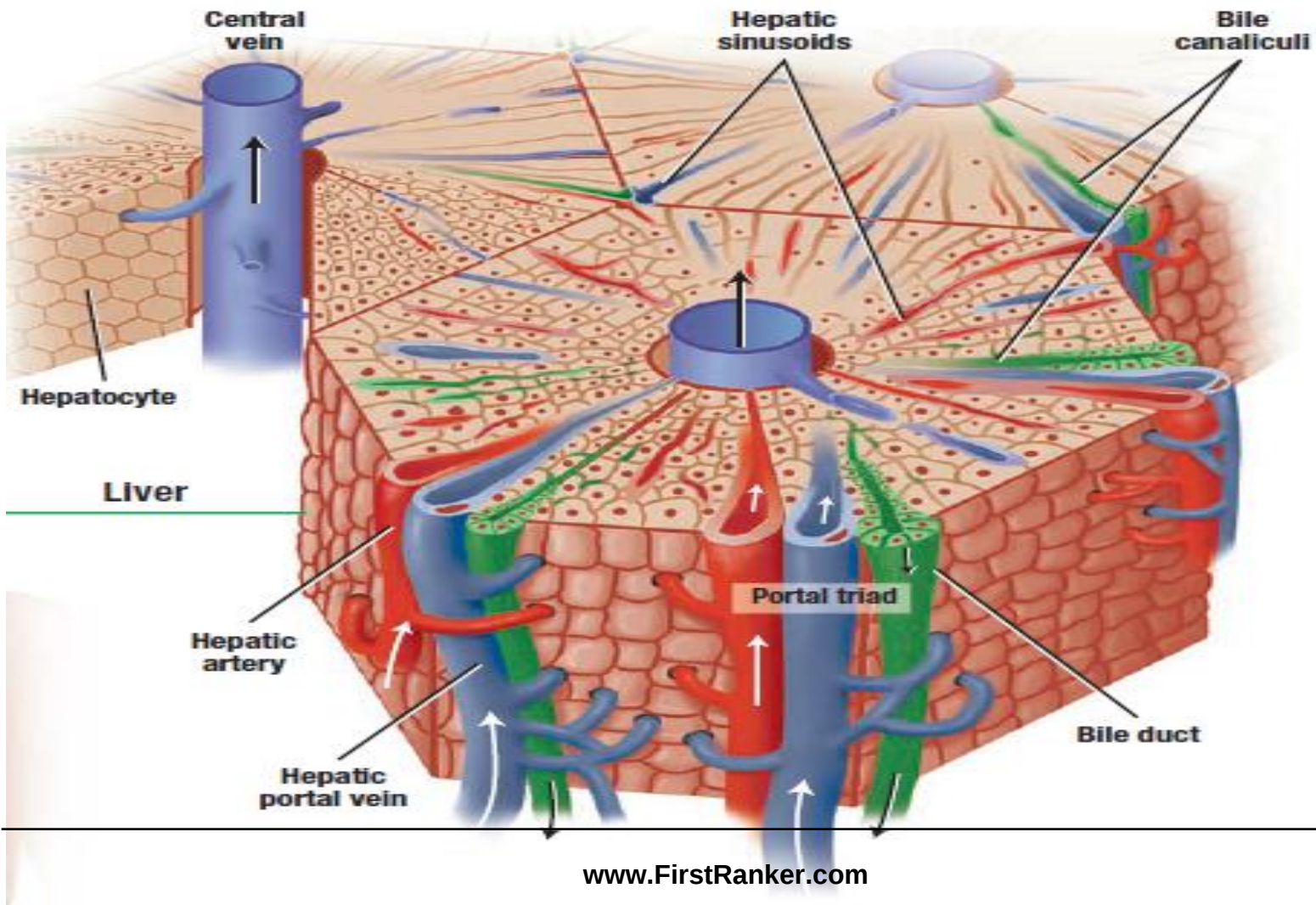


DIGESTIVE SYSTEM III

HISTOLOGY OF LIVER, GALL BLADDER AND PANCREAS

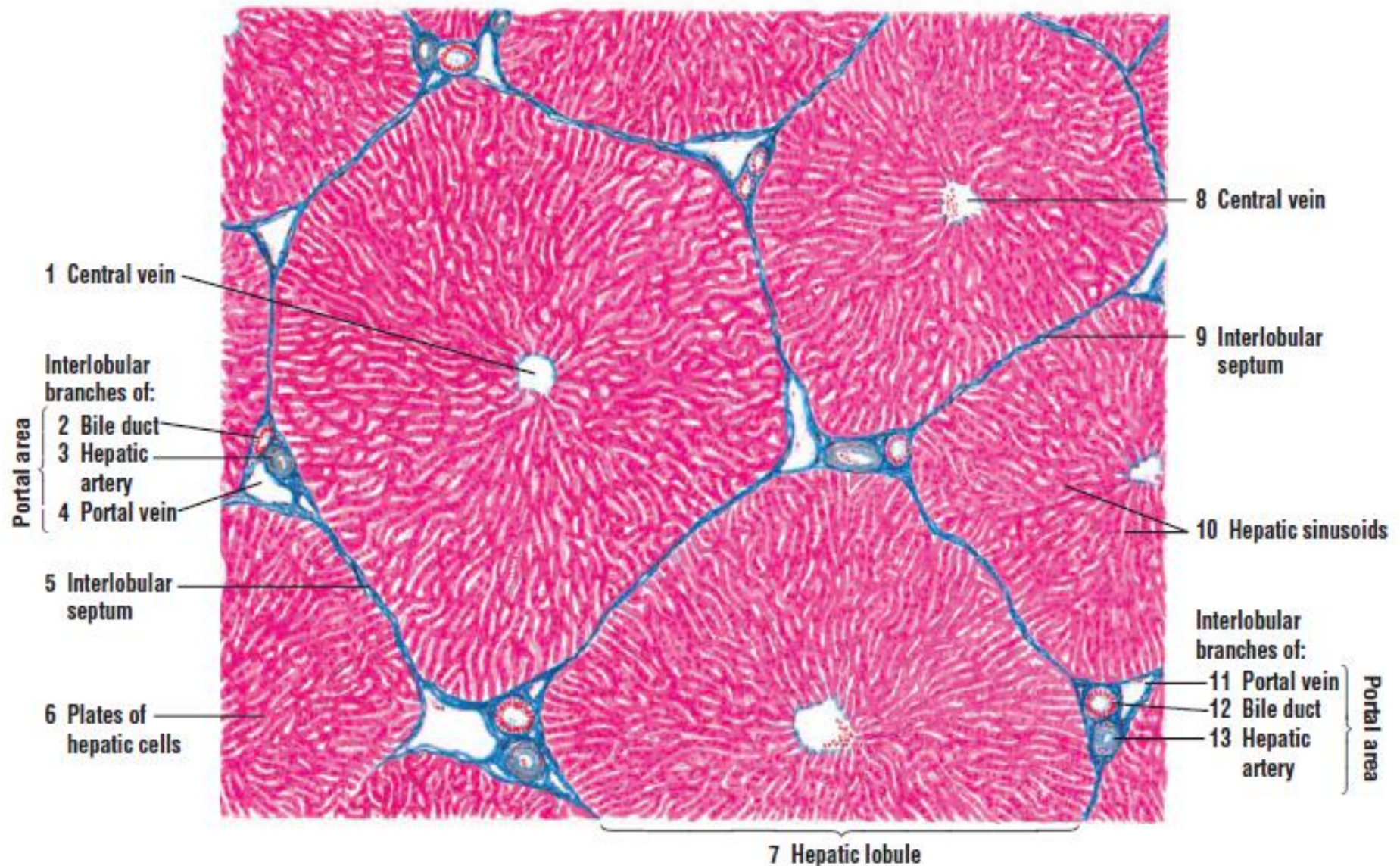
HISTOLOGY OF LIVER



INTRODUCTION

- Liver is the largest internal organ.
- In adults weight-- 1.5 kg (2% of the body weight).
- Location—Right upper quadrant of the abdomen.
- Dual blood supply—Portal vein and hepatic artery.
- Liver is surrounded by thin connective tissue capsule called *Glisson's capsule*.
- Glisson's capsule thickened at the porta hepatis and sends *trabeculae* into the interior dividing parenchyma into *lobules*.
- These trabeculae carry branches of *hepatic artery, portal vein, and bile duct*.

- ***Liver lobules:***
- Hexagonal areas that form the ***structural & functional unit of liver.***
- Scanty connective tissue between lobules.
- Each lobule is made up of cords of ***liver cells (hepatocytes)*** separated by ***sinusoids.***
- At the periphery of each lobule there are several ***portal triad.***
- ***Central vein*** in the *centre of each lobule* and drain blood from lobules into ***hepatic vein.***
- ***Bile canaliculi:*** spaces present between plasma membrane of adjacent liver cells.

