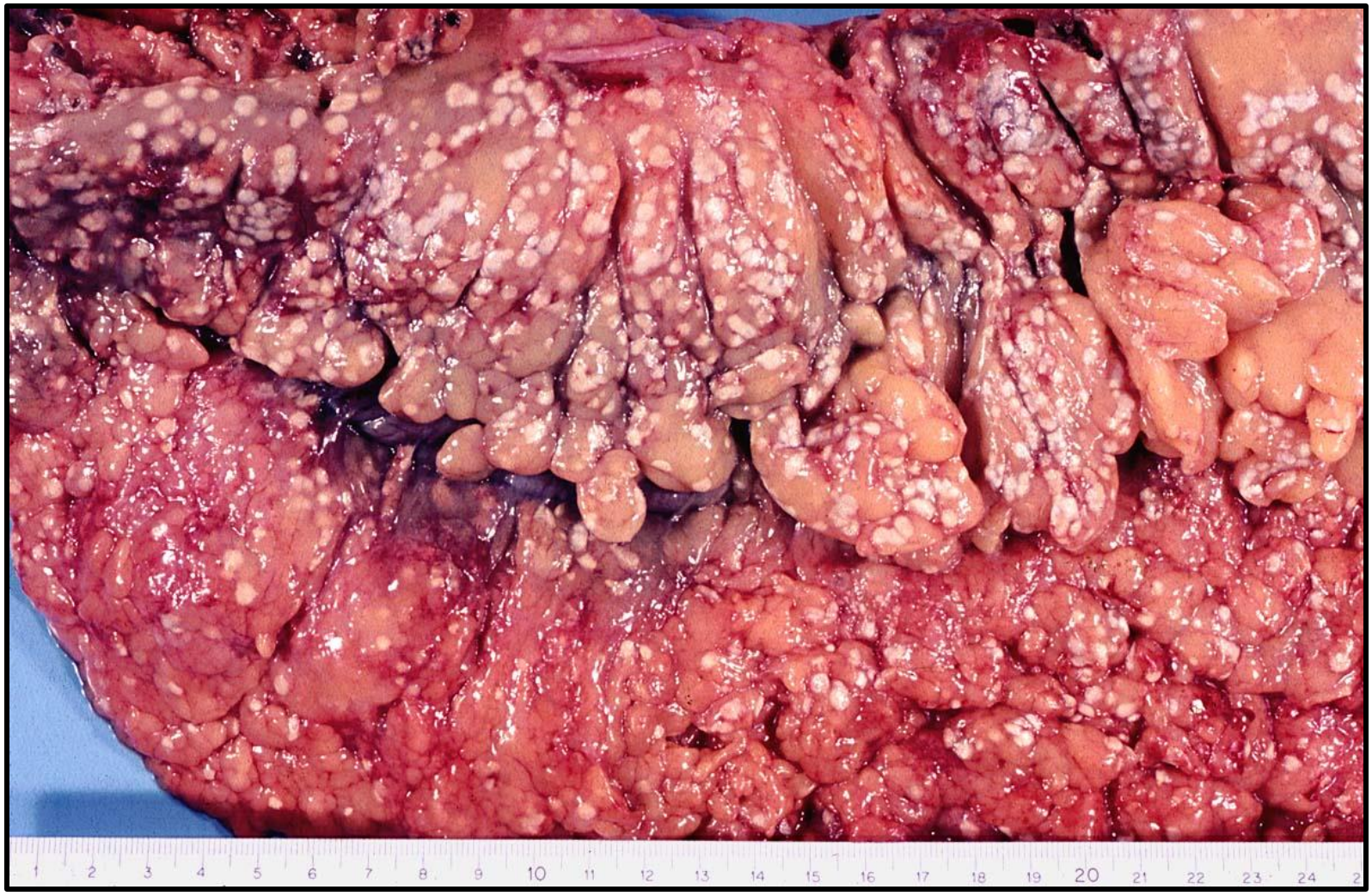
6 – Fat Necrosis

Fat Necrosis in the Mesentery



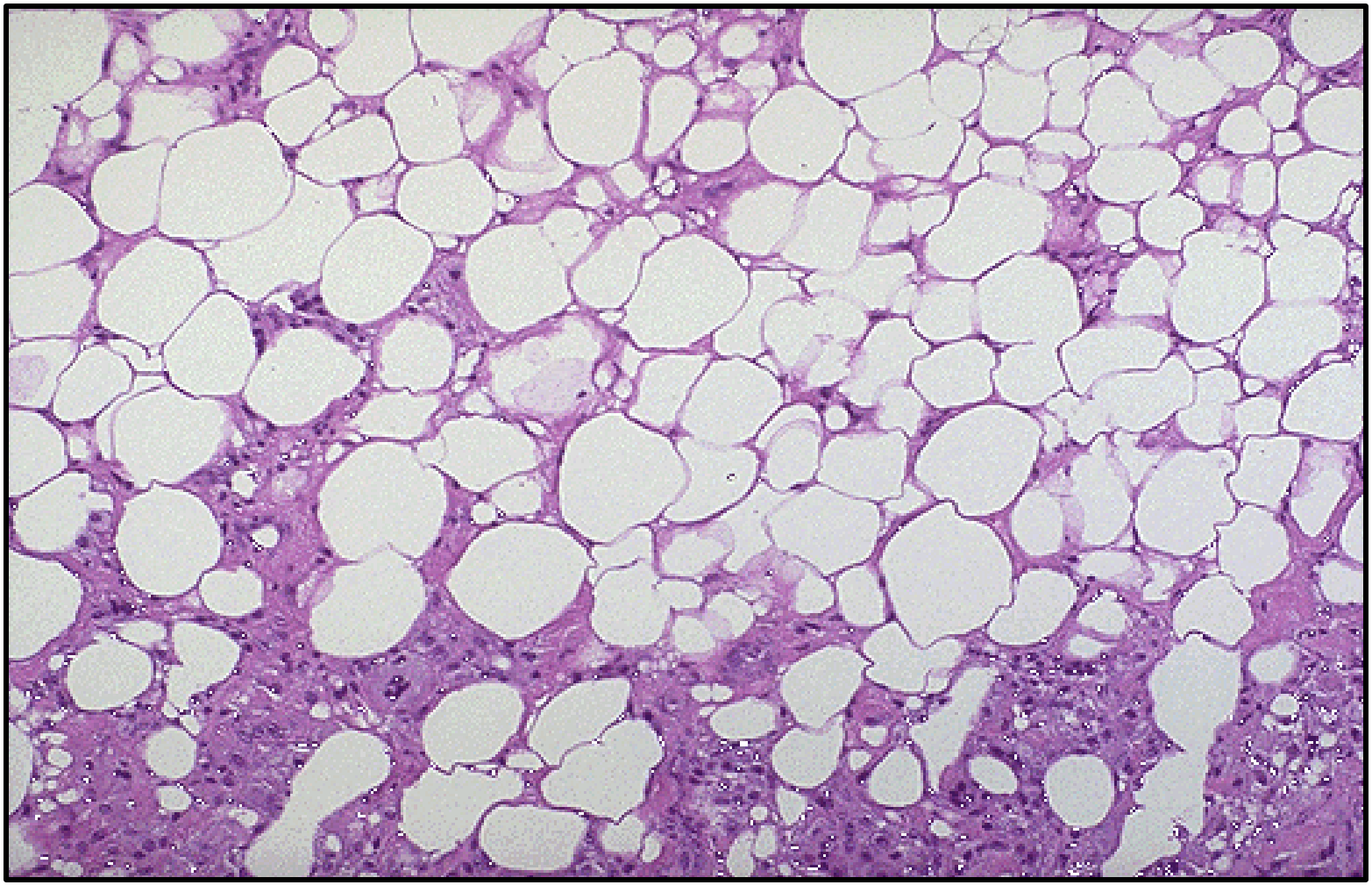
The areas of white chalky deposits represent foci of fat necrosis with calcium soap formation (saponification) at sites of lipid breakdown in the mesentery

