

Small intestine

Bile, succus entericus & pancreatic juice

Figures in this ppt are from guyton, ganong, best & taylor, tortora and google images

Shortest & widest & most fixed part, C-shaped

duodenum
(25 cm)

stomach

ascending colon

jejunum
(1m)

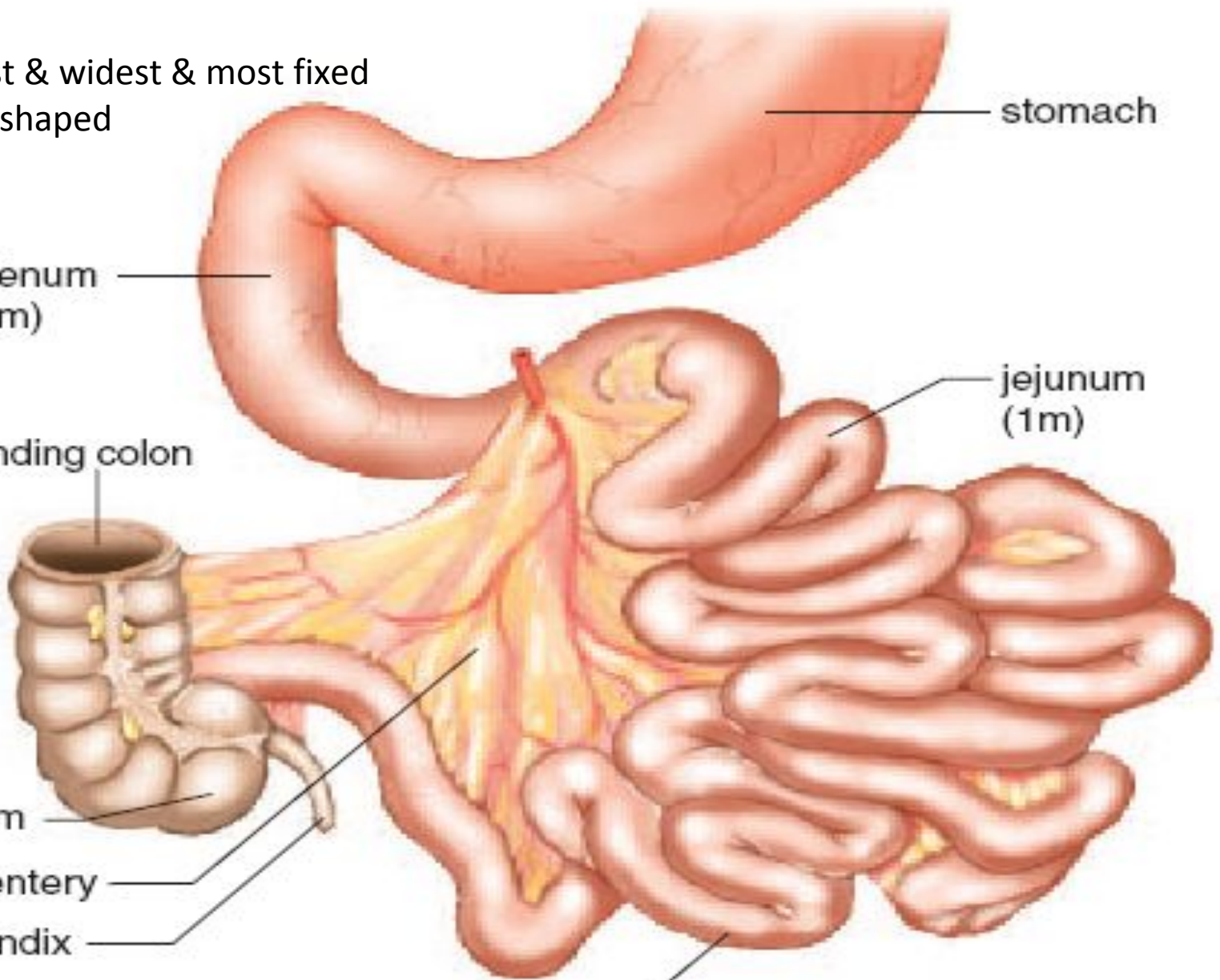
cecum

mesentery

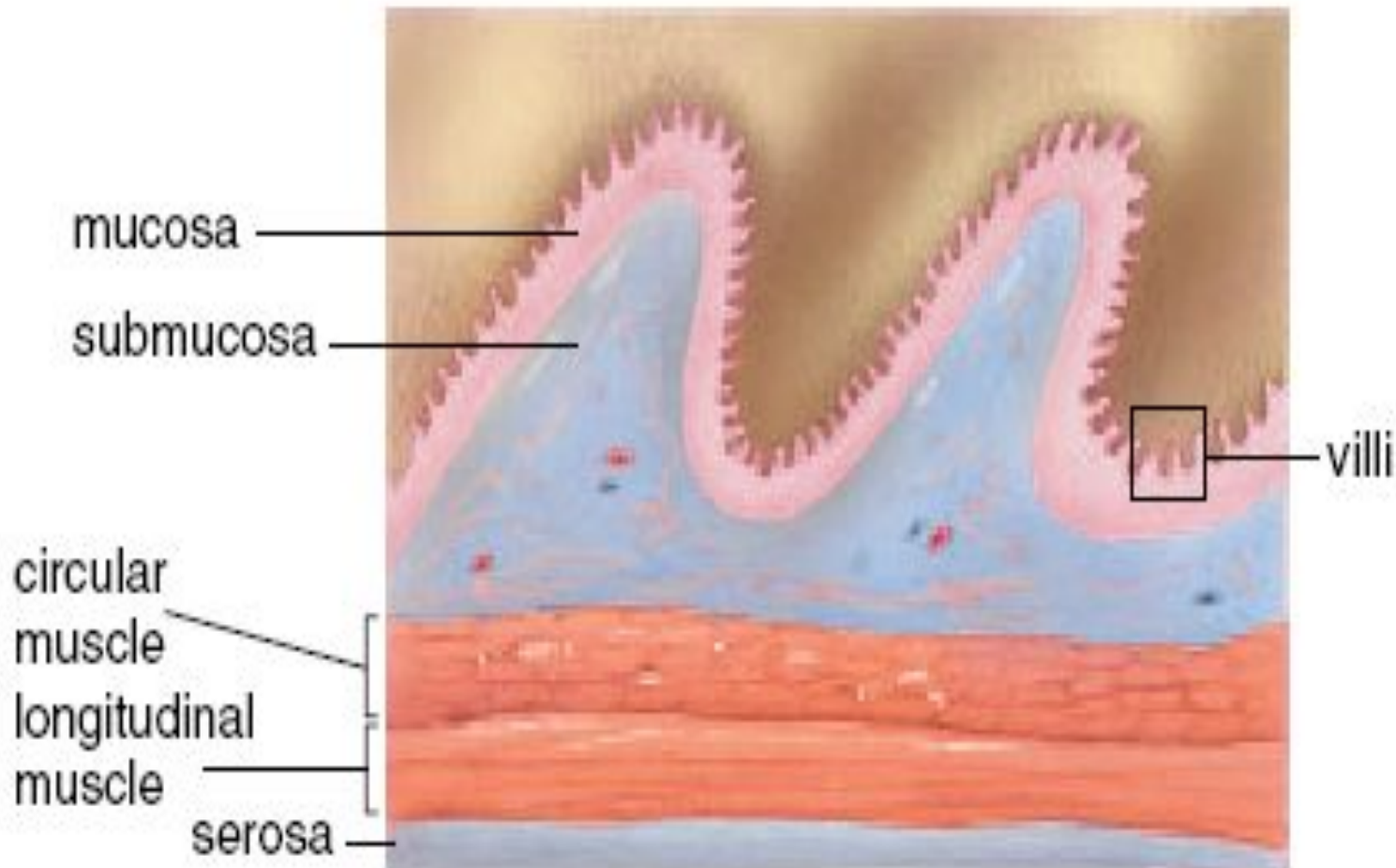
appendix

ileum
(2 m)