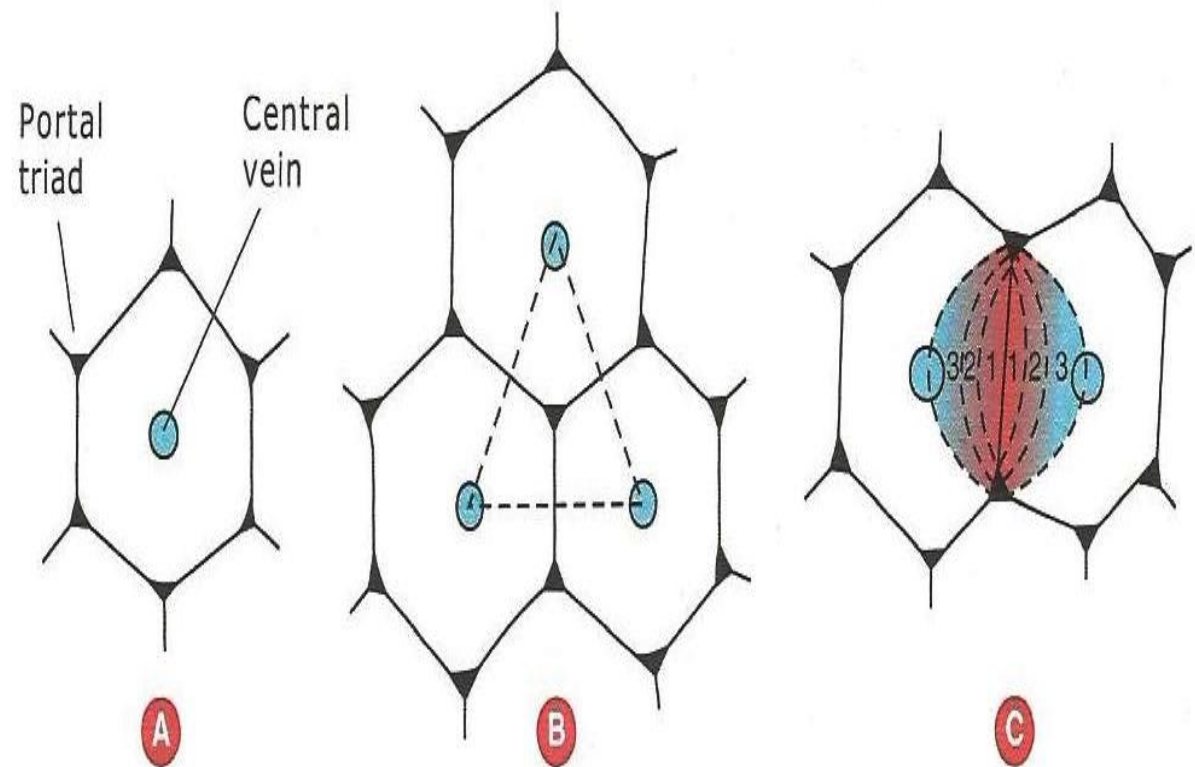


Different types of liver lobules

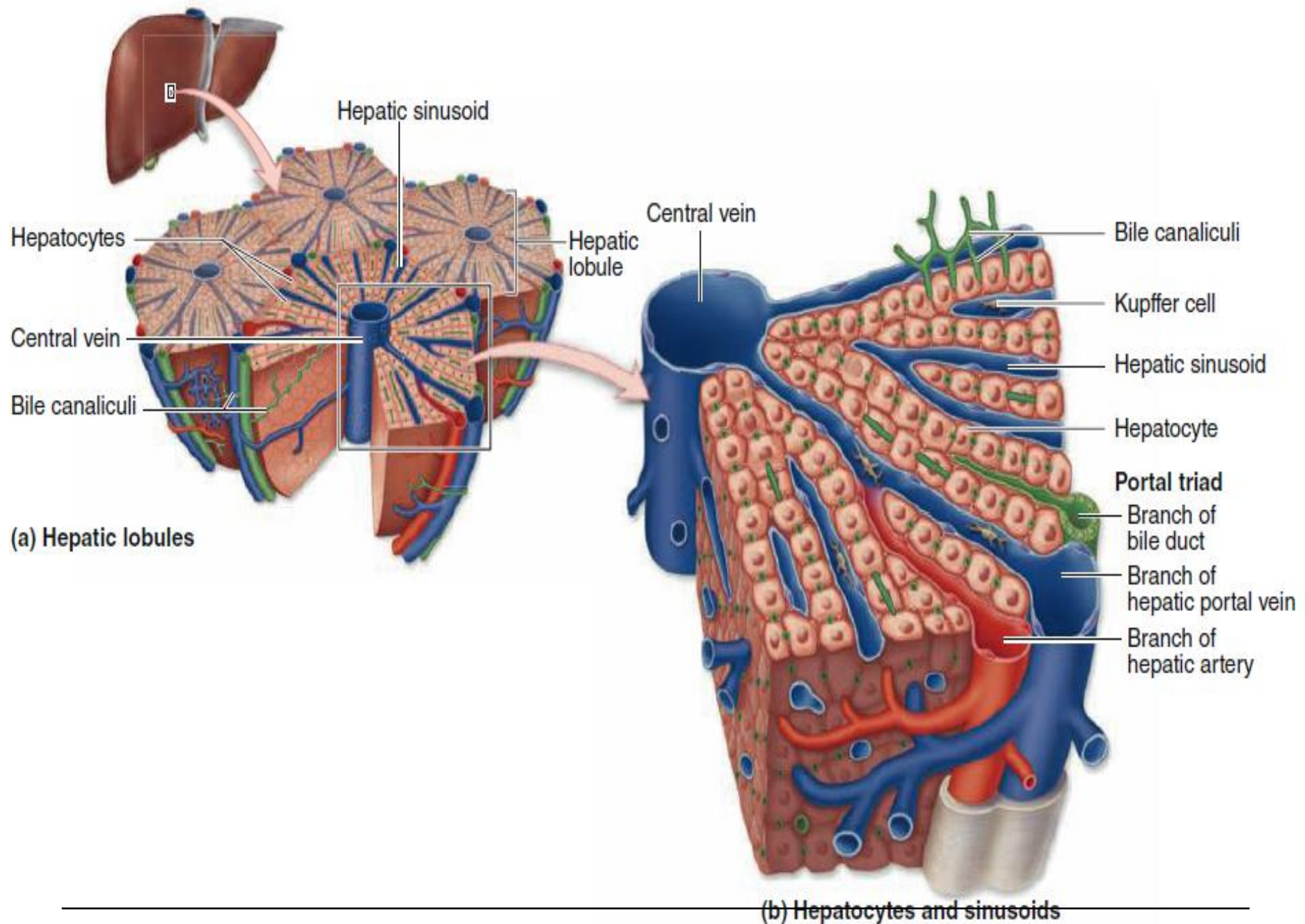
A. Classical liver lobule

B. Portal liver lobule

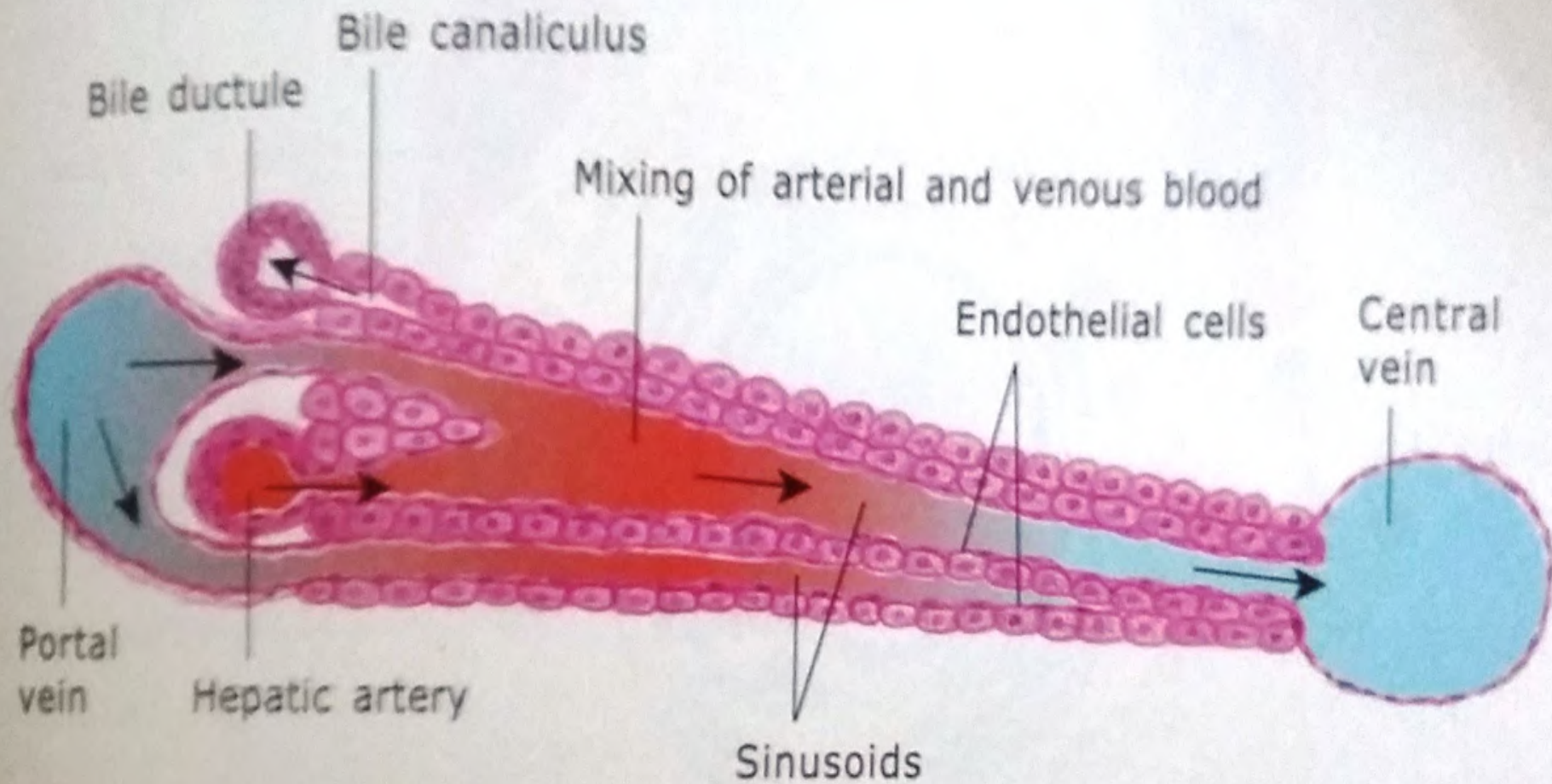
C. Liver acinus

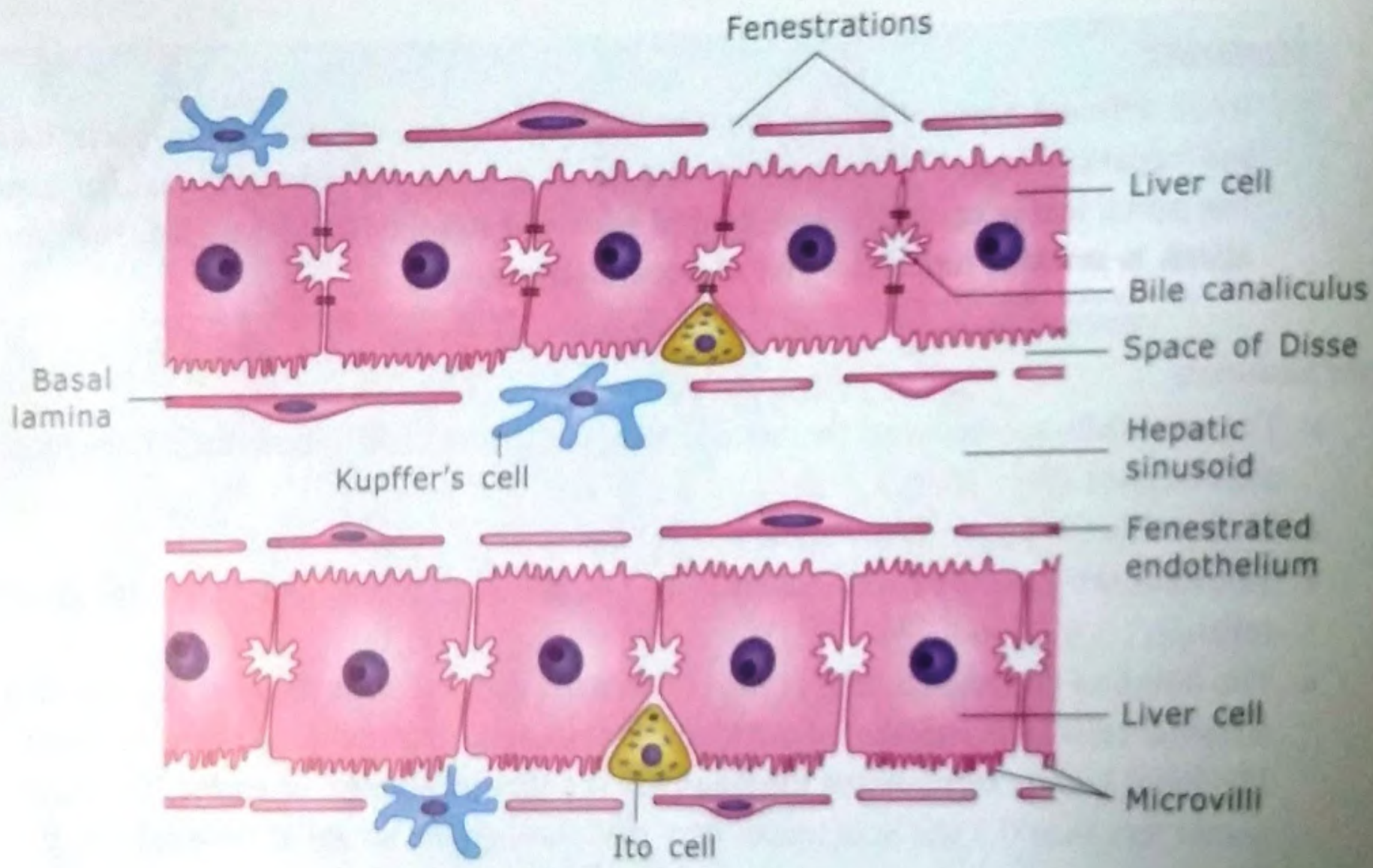


- *Hepatocytes (liver cells) →*
- Shape—polygonal
- Nucleus—Large, round & central (may binucleated).
- Consitute about 80% of liver volume.
- Life span about 5 months.
- Capable of regeneration.
- Forms hepatic cords (may branch & anastomose).
- Liver cells has 5-12 sides, some sides exposed to *sinusoids* and other sides shows infolding between adjacent cells to form *bile canaliculi*.