Fat Necrosis in the Mesentery



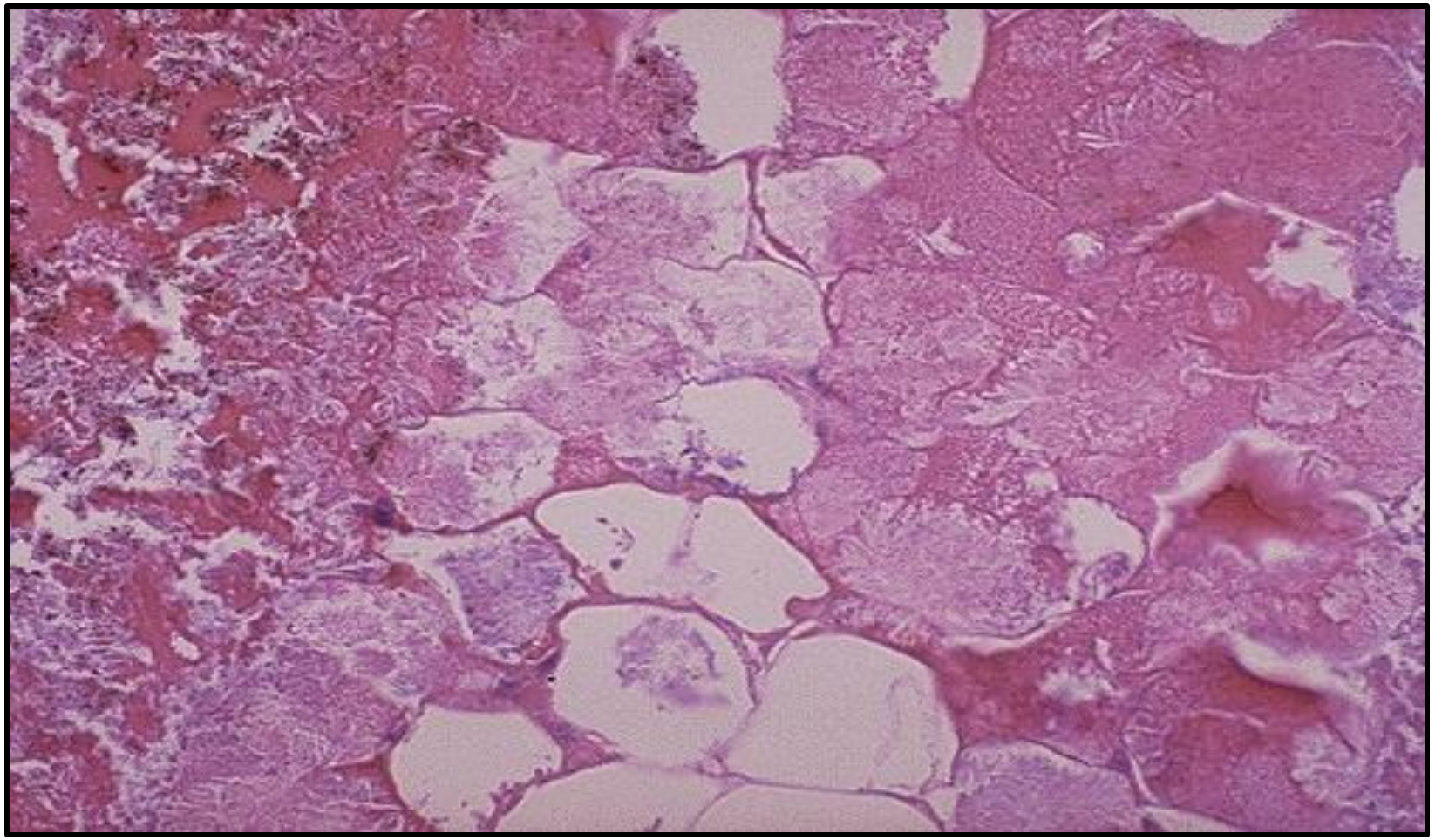
Fat necrosis of the mesentery in a case of acute pancreatitis
Numerous round white fat necroses

Fat Necrosis – Histopathology



The necrotic fat cells have vague cellular outlines, have lost their peripheral nuclei, and their cytoplasm has become a pink amorphous mass of necrotic material

Fat Necrosis – Histopathology



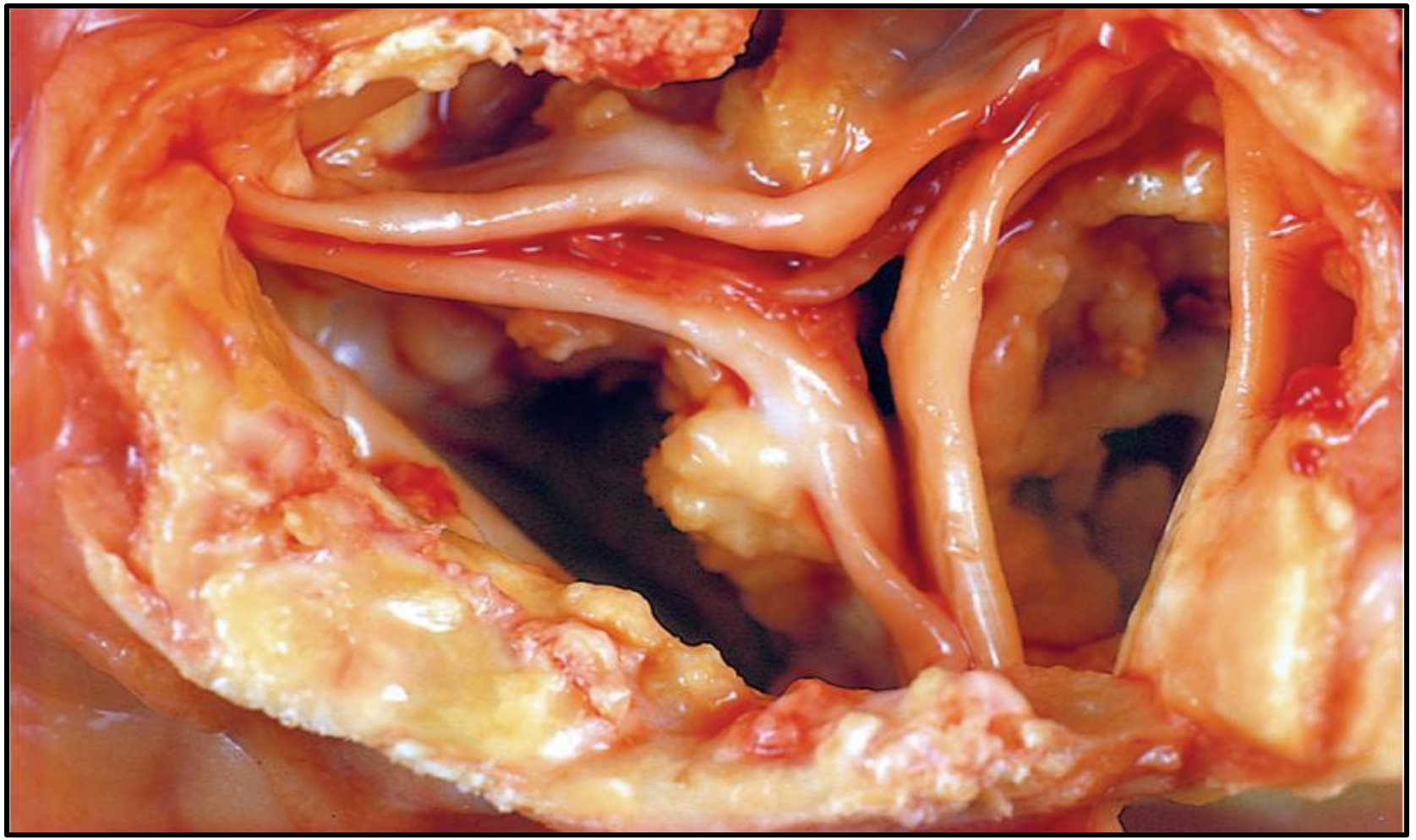
Fat necrosis adjacent to pancreas is seen here.There are some remaining steatocytes at the left which are not necrotic.