Ligament treitz

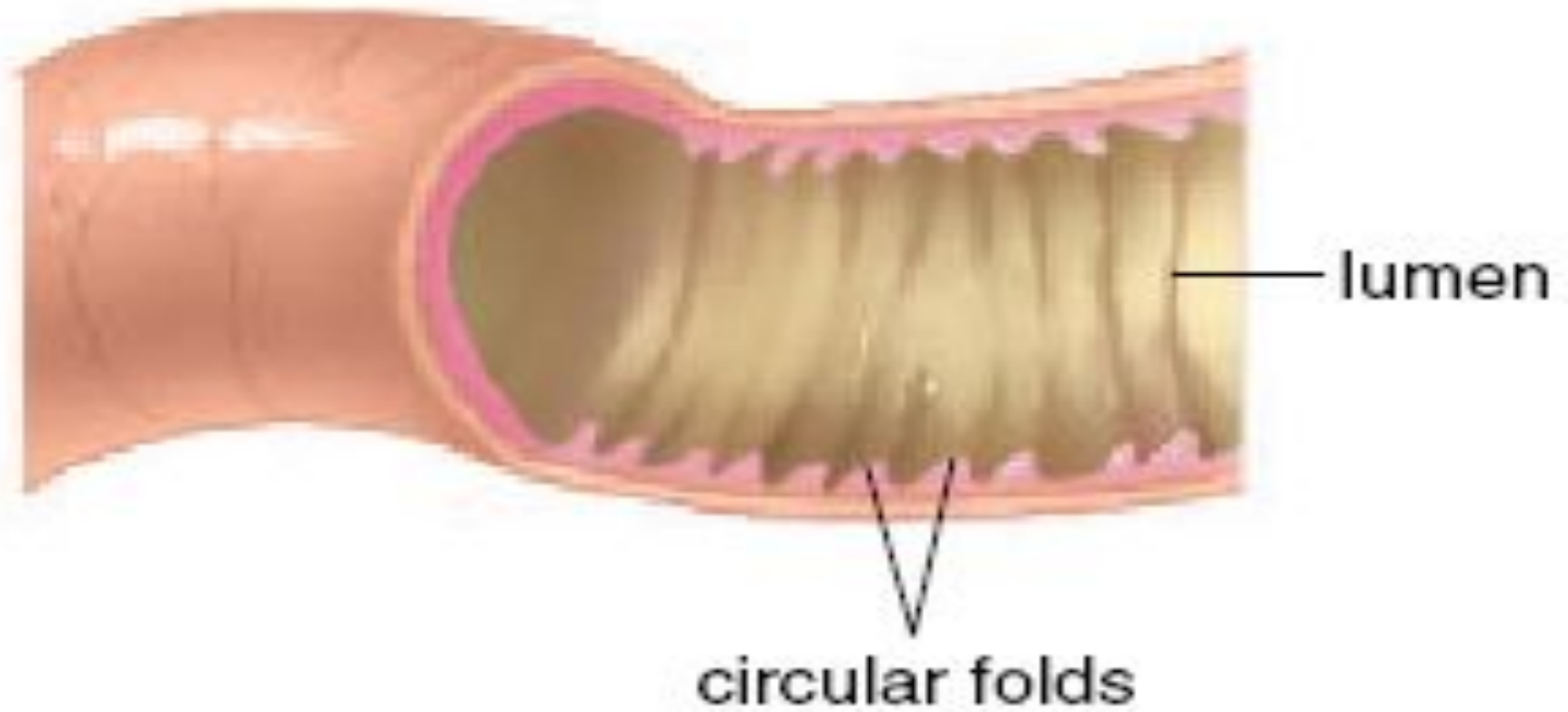


Circular folds, villi, microvilli & peyers patches (MALT or GALT), crypts of lieberkuhn