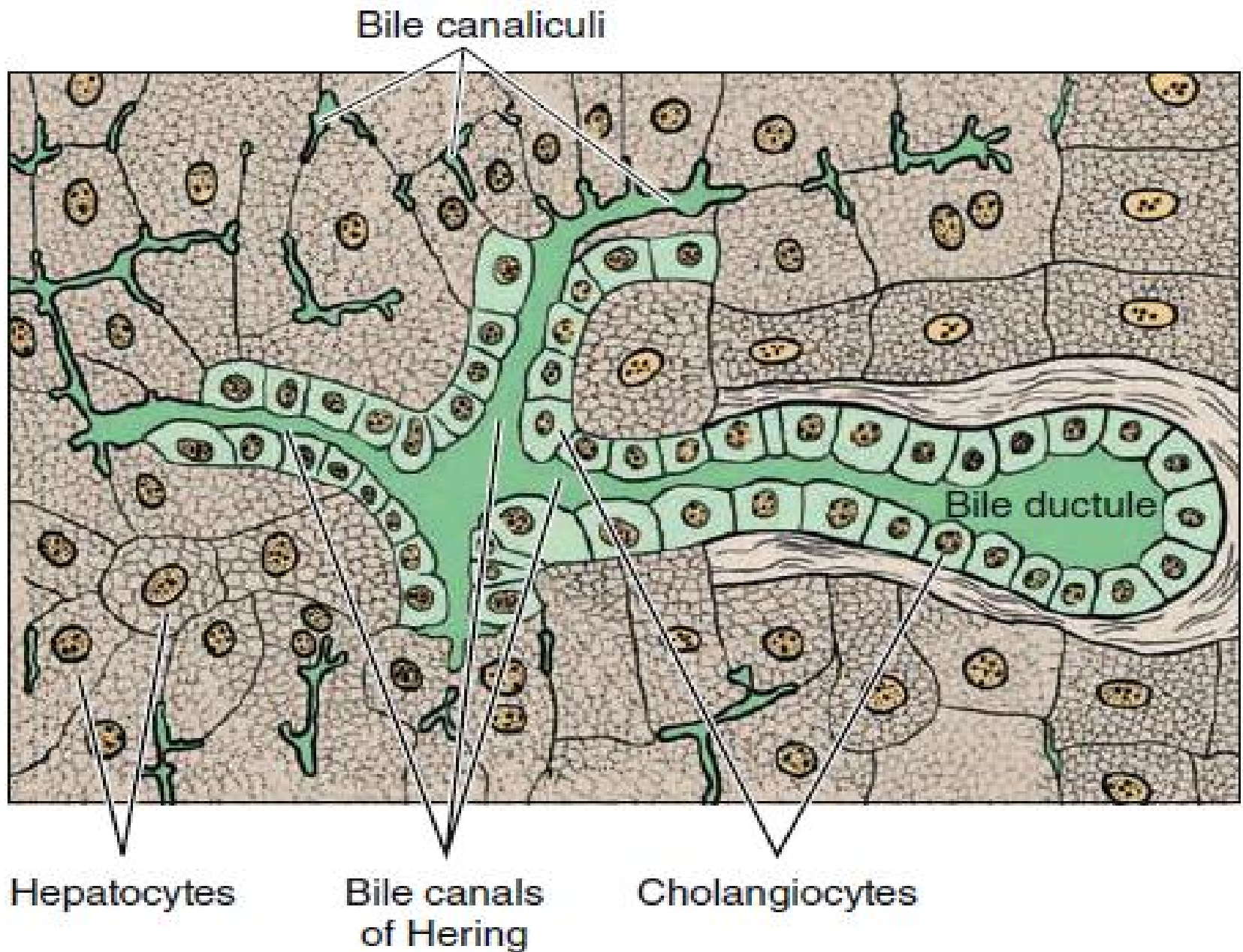


- ***Hepatic sinusoid—***
- ***Vascular channels*** between the plates of hepatocytes.
- Lined by ***endothelial*** and ***phagocytic (kupffer) cells***.
- The venous and arterial blood mixes in hepatic sinusoids
- ***Space of Disse (perisinusoidal space)—***
Between sinusoidal endothelium and hepatocytes.
- ***Ito cells (hepatic stellate cells)—***
Found in perisinusoidal spaces.
Involved in storage of ***vitamin A and lipid***





- ***Bile canaliculi*** →
- Smallest branches of the biliary tree.
- They empty into ***bile canals of Hering*** composed of cuboidal epithelium (**cholangiocytes**).
- ***Bile canal*** merge to form ***bile ductules***