The necrotic fat cells at the right have vague cellular outlines, have lost their peripheral nuclei, and their cytoplasm has become a pink amorphous mass of necrotic material

7 - Dystrophic calcification

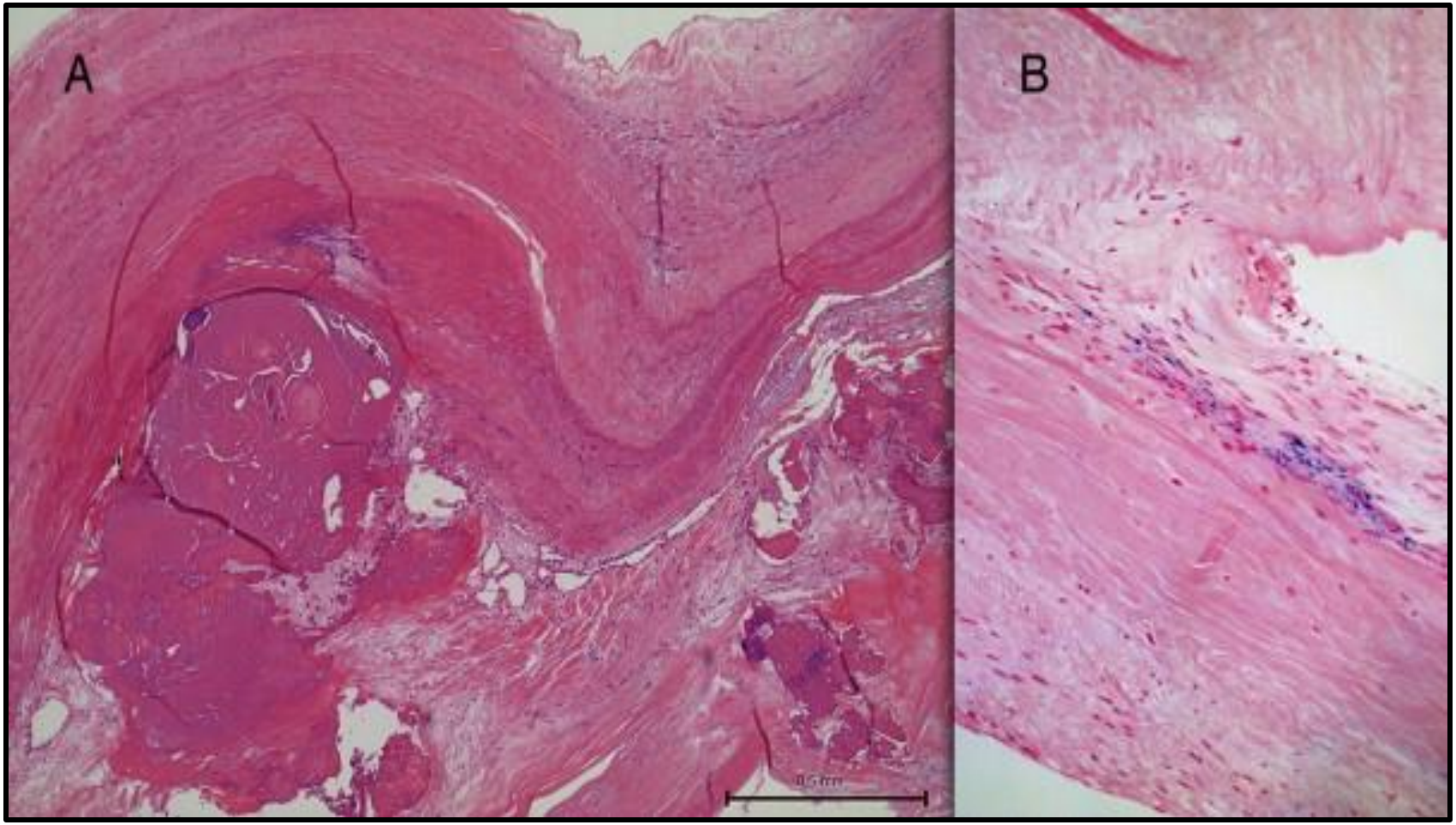
(Aortic valve – Stomach - Skin)

Dystrophic calcification of Aortic Valve



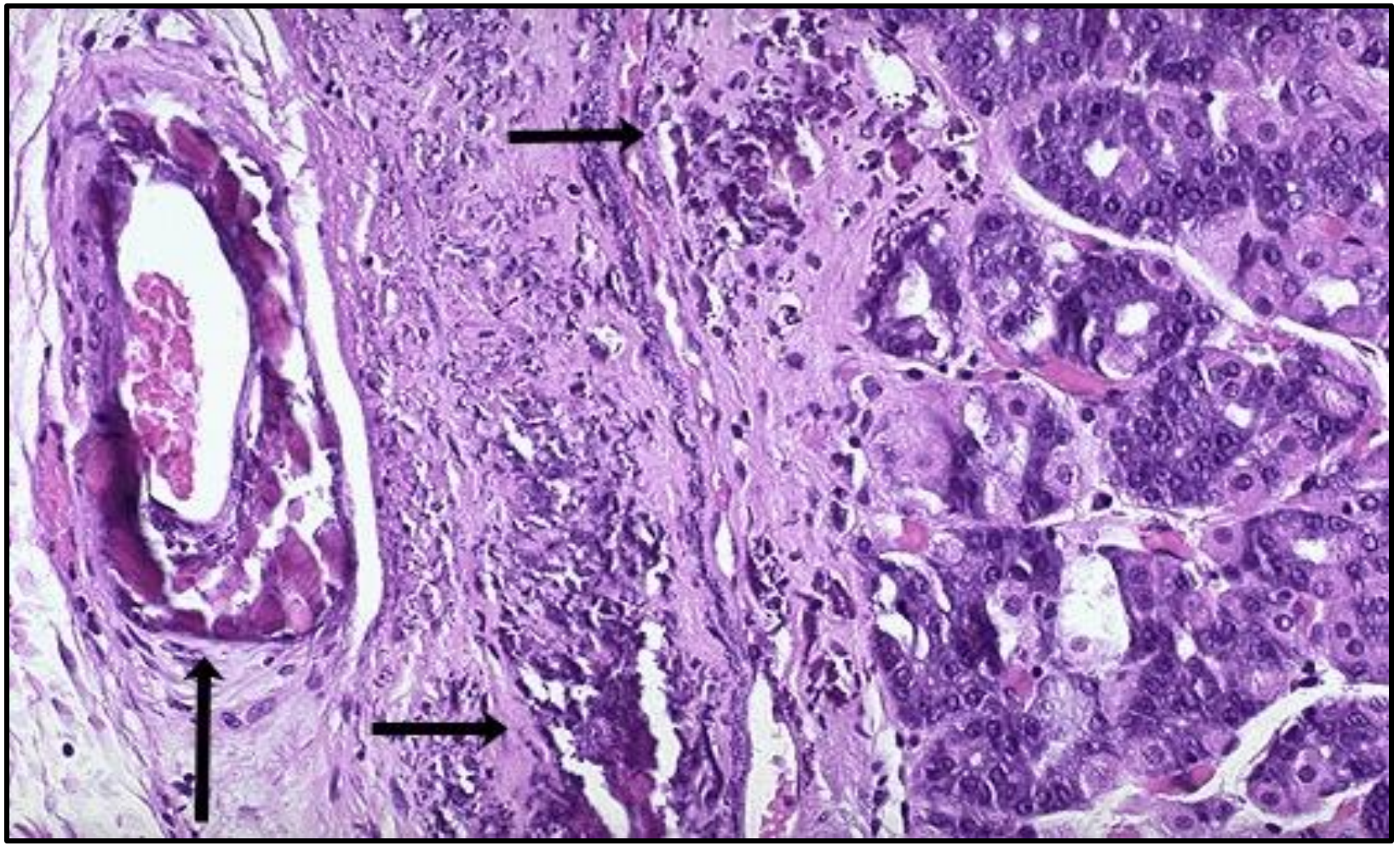
View looking down onto the unopened aortic valve in a heart with calcific aortic stenosis. It is markedly narrowed (stenosis). The semilunar cusps are thickened and fibrotic, and behind each cusp are irregular masses of piled-up dystrophic calcification

Dystrophic calcification of Aortic Valve



Aortic valve. Fibrosis with some lymphocytes and dystrophic calcification
(A) hematoxylin and eosin; 1.25× objective magnification; and siderosis
(B) Berlin blue 40× objective magnification