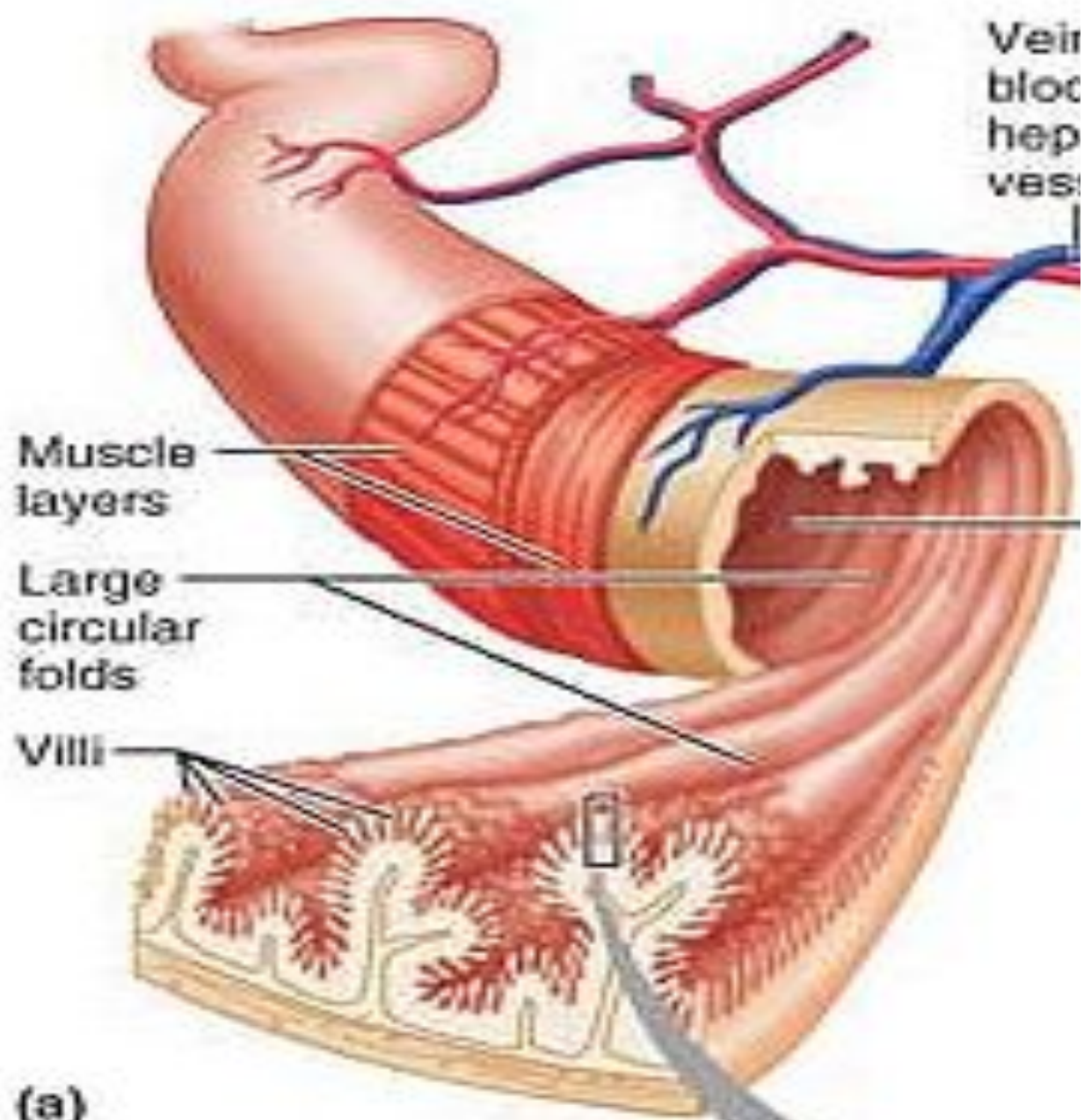
b. Section of intestinal wall

Permanent folds
1 cm tall

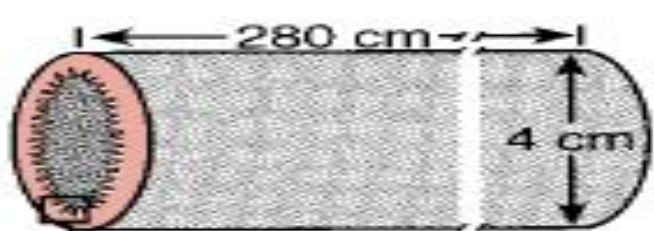





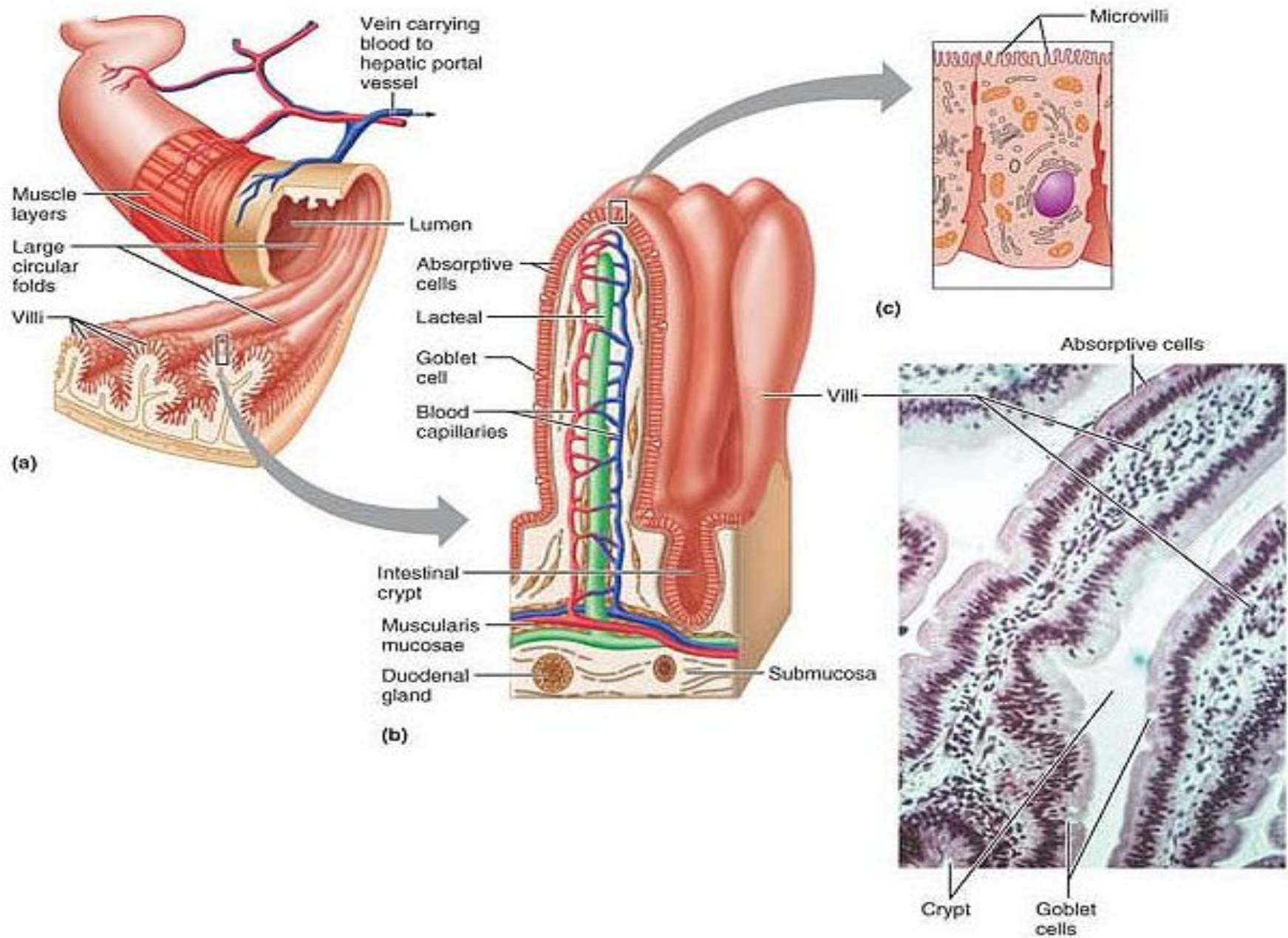
a. Small intestine

Numerous folds of mucosa-
Plica circulares
Folds of kerkring
Valvular conniventes

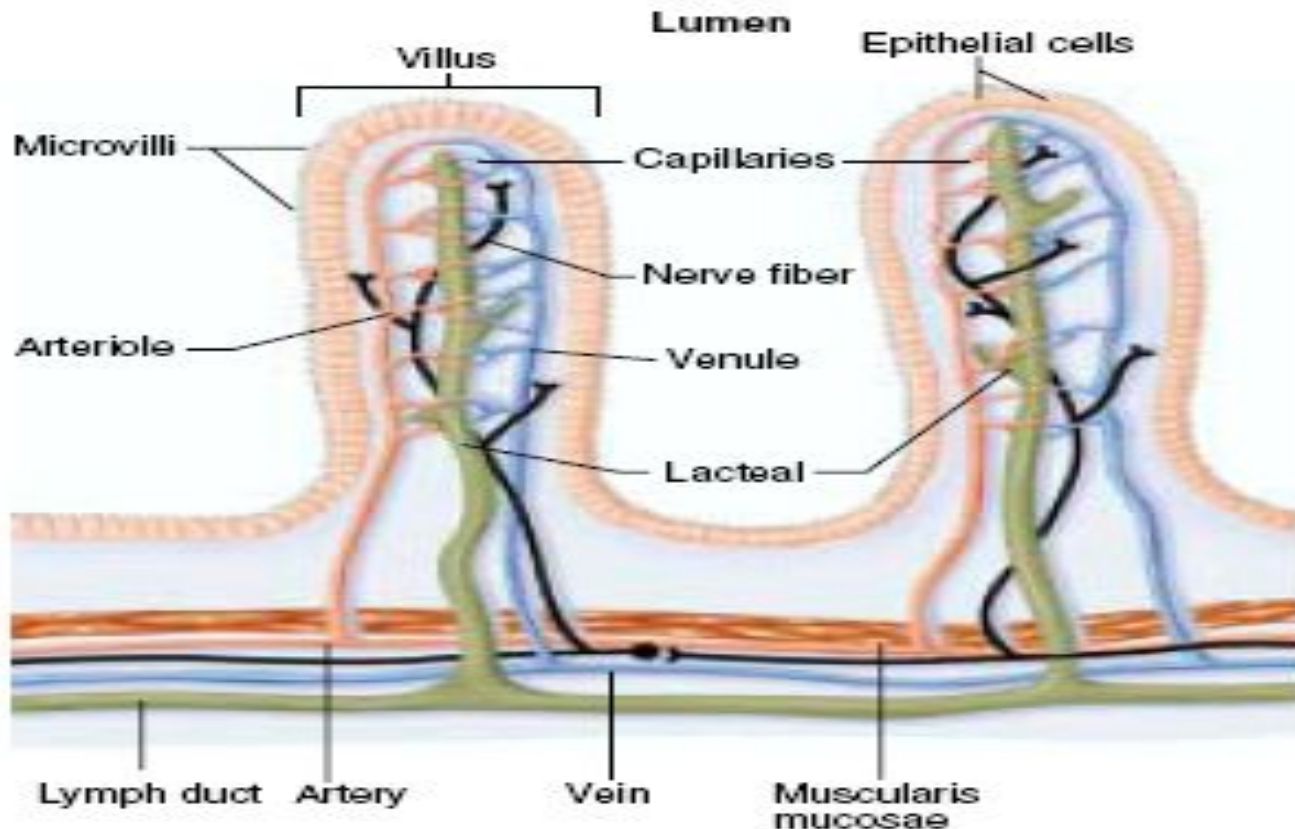


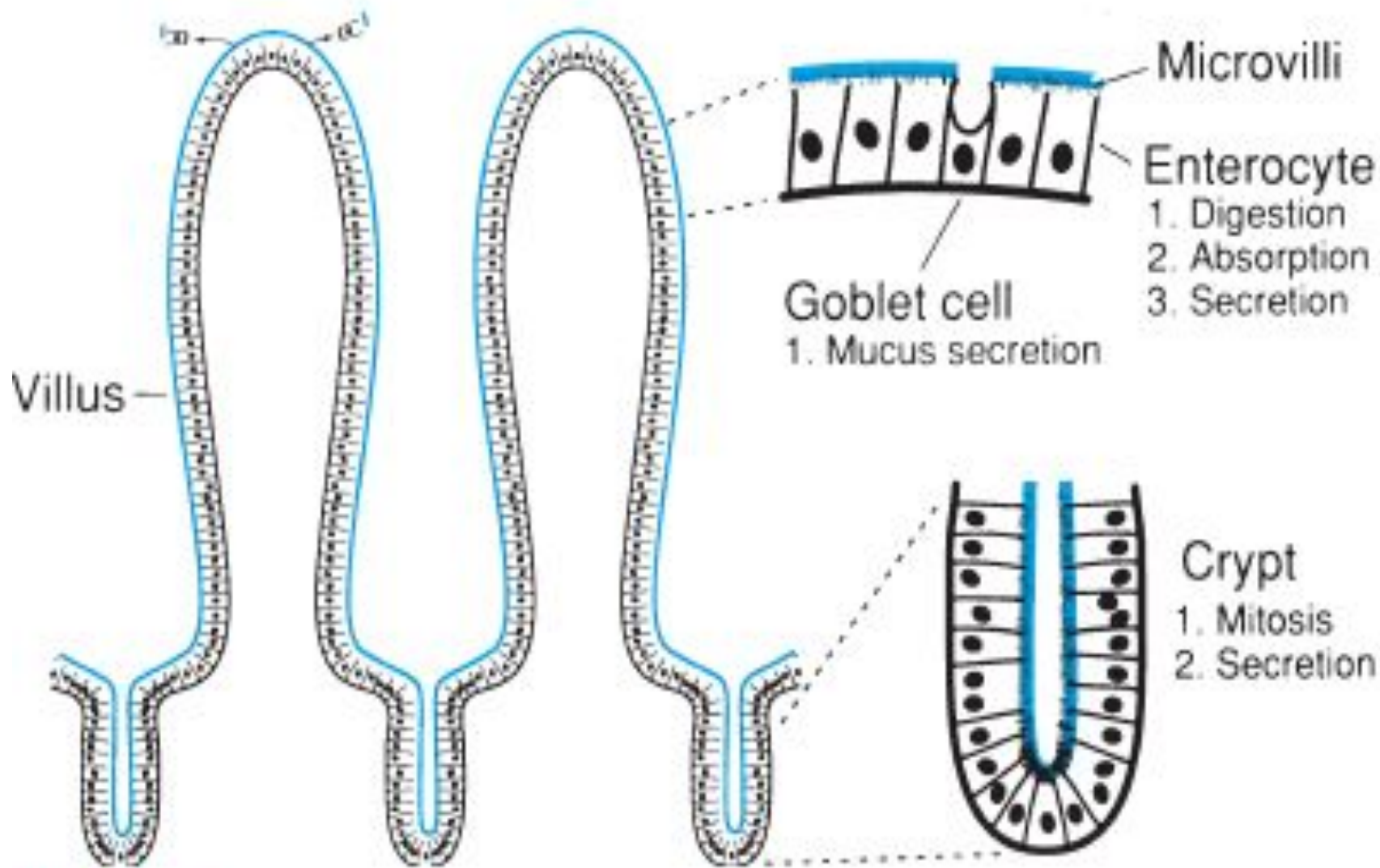
(a)