- ***Bile ductules*** merge, enlarge, and form ***right*** and ***left hepatic ducts*** leaving the liver.
- Into the canaliculi hepatocytes continuously secrete bile.



GALL BLADDER

- Gall bladder is *temporary storehouse of bile* and *concentrate it* by water re-absorption.
- ***Layers of gall bladder—***
 - a) **Mucosa**
 - b) **Fibromuscular layer**
 - c) **Serosa/adventitia**

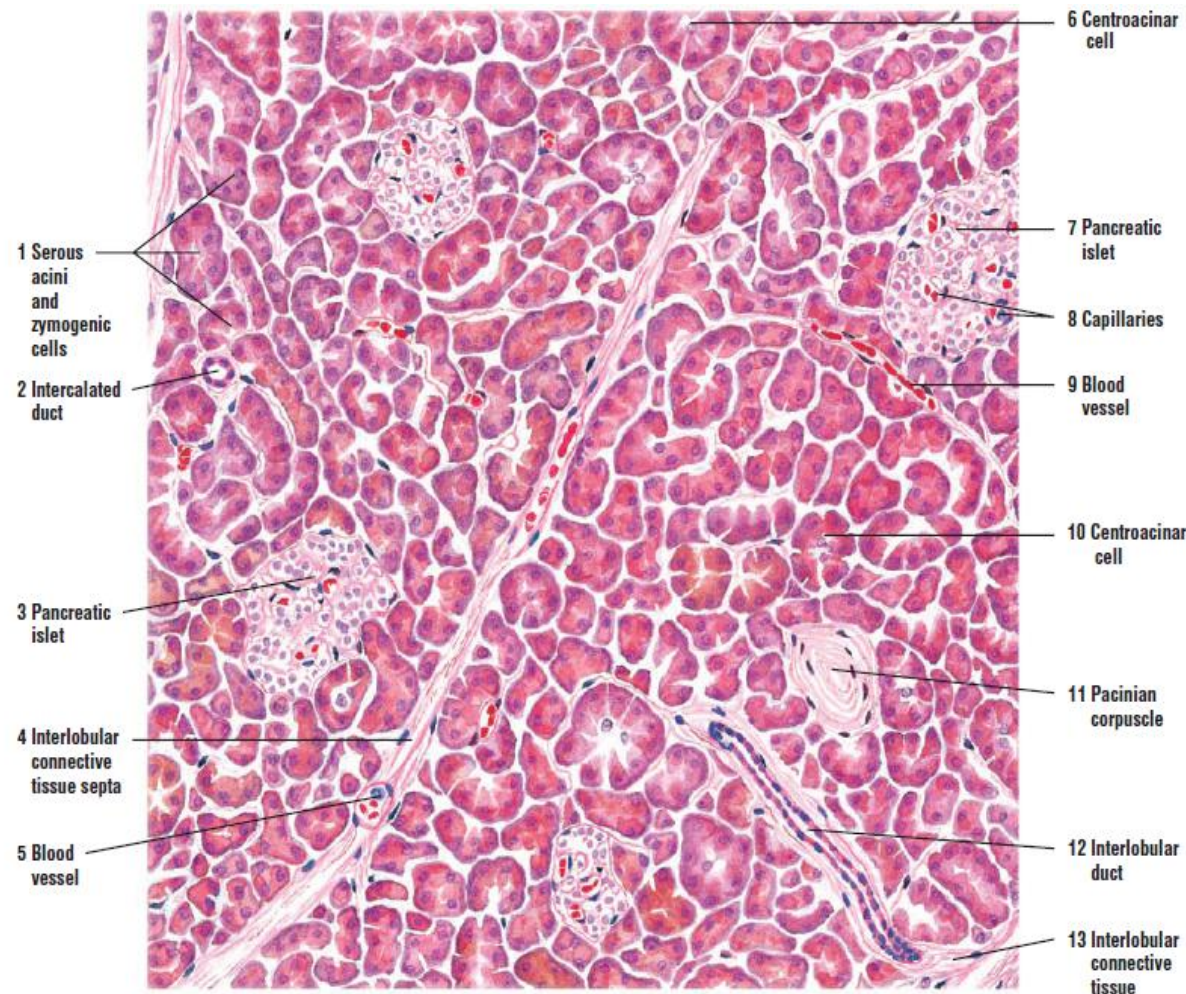
- ***Mucosa***—
- Lining epithelium *simple columnar epithelium*.
- These cells have many *small microvilli* on their apical surface.
- These cells involved in *absorption of water* from stored bile.
- *Lamina propria is present*.
- *Mucosal gland, muscularis mucosae and submucosa are absent*.