Dystrophic Calcification of Stomach

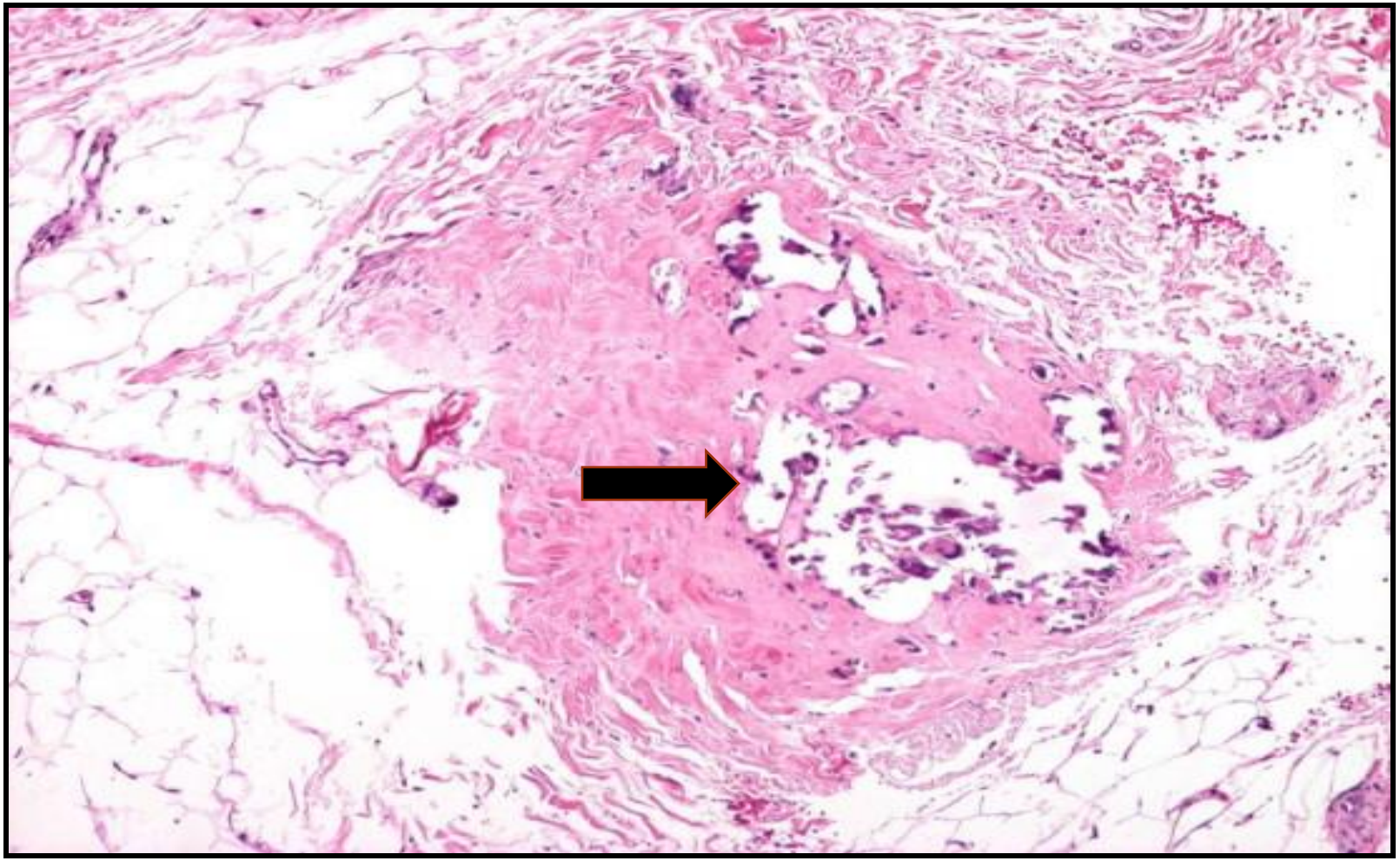


This is a dystrophic calcification in the wall of the stomach. At the far right is an artery with calcification in its wall. There are also irregular bluish-purple deposits of calcium in the submucosa

Dystrophic Calcification of the Skin

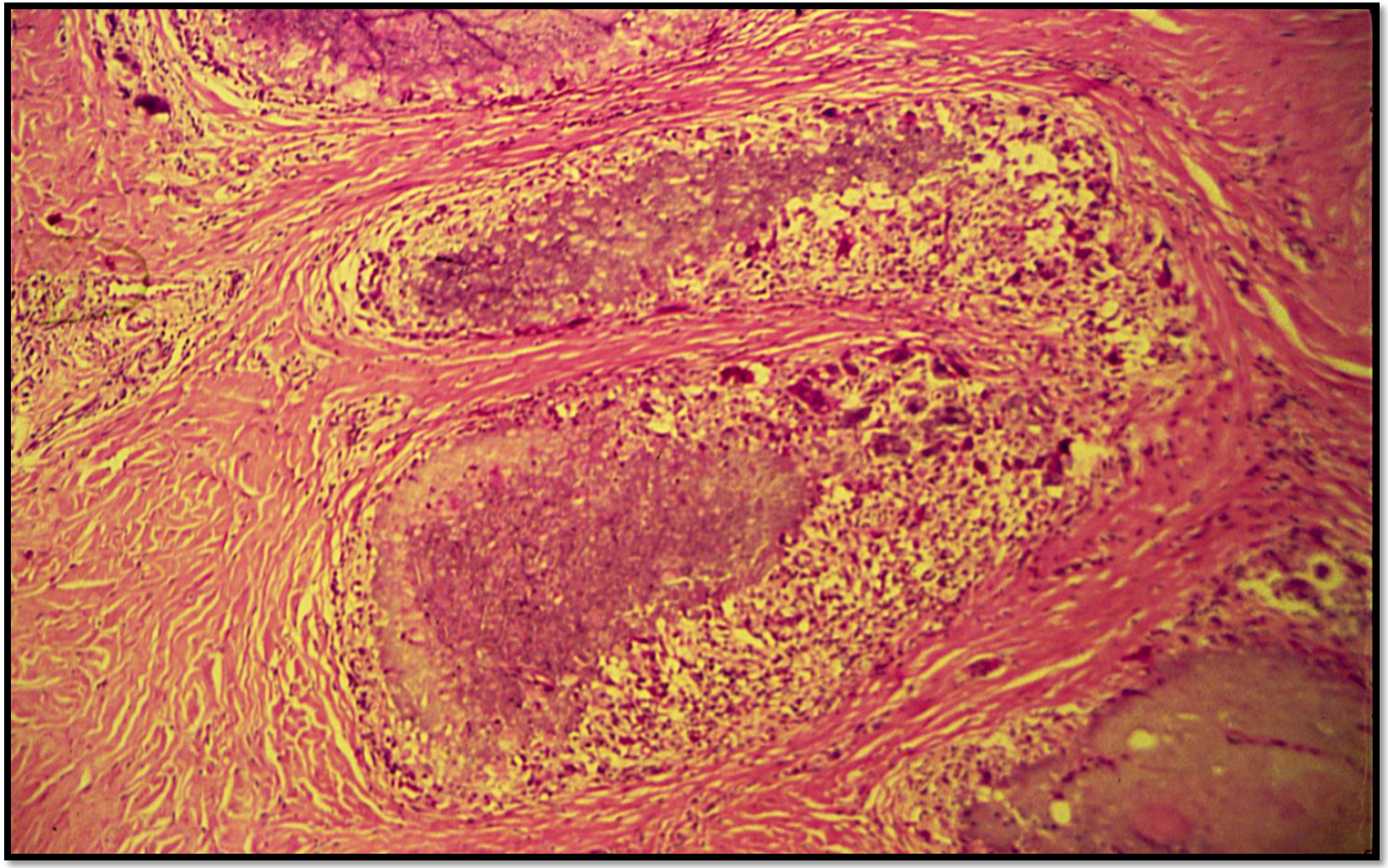
Multiple erythematous hard papules in linear configuration on the extensor aspect of the arm. Within the lesion there were several 2-5 mm white calcifications

Dystrophic Calcification of the Skin



Calcifying panniculitis with fibrosis of the subcutaneous connective tissue septae, adjacent inflammation containing plasmocytes and lymphocytes, and a deposit of calcification (arrow).