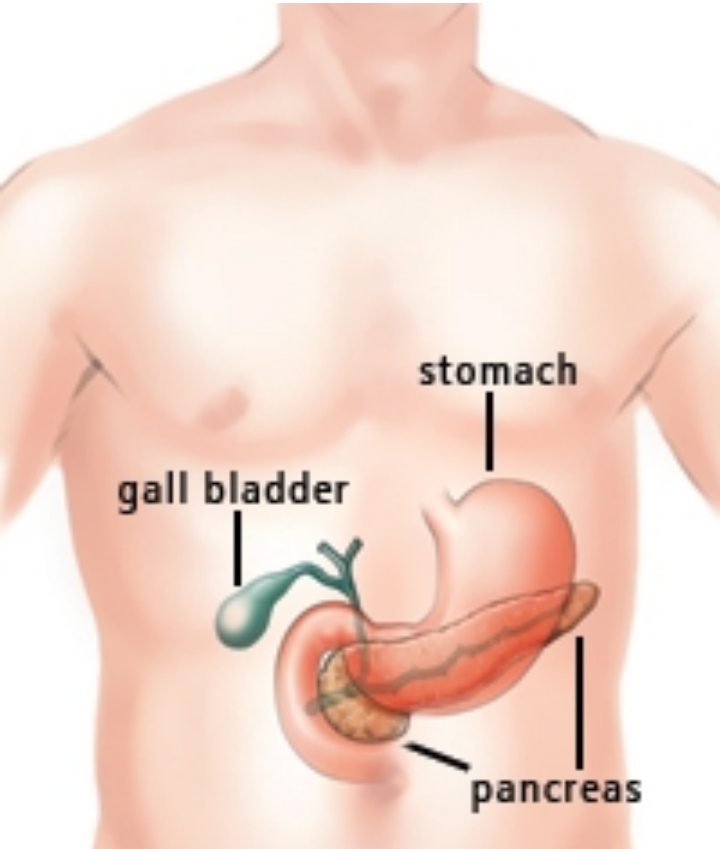
	Structure	Relative surface increase (cylinder = 1)	Surface area (m ²)
Intestine as cylinder	 <p>A diagram of a smooth intestine cylinder. The length is labeled as 280 cm and the diameter as 4 cm. The surface is smooth.</p>	1	0.33
Circular folds	 <p>A diagram showing the intestine with circular folds (plicae circulares) along its length. A small square indicates a magnified view of the surface.</p>	3	1
Villi	 <p>A diagram showing the intestine with villi (finger-like projections) on its surface. A small square indicates a magnified view of the surface.</p>	30	10
Microvilli	 <p>A diagram showing the intestine with microvilli (tiny hair-like projections) on its surface. A small square indicates a magnified view of the surface. Below the diagram is a cross-section of an intestinal cell showing its internal structure.</p>	600	200



Villi is a layer of epithelium with network of capillaries & a lacteal and some fibers of muscularis mucosa

