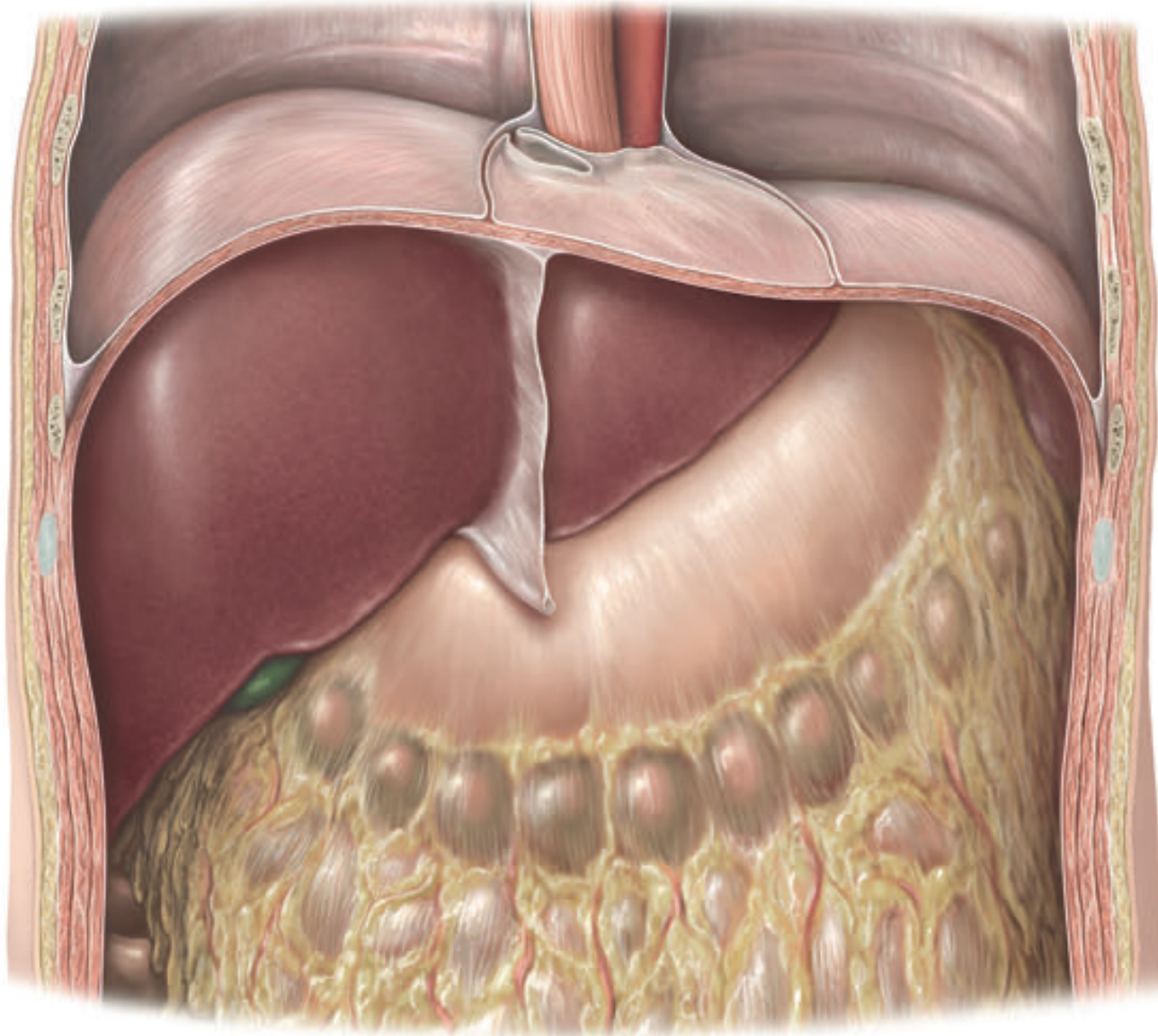