Dystrophic Calcification of the Skin



Irregular blue granular deposits of calcium in the dermis surrounded by fibrous tissue and foreign body giant cell reaction

8- Atrophy of the Organs

(Brain – Testis)

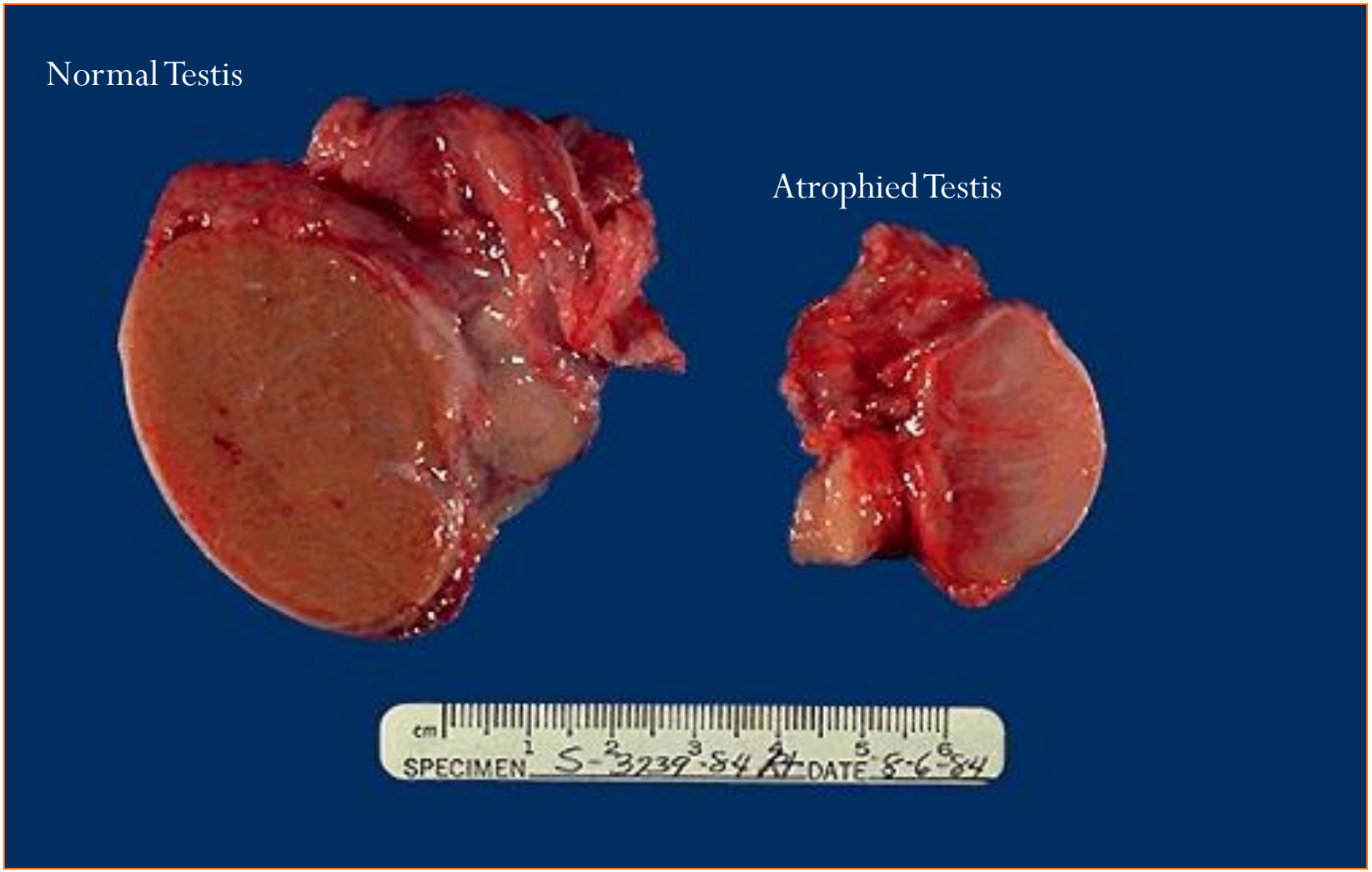
Atrophy of the Brain

This is cerebral atrophy in a patient with Alzheimer disease. The gyri are narrowed and the intervening sulci are widened, particularly pronounced toward the frontal lobe region.

Right

Atrophy of the Testis

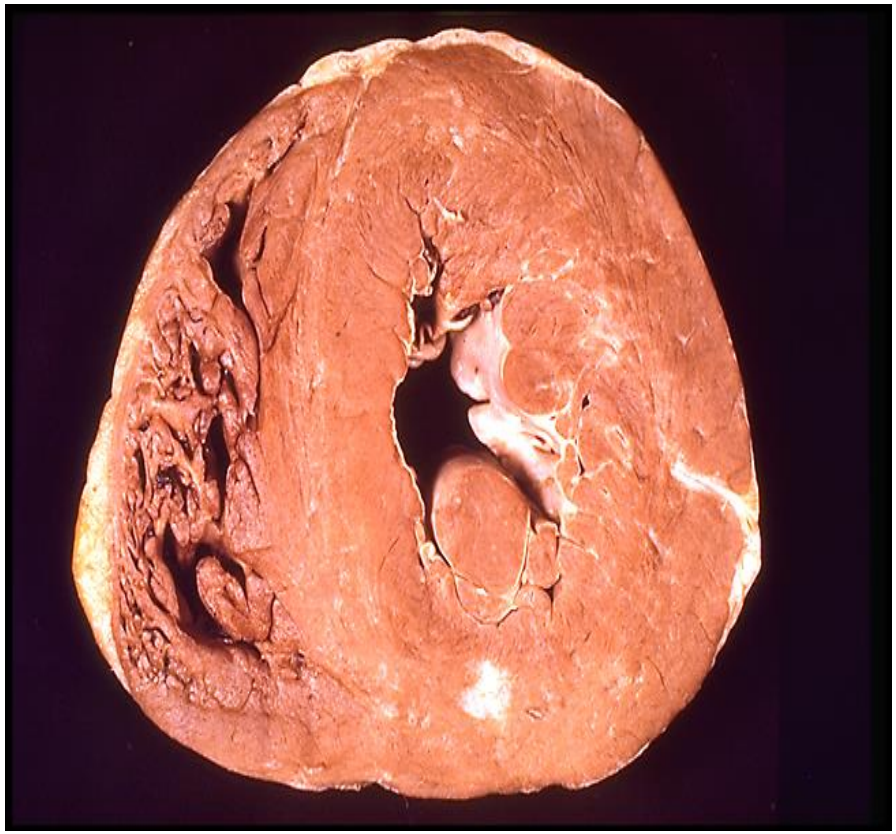
Left



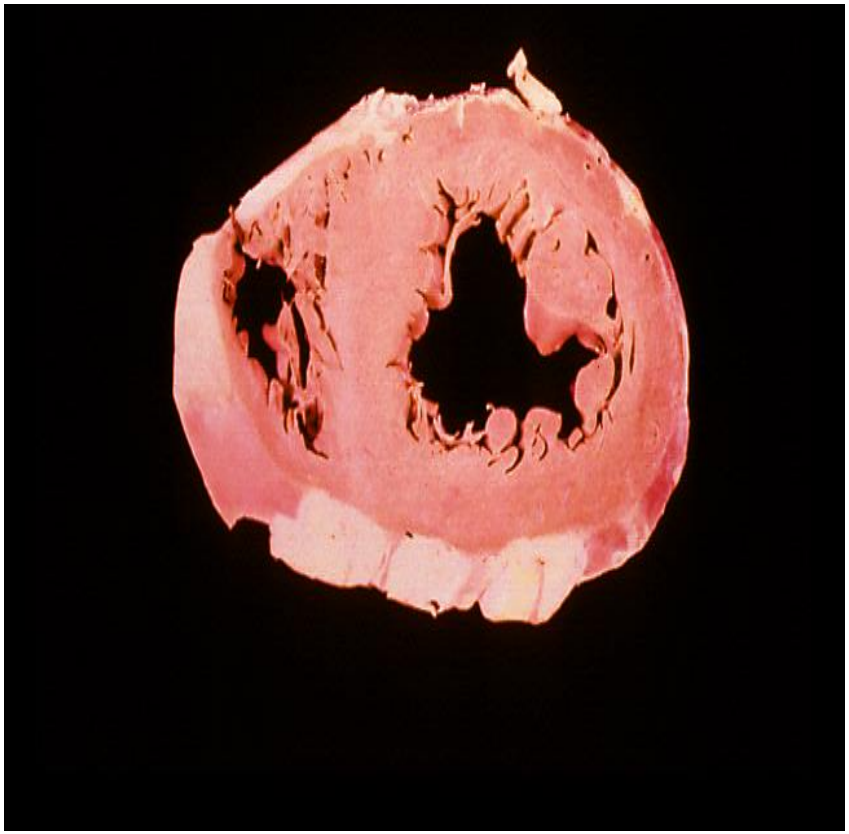
The testis at the left has undergone atrophy and is much smaller than the normal testis at the right.