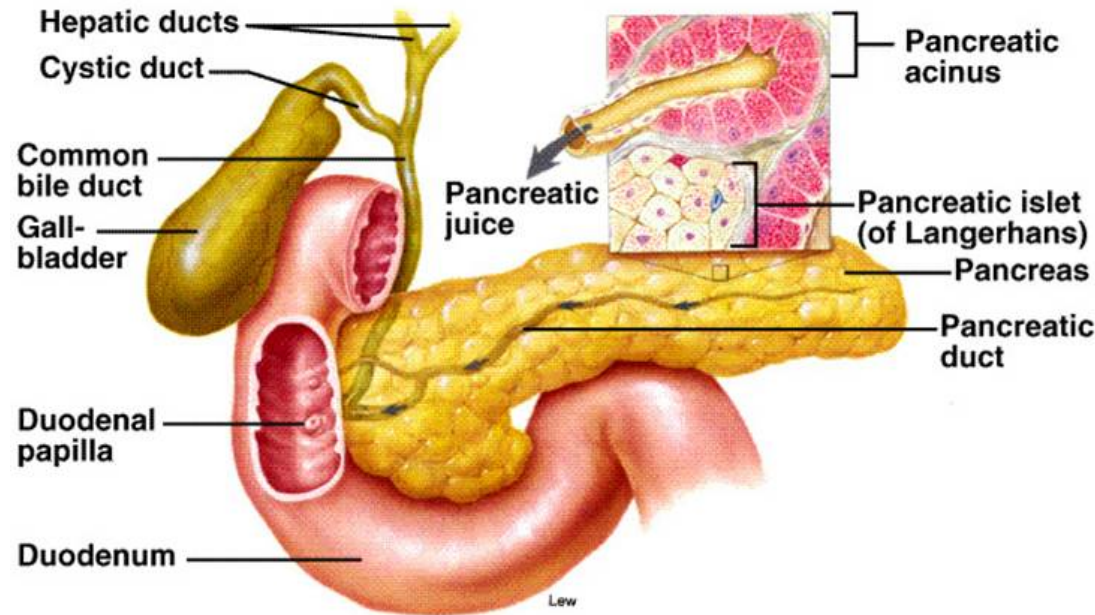


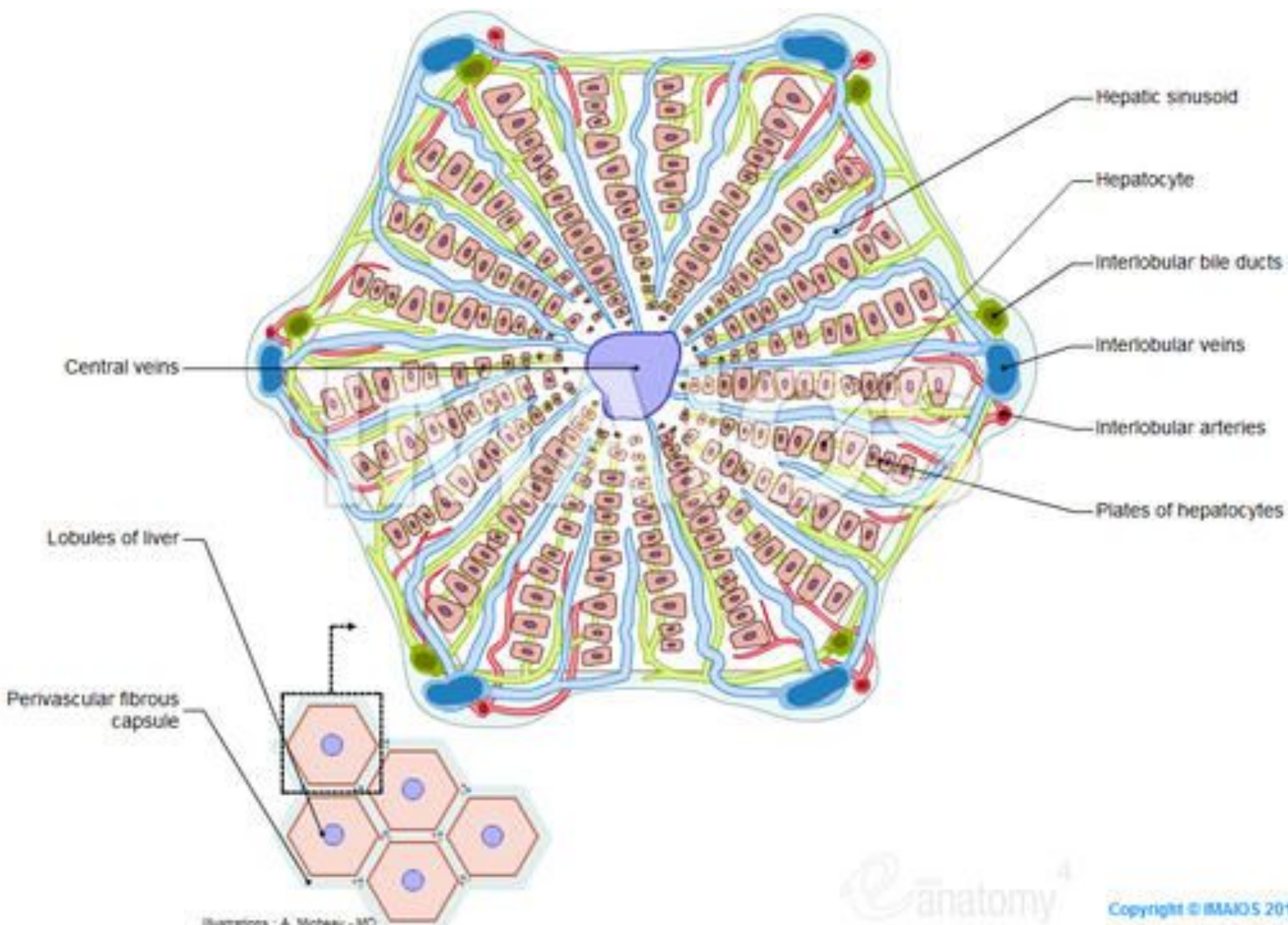


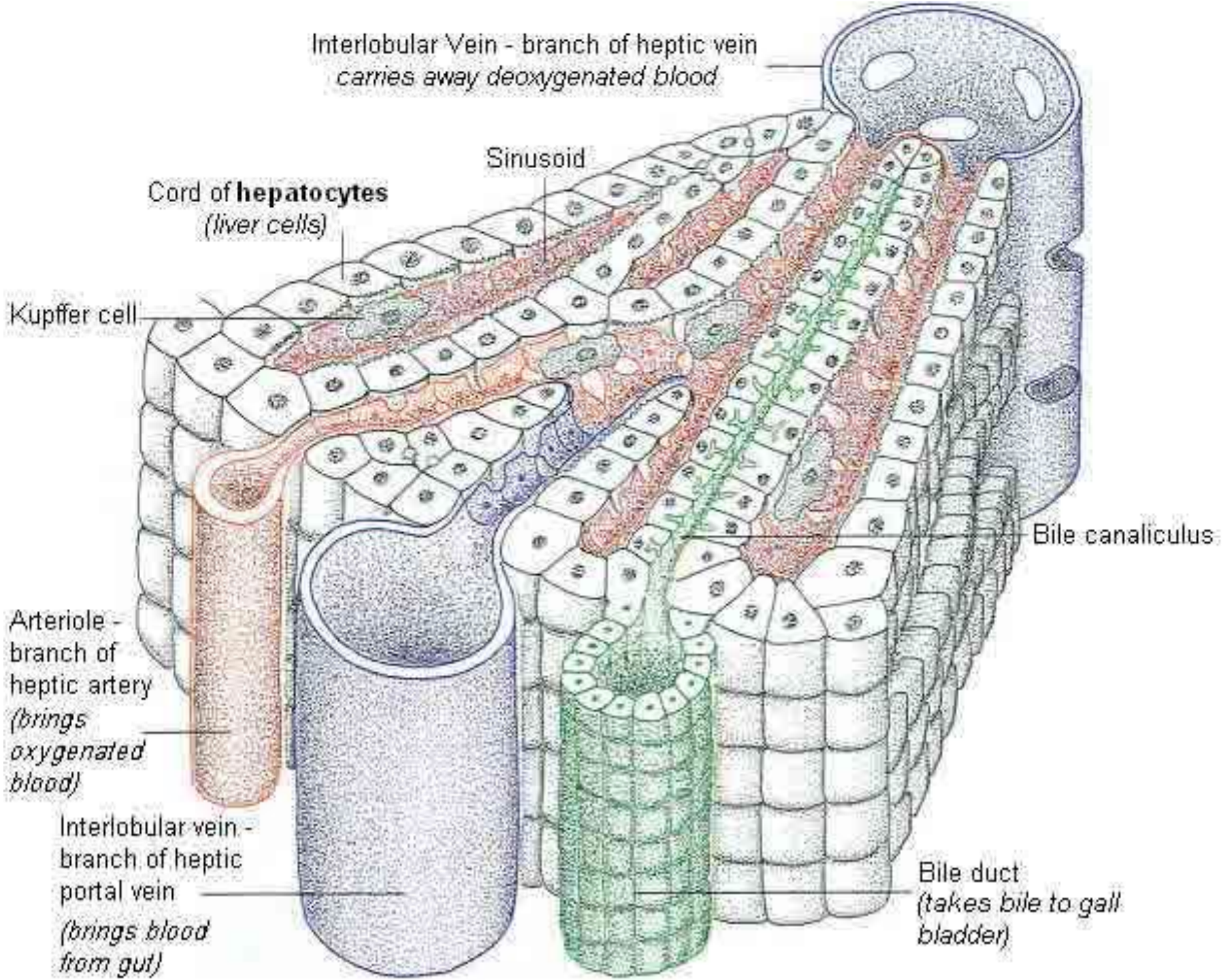


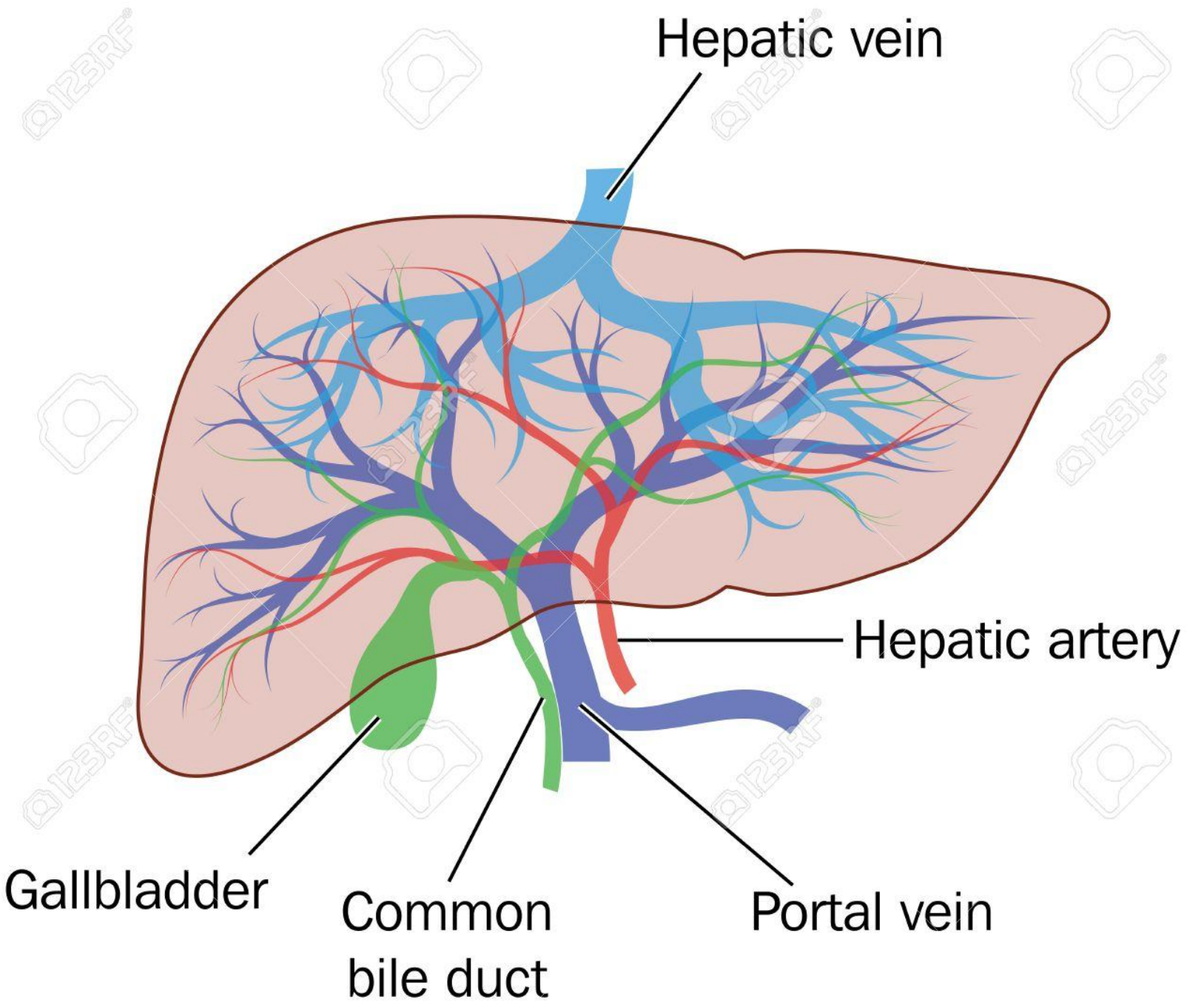
Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.