- ***Fibromuscular layer—***
- Composed of randomly arranged *smooth muscles*.
- In between muscles fibre is *dense connective tissue* that is *rich in elastic fibres*.
- ***Serosa—***
- Inferior surface is covered by serosa and rest is by adventitia.

PANCREAS

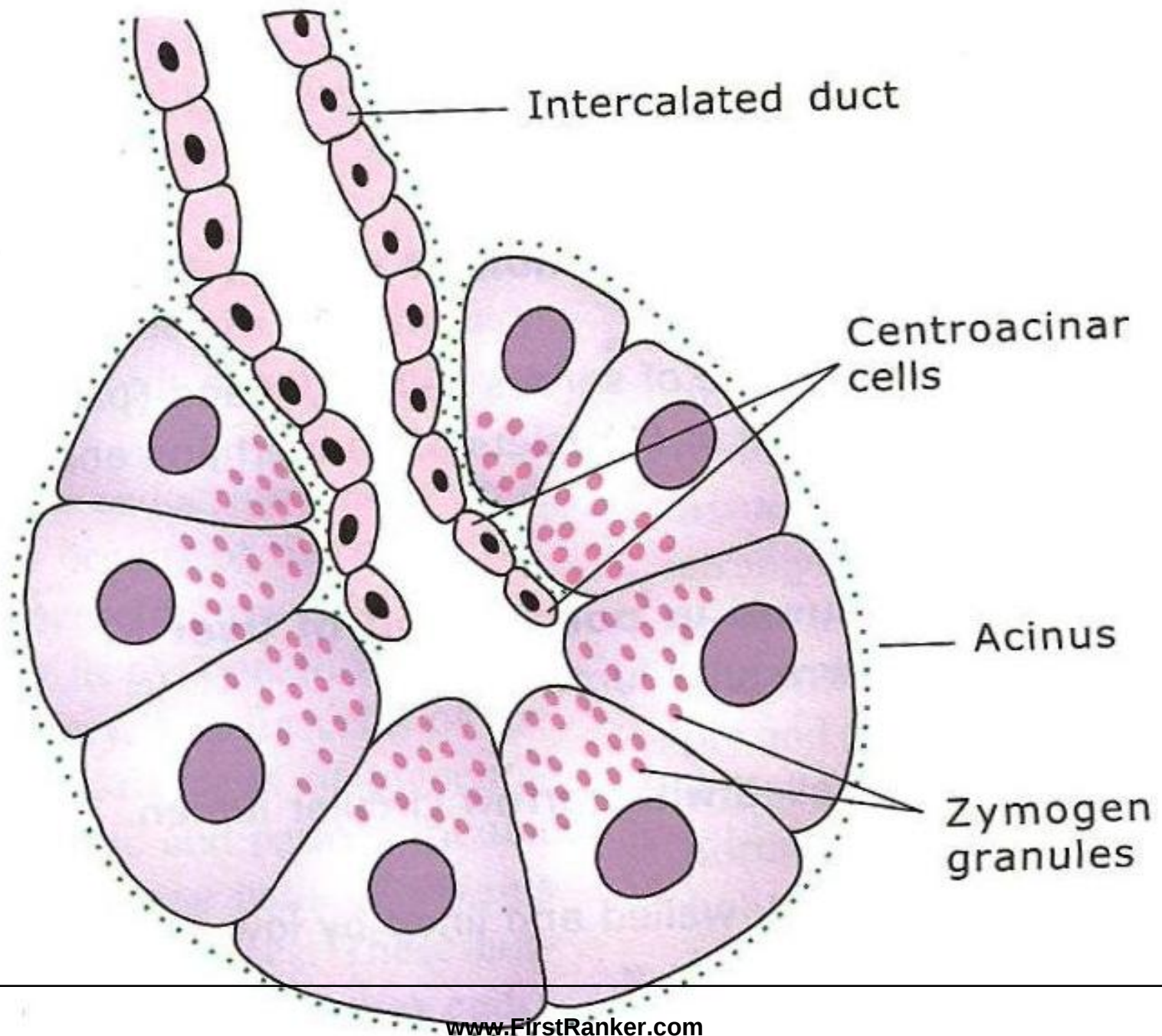
- Mixed gland i.e. consists of an exocrine & endocrine portion.
- **Exocrine part:** secretes *pancreatic juice*.
- **Endocrine part:** secretes *hormones*.