9 - Left Ventricular Hypertrophy

Normal and Hypertrophied Left Ventricle



Left ventricular hypertrophy: The number of myocardial fibers does not increase ,but their size increased in response to an increased workload

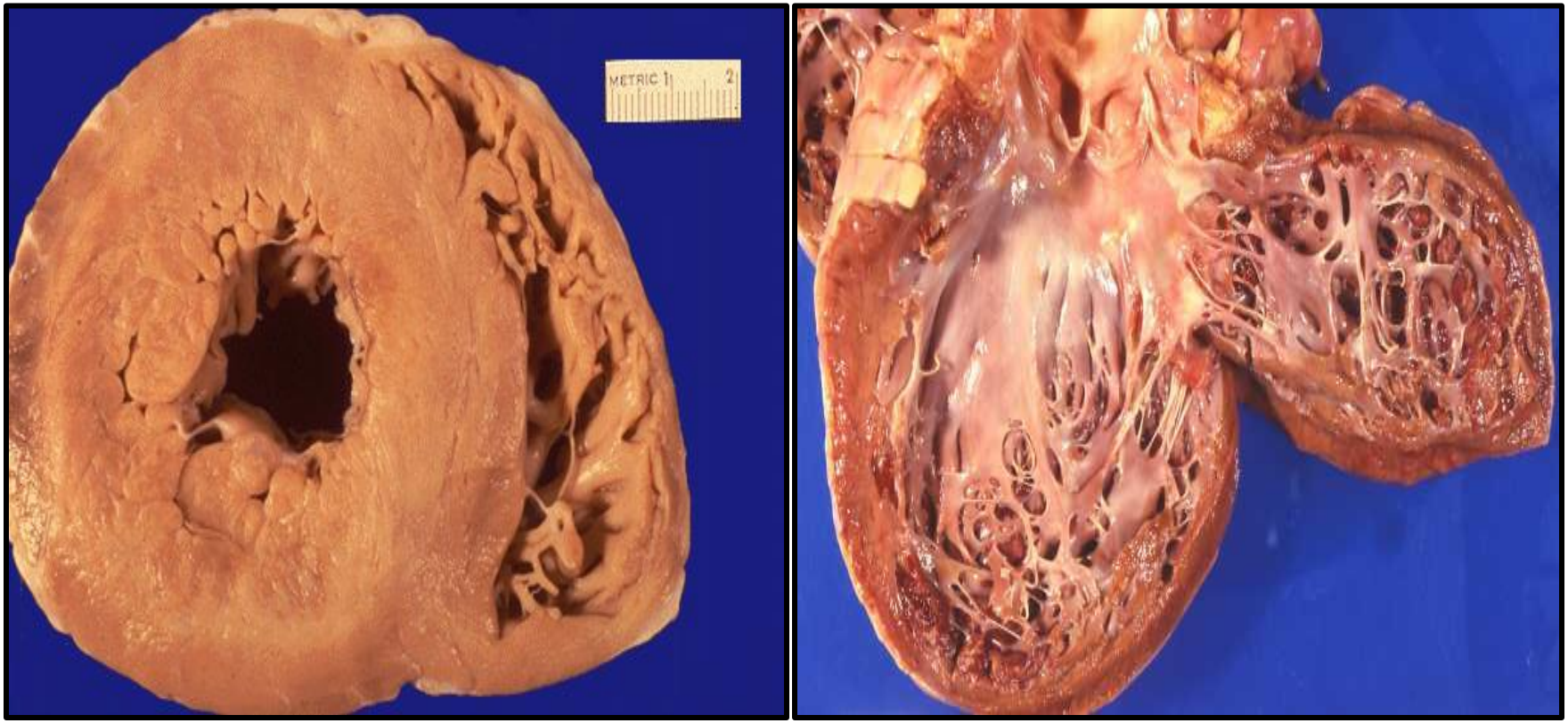


Normal ventricles

Right

Left Ventricular Hypertrophy

Left



This cross section view of the heart shows the left ventricle in the right of the picture. The heart is from a severe hypertensive patient. The left ventricle is grossly thickened. The myocardial fibers have undergone hypertrophy.

10- Prostatic Hyperplasia

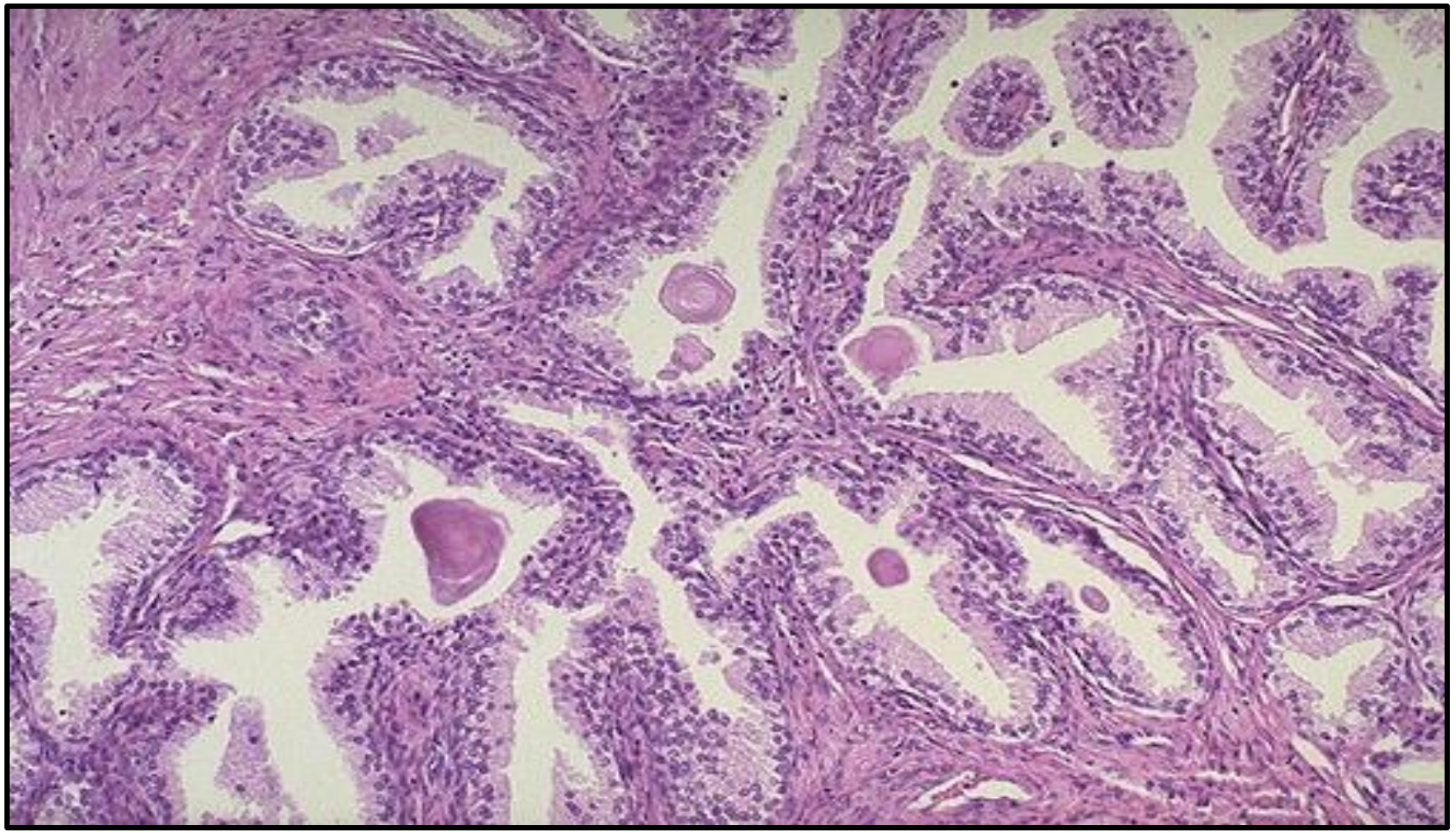
Prostatic Hyperplasia - Gross

The normal adult male prostate is about 3 to 4 cm in diameter.The number of prostatic glands, as well as the stroma, has increased in this enlarged prostate

Prostatic Hyperplasia

Nodular hyperplasia of glandular and fibromuscular stromal tissue. Each nodule shows large number of glands of variable sizes lined by tall columnar epithelium and some are cystically dilated.