Pancreatic Juice and Bile are Secreted Into the Duodenum







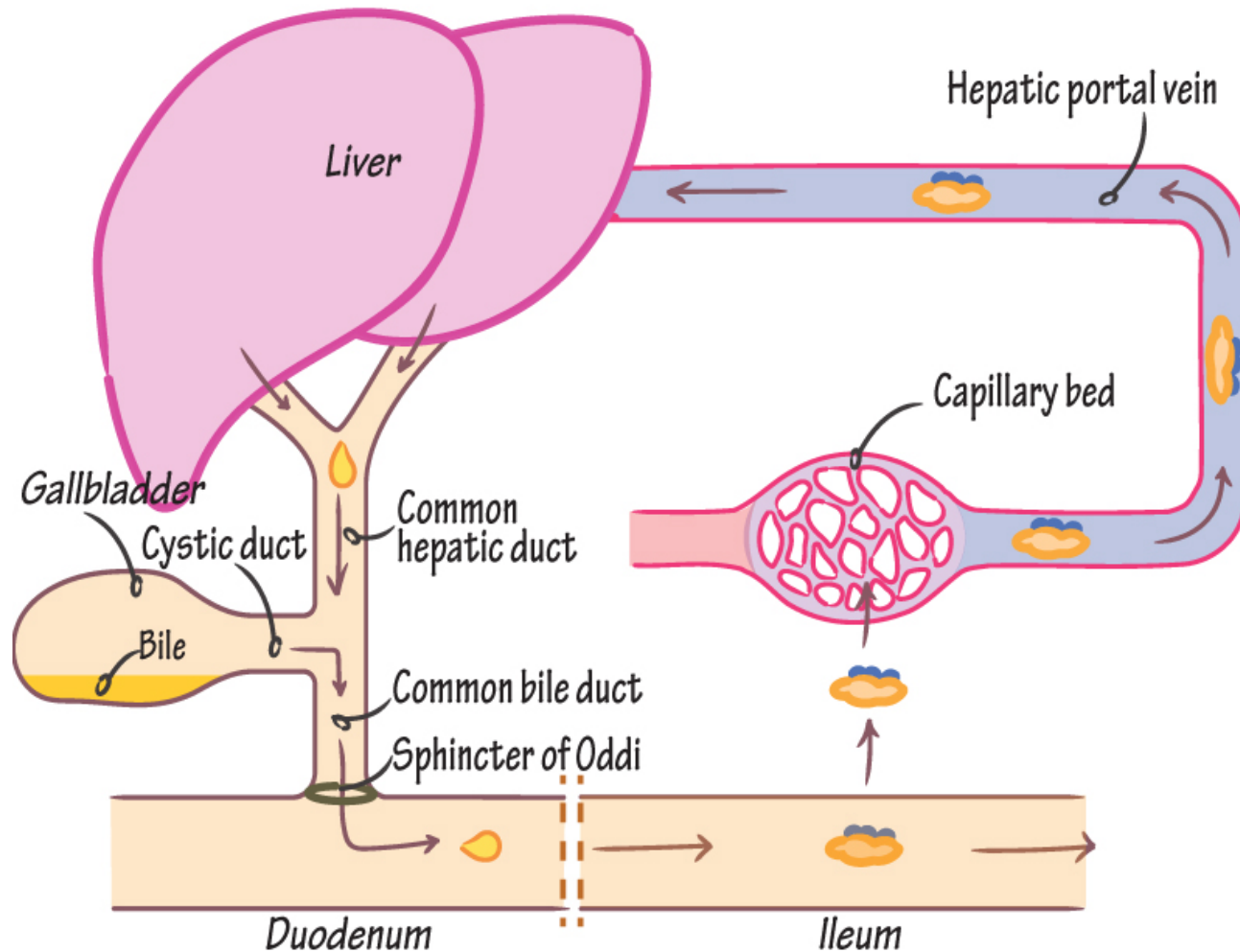


Bile

- **Excretory product, no enzymes**
- **Bile salts**
- **Bilirubin**
- **Cholesterol**
- **Lecithin**
- **Water & Electrolytes**
- **Phases- cephalic, gastric, intestinal**
- **Regulation- Vagus, CCK, Bile salts**
- **Choleretic & Cholegogue**

Enterohepatic circulation of bile salts

Enterohepatic Circulation



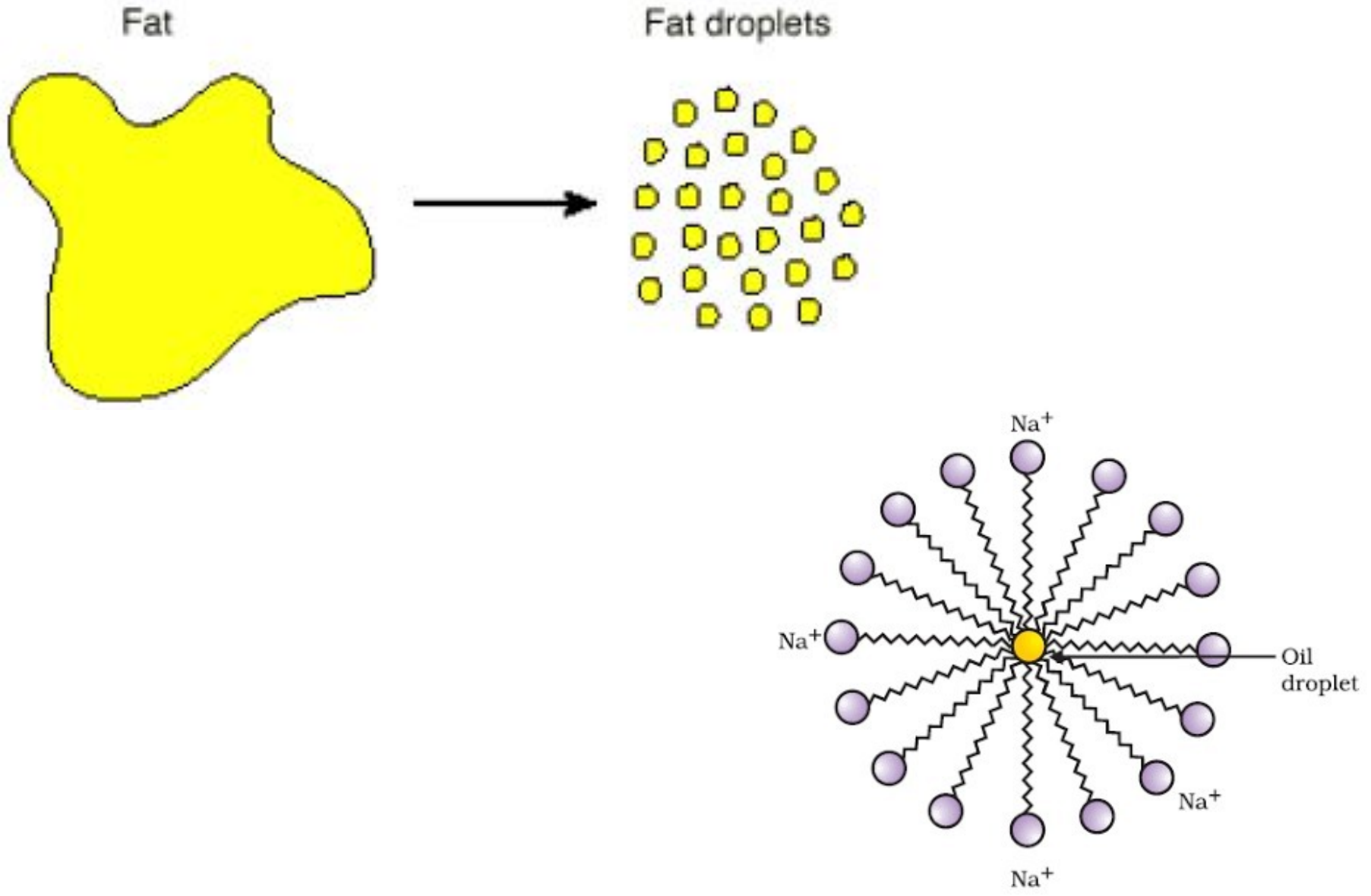
✓ 5% bile salts excreted in feces

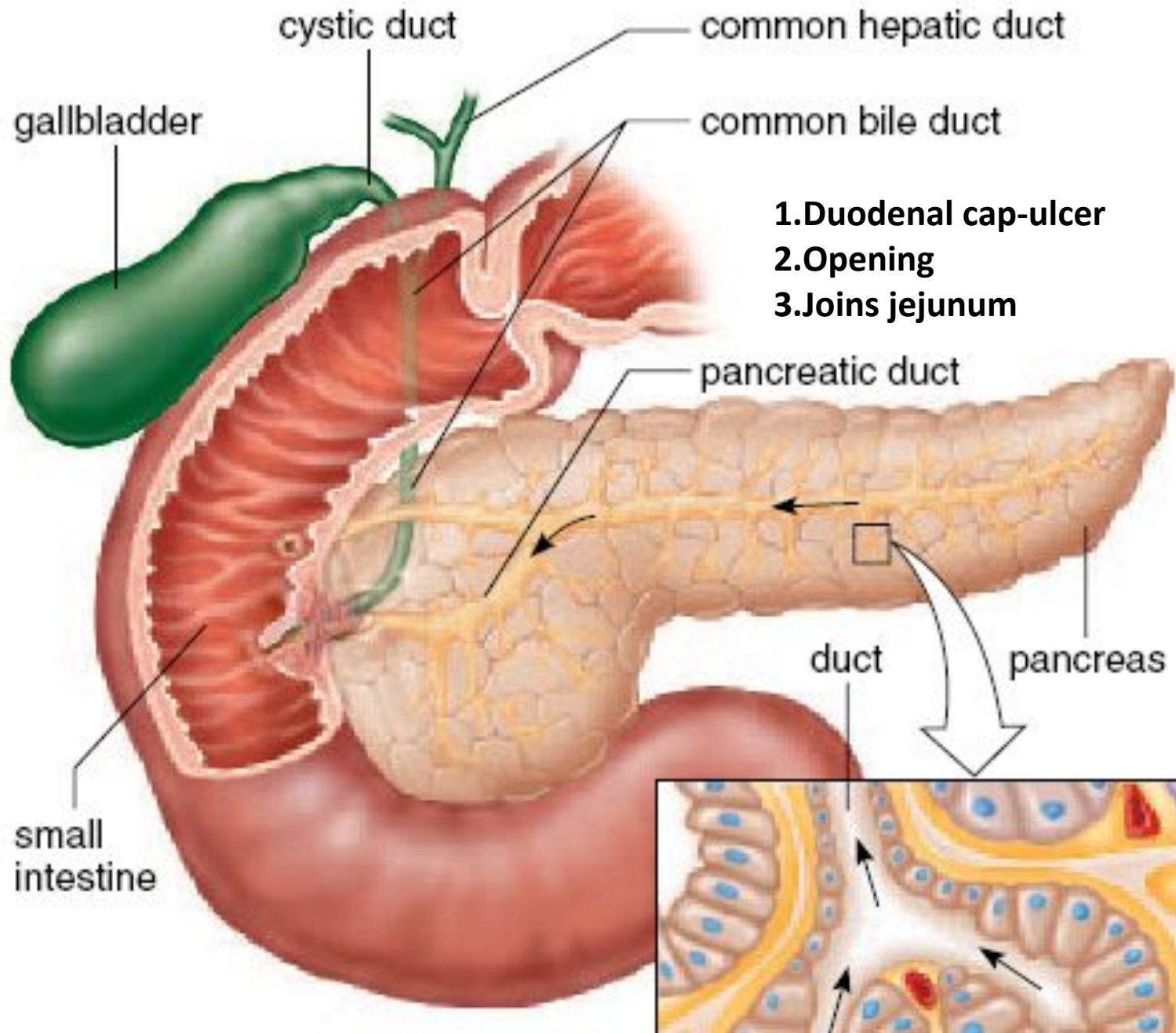
Bile acids & bile salts

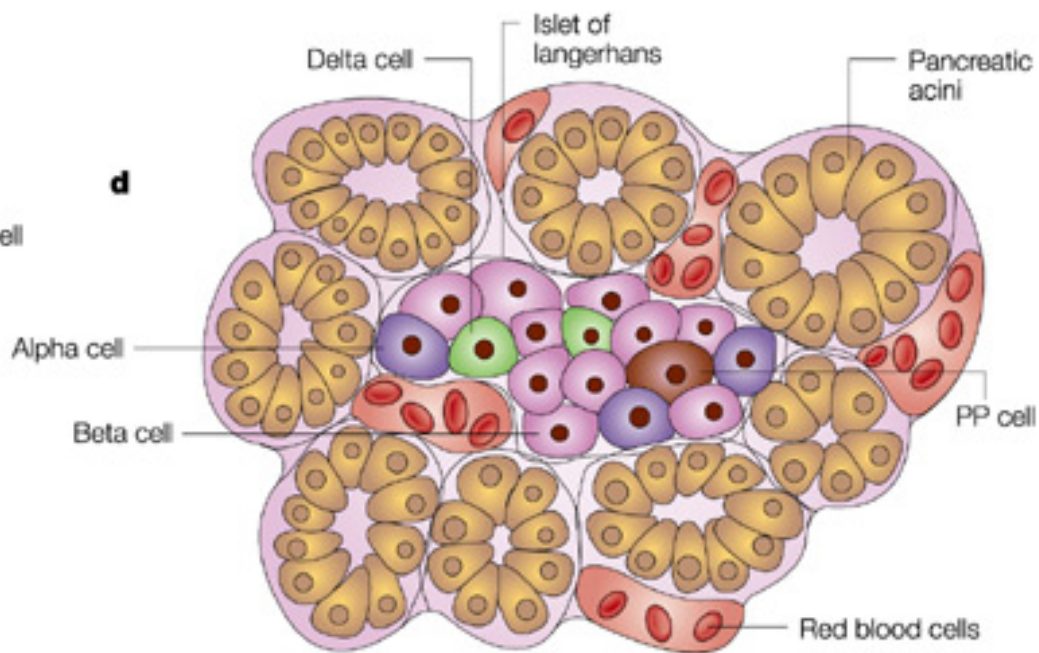
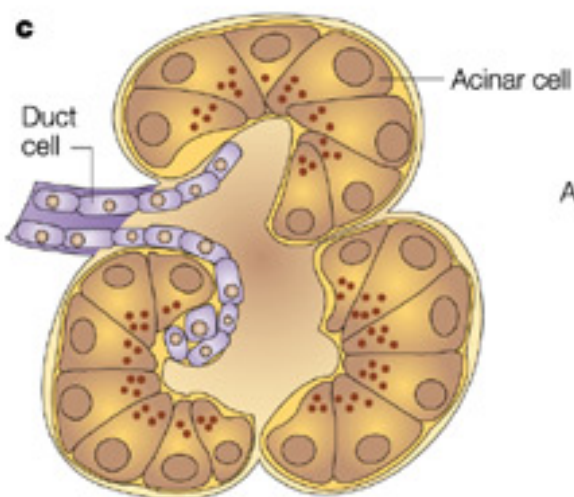
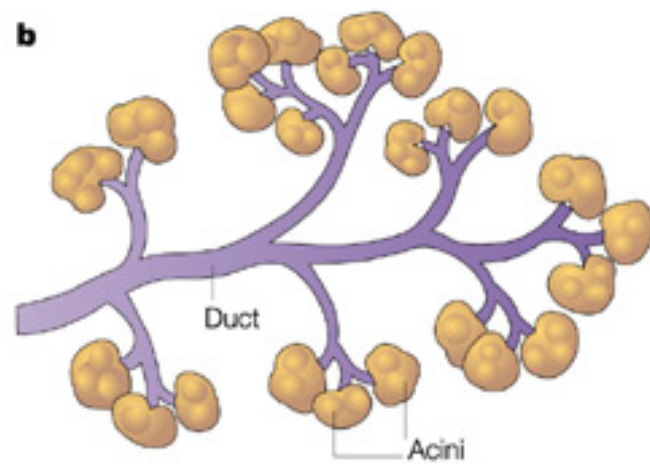
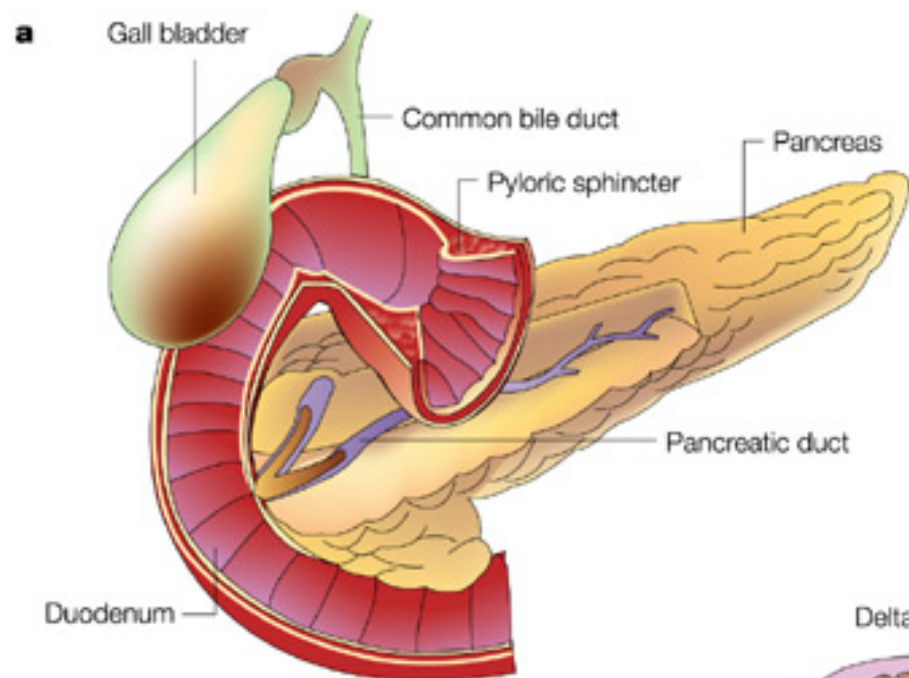
- Bile acids synthesized in liver from **precursor** –cholesterol
- **Primary bile acids**- Cholic acid & Chenodeoxycholic acid
- **Secondary bile acids**(in colon by bacterial action)- Deoxycholic acid & lithocholic acid
- Absorbed & **Conjugated in liver** with glycine & taurine to form glycocholate & taurocholate
- **Na & K salts** of this 2 are **called bile salts**

Function of bile salts

Emulsification & absorption of fat







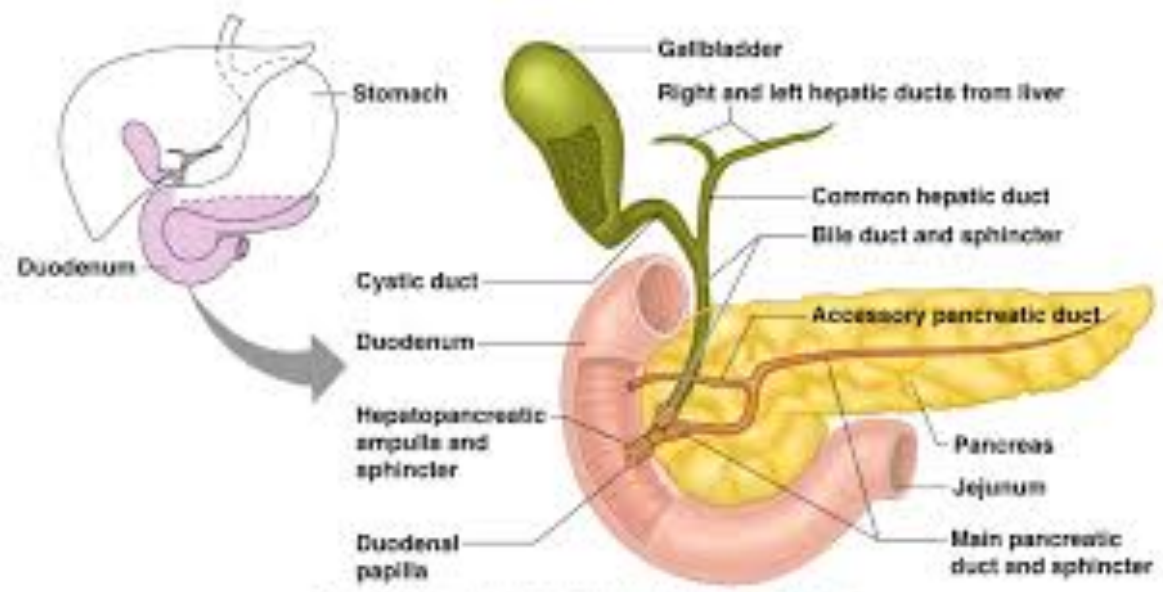
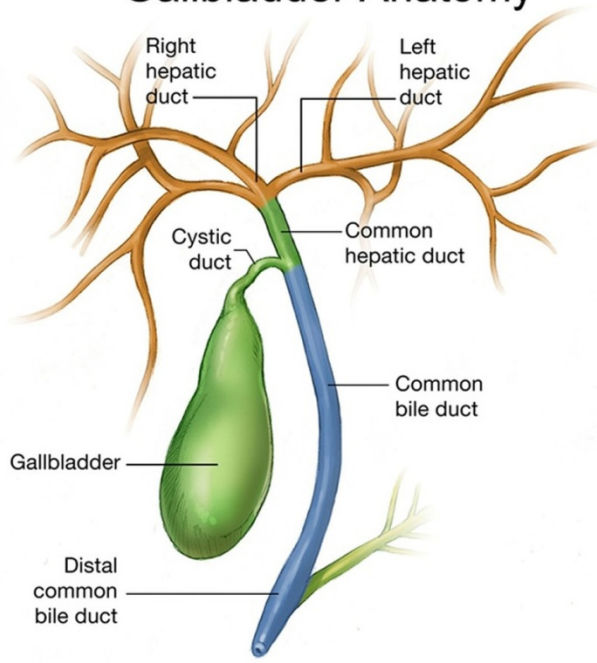
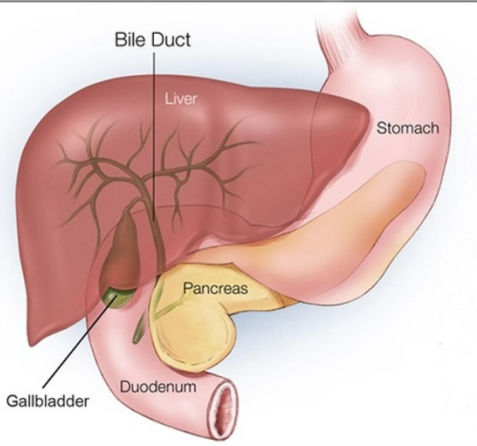
Pancreatic juice

- Enzymes for digestion of fat, protein & carbohydrate(act at pH 7-8)
- **Protein**-trypsinogen, chymotrypsinogen, carboxypeptidase
- **Fat**-lipase, cholesterol esterase, phospholipase
- **Carbohydrate**- amylase
- **Trypsin inhibitor**
- **Water & electrolytes**

Pancreatic juice

- **Phases-** cephalic, gastric, intestinal
- **Regulation-** Vagus(Ach) , CCK, Secretin
- CCK secreted by I cells in response to proteases , peptones & long chain fatty acids
- **Ach & CCK stimulate** acini to secrete enzyme rich secretion
- **Secretin** stimulates cells of ducts to secrete water & electrolytes mainly

Gallbladder Anatomy



Succus entericus

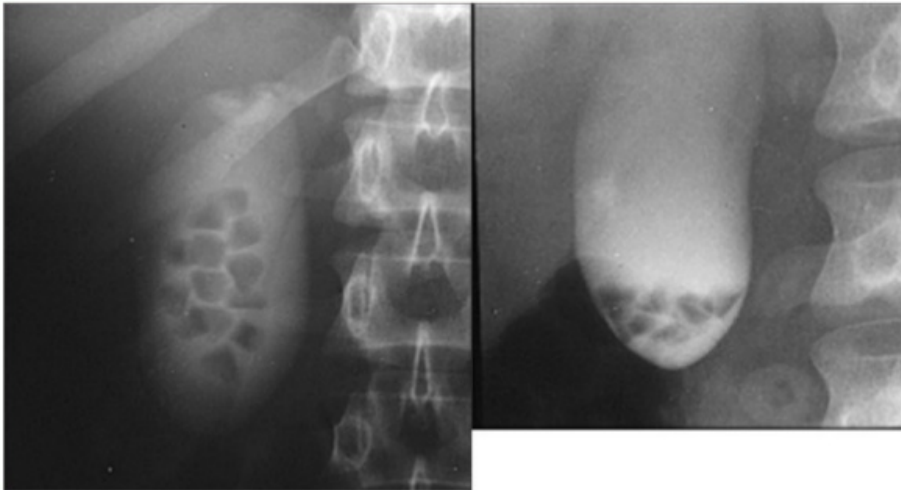
- Crypts of Lieberkuhn-enzymes, water & electrolytes
- **Enterokinase**: -Activates Trypsinogen
- **Enterogastrone**-hormone that inhibits gastric motility & secretion
- **Mucus** – Brunner's glands & goblet cells
- **Enzymes** in brush border outer membrane - disaccharidases, peptidases, nucleases, lipase, sucrase, maltase, isomaltase
- Stimulated by local reflexes. Ach & secretin

Applied

- **Jaundice –prehepatic (hemolytic),
hepatic (hepatocellular)
Posthepatic (obstructive)**
- **Cholelithiasis (gall stone)&
choledocholithiasis (stone in biliary duct)**
- **Cholecystitis (inflammation of GB)**
- **Hepatitis**
- **Cirrhosis**
- **Fatty liver**
- **Pancreatitis (acute & chronic)**

Cholecystography (oral & IV)

Gall stones in OCG



ORAL CHOLECYSTOGRAPHY

Opacified Gall
Bladder