Histology of Exocrine Pancreas

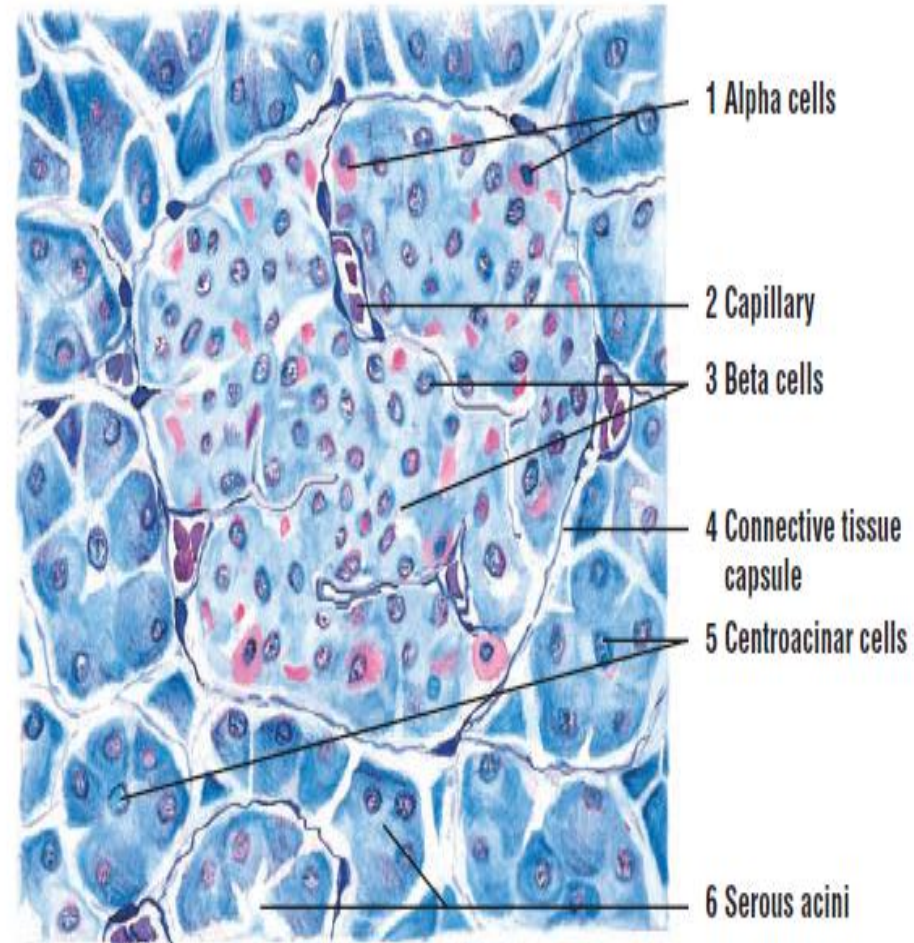
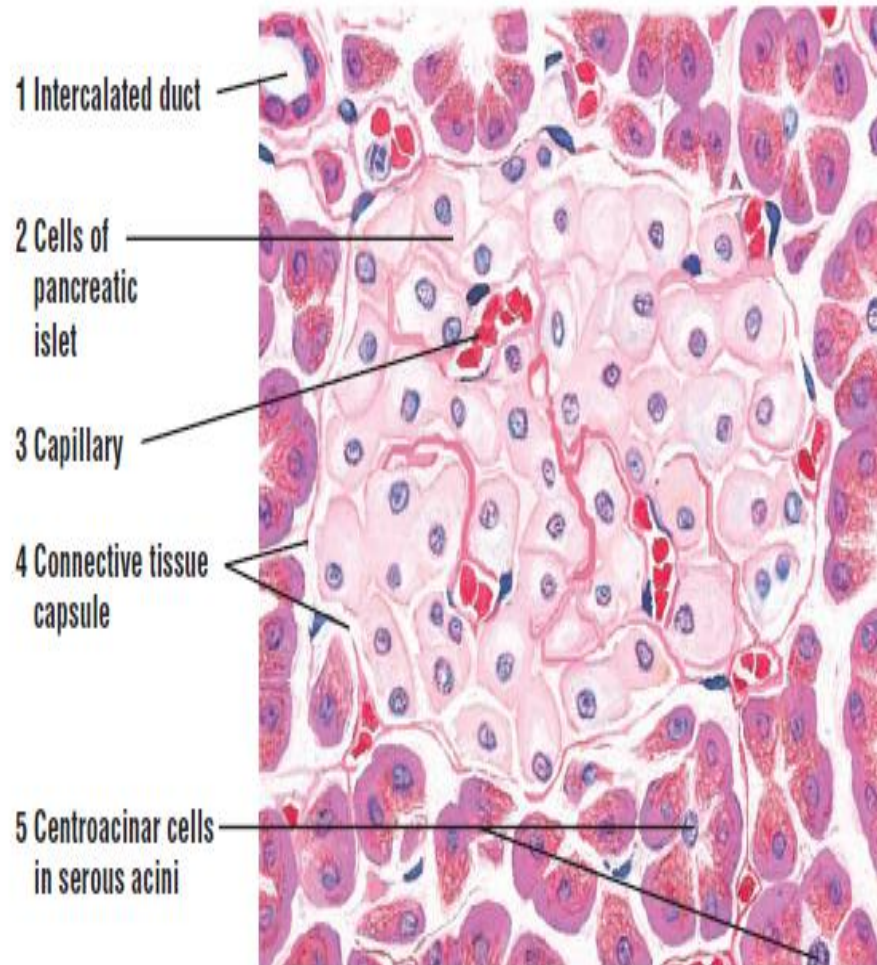
- Covered with a *capsule*.
- *Septas* arise from capsule which divide the gland into many *small lobules*.
- ***Interlobular connective tissue*** contains *large ducts, blood vessels & nerve fibres*.
- ***Interlobular connective tissue*** surrounds the *acini, small ducts & islets of Langerhans*.