Prostatic Hyperplasia

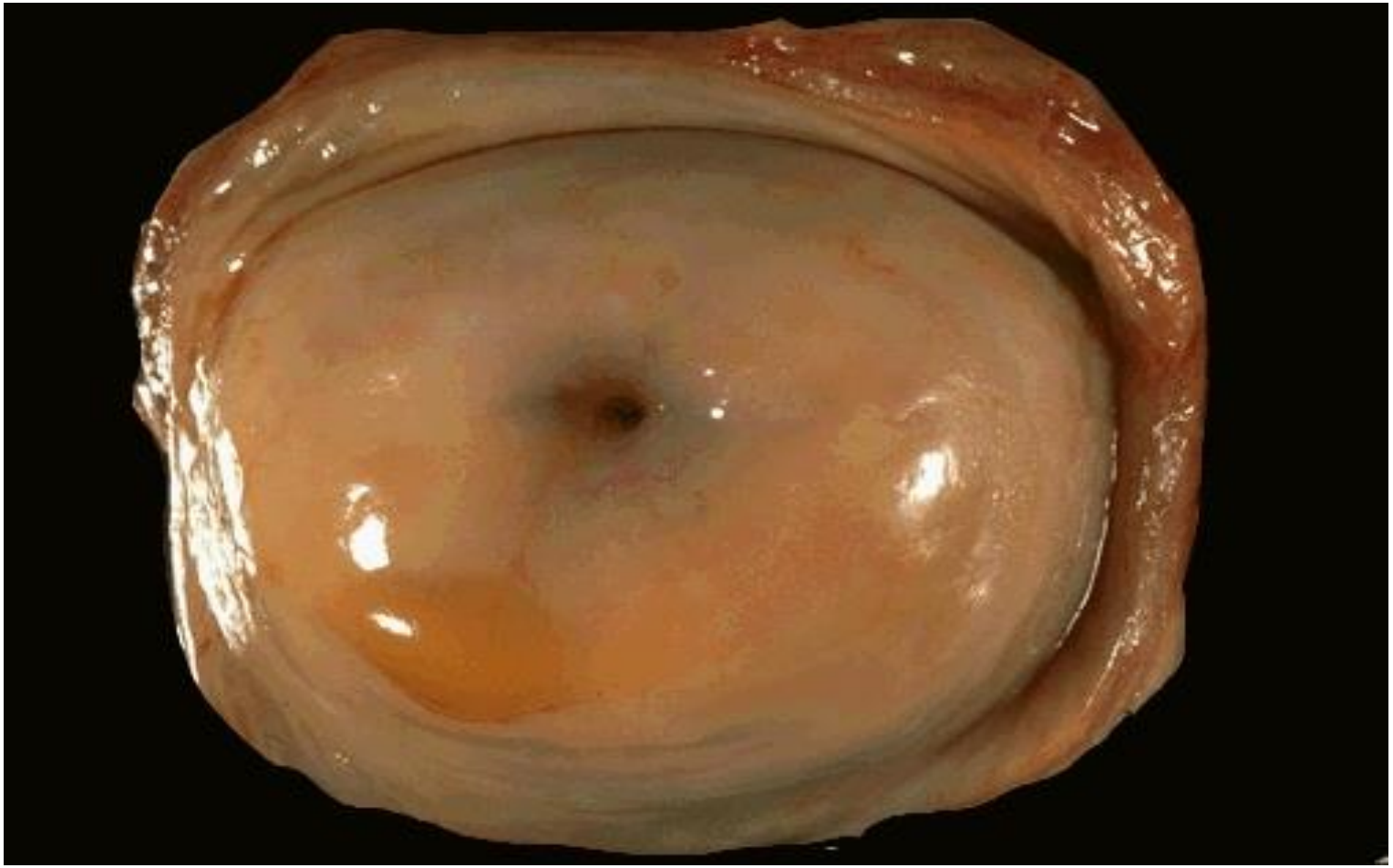


Here is one of the nodules of hyperplastic prostate, with many glands along with some intervening stroma.

The cells making up the glands are normal in appearance, but there are just too many of them. Eosinophilic hyaline corpora amylacea is present in some glands.

11- Squamous Metaplasia and Dysplasia

Normal Uterine Cervix

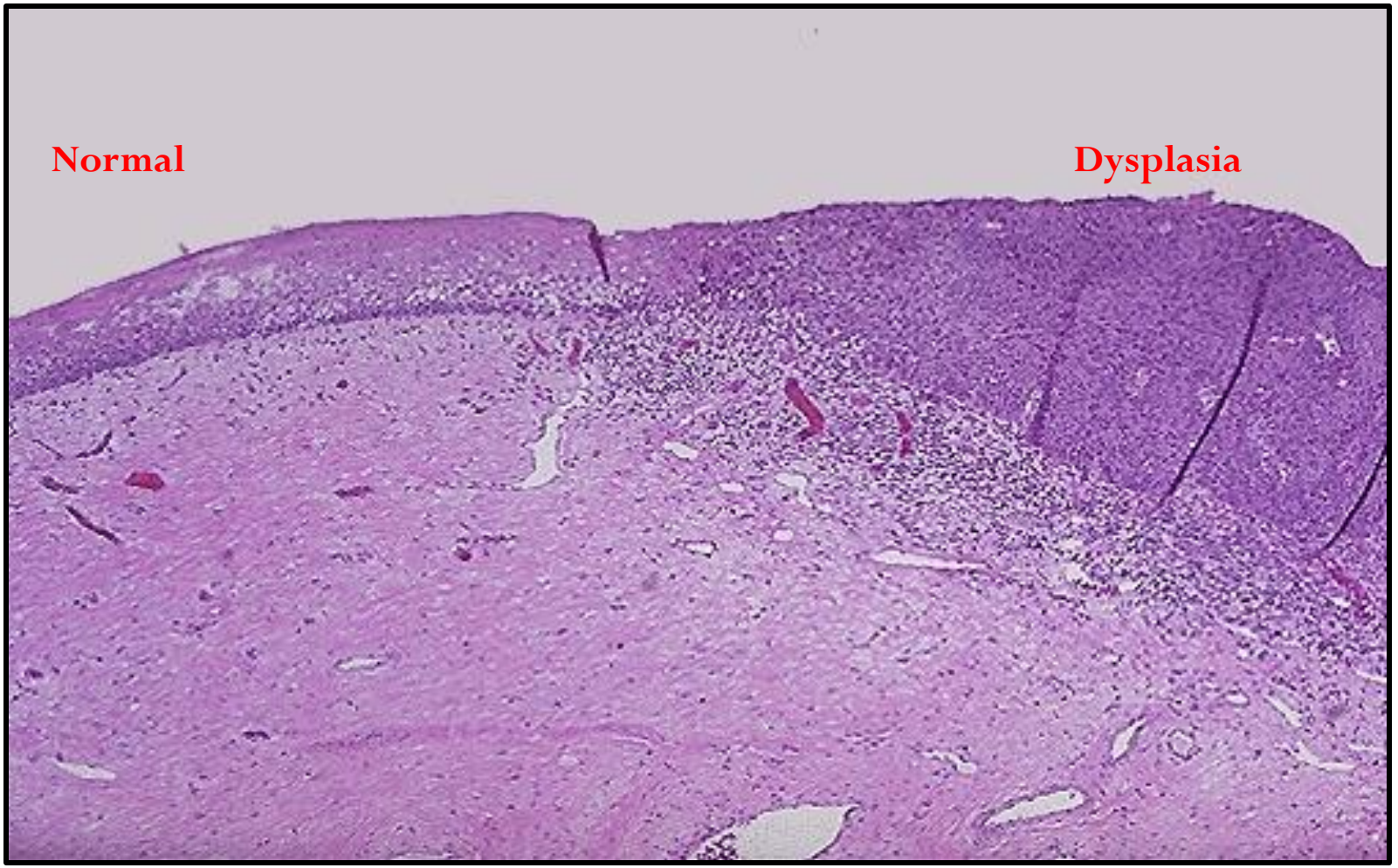


Normal cervix with a smooth, glistening mucosal surface. There is a small rim of vaginal cuff from this hysterectomy specimen. The cervical os is small and round, typical for a nulliparous woman. The os will have a fish-mouth shape after one or more pregnancies

Right

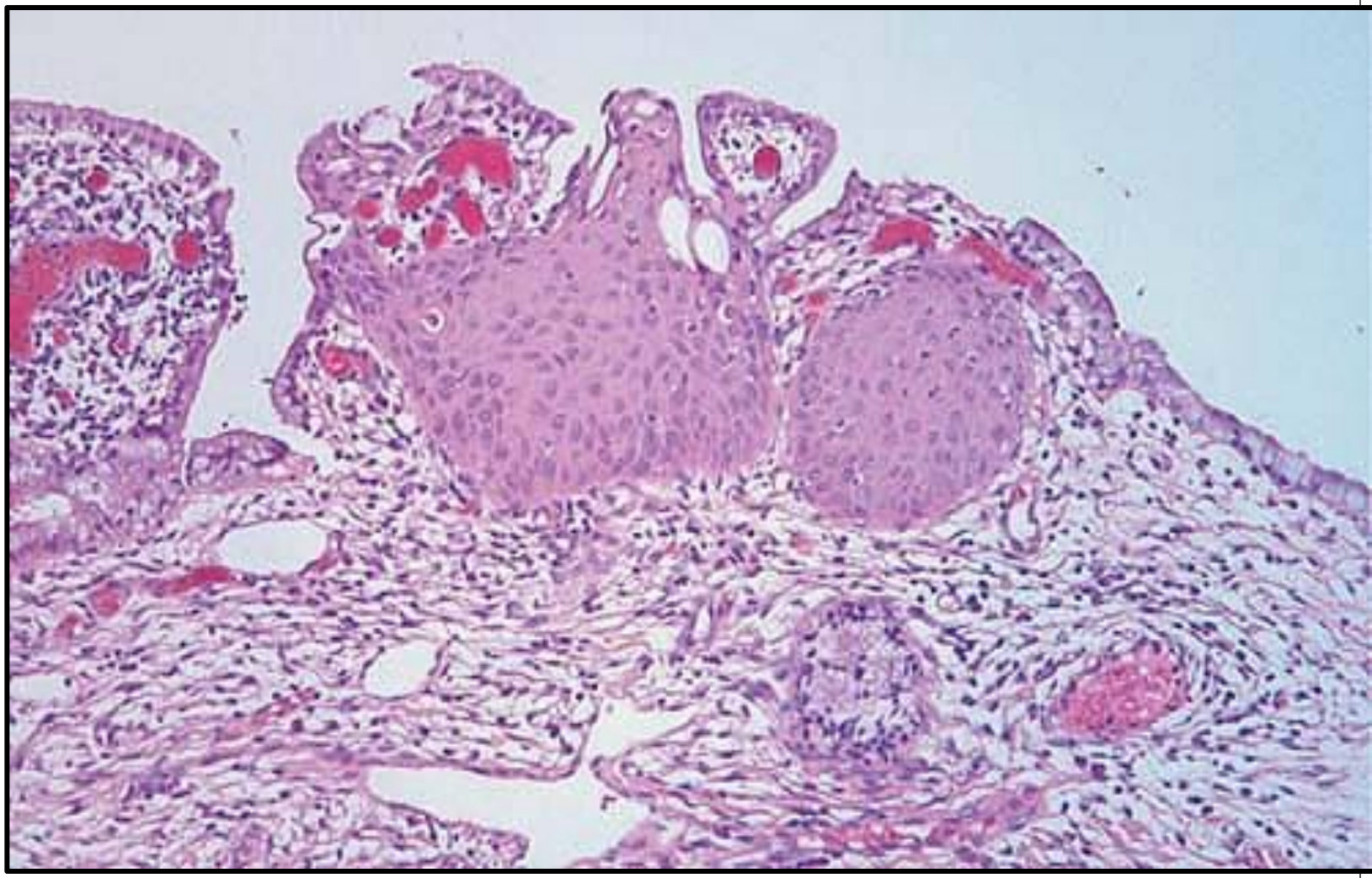
Normal and Dysplastic Cervical Squamous Epithelium

Left



The normal cervical squamous epithelium at the right transforms to dysplastic changes on the left with underlying chronic inflammation

Endocervical Squamous Metaplasia

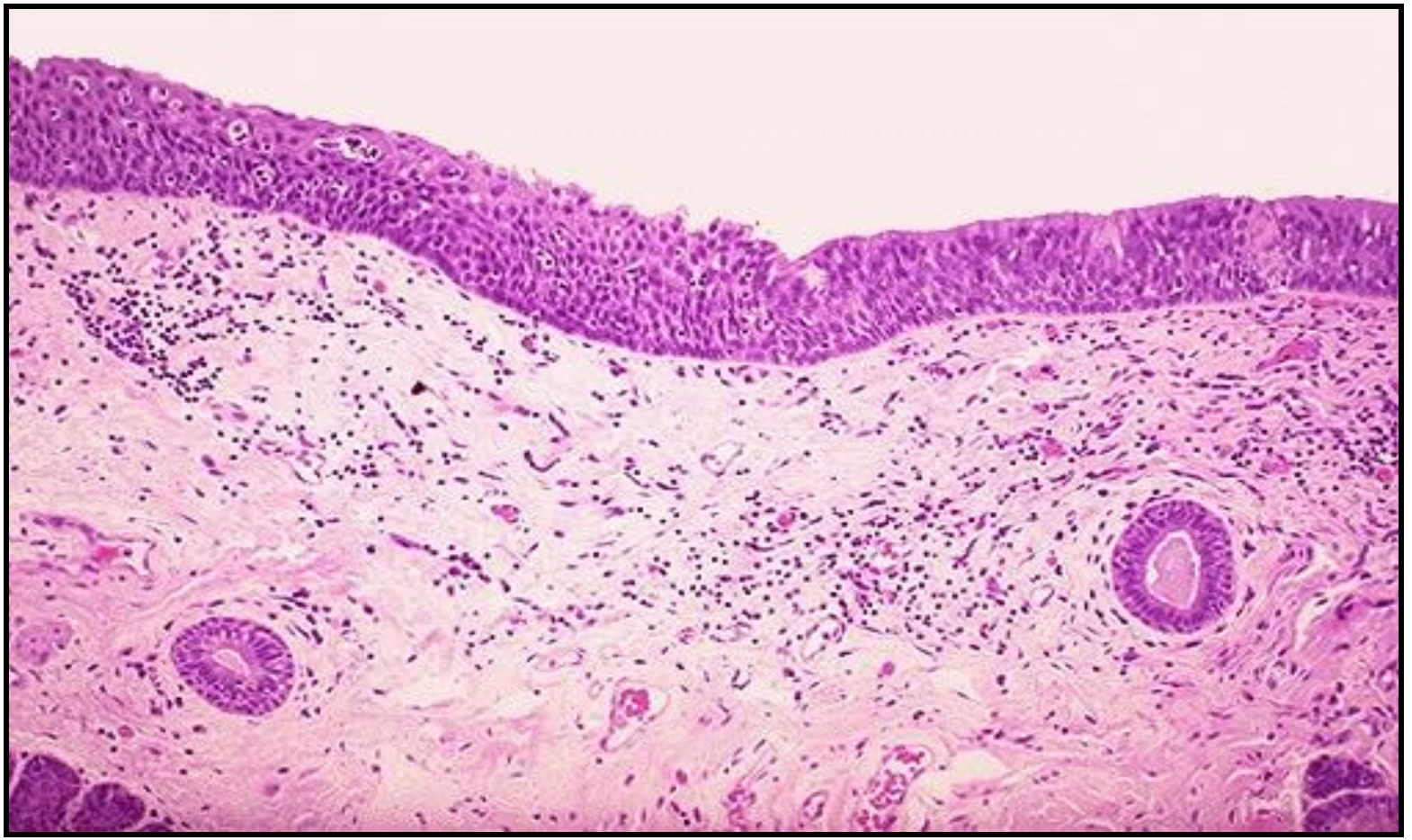


A section of endocervix shows the normal columnar epithelium at both margins and a focus of squamous metaplasia in the center.

Right

Laryngeal Squamous Metaplasia

Left



Metaplasia of laryngeal respiratory epithelium has occurred here in a smoker .The chronic irritation has led to an exchanging of one type of epithelium (the normal respiratory epithelium at the left) for another (the more resilient squamous epithelium at the right)

GOOD LUCK