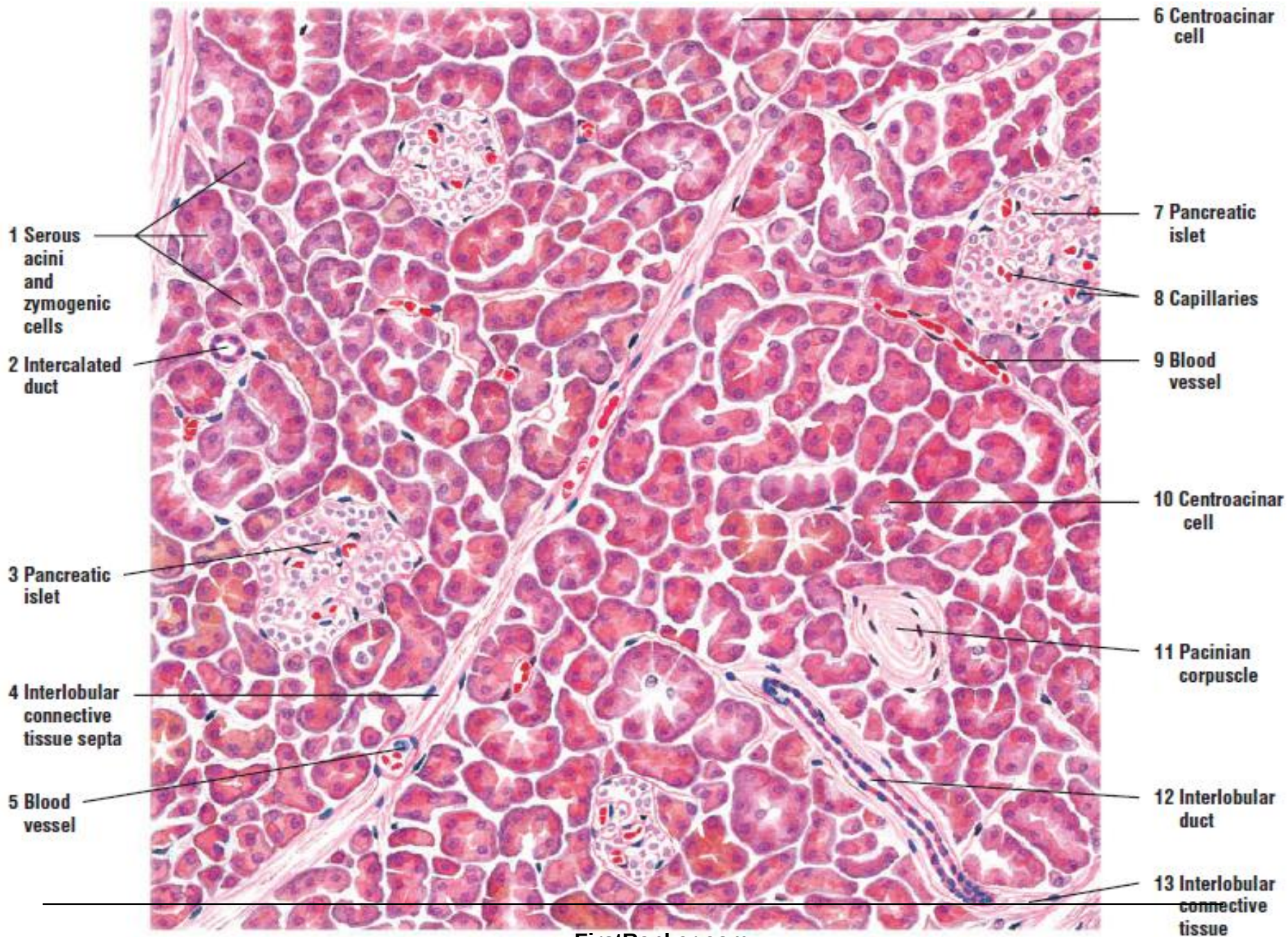
- ***Pancreatic Acini—***
- *Serous in nature.*
- Lined by *pyramidal cells* and have *small lumen*.
- ***Acinar cells—***
supranuclear region is filled with ***zymogen granules***.
Infranuclear region is intensely ***basophilic***.
- ***Extensive duct system—***
intralobular (intercalated), interlobular & main duct
- Acinar lumen may show pale staining cells of intercalated duct (***centroacinar cells***).



Histology of Endocrine Pancreas

- In the form of “islands”: **Islets of Langerhans**
- Scattered among the acini of exocrine part.
- Cells of islets are arranged as anastomosing plates.
- ***Islets contain 4 types of cells:***
 - **A(alpha) cells**—20% , secrete *glucagon*
 - **B (beta) cells**—70% , secrete *insulin*
 - **D (delta) cells**—5% , secrete *somatostatin*
 - **F or PP cells**— secrete *pancreatic polypeptides*





Self Assessment

1] Which of the following cell is responsible for myelination of axon in CNS ?

- a) Astrocytes
- b) Oligodendrocytes
- c) Microglia
- d) Schwann cells

2.] Thymus-dependent zone of a lymph node is

- (a) Cortex
- (b) Paracortex
- (c) Medullary cords
- (d) Medullary sinuses.

3.] White pulp of spleen can be identified differentially from the lymphatic nodule of lymph node by the presence of

- (a) Germinal centre
 - (b) Corona
 - (c) Central arteriole
 - (d) Lymphocytes
-

4.] Hassall's corpuscles are present in

- (a) Lymph node
- (b) Spleen
- (c) Thymus
- (d) Tonsil

5.] Crypts of palatine tonsil are lined by

- (a) Simple squamous epithelium
- (b) Stratified squamous nonkeratinized epithelium
- (c) Pseudostratified columnar epithelium
- (d) Stratified squamous keratinized epithelium

6.] All of the following layers are present in epidermis of THIN SKIN except ?

- a) Stratum basale
- b) Stratum spinosum
- c) Stratum lucidum
- d) Stratum corneum

7.] Thin skin is characterised by the presence of

- (a) Thin epidermis
- (b) Hair follicle
- (c) Sebaceous gland
- (d) All of the above

8.] Lining epithelium of trachea ?

- a) Simple sqamous
- b) Simple columnar
- c) Pseudostratified ciliated columnar
- d) Stratified squamous non-keratinized

9.] Blood-air barrier is formed by all except ?

- a) Endothelium of capillary
- b) Lining epithelium of alveolus
- c) Fused basal lamina of endothelium and epithelium
- d) only endothelium of capillary

10.] Elastic cartilage is present in which part of respiratory tract?

- a) Trachea
- b) Bronchus
- c) Epiglottis
- d) None

- **1.Ans:→ b) Oligodendrocytes**
- **2.Ans→ (b) Paracortex**
- **3.Ans→ (c) Central arteriole**
- **4 Ans→ (c) Thymus**
- **5 Ans→ (b) Stratified squamous nonkeratinized epithelium**
- **6. Ans→(c) Stratum lucidum**
- **7.Ans→(d) All of the above**
- **8.Ans→ (c) Pseudostratified ciliated columnar**
- **9.Ans→ (d) Only endothelium of capillary**
- **10.Ans→(c) Epiglottis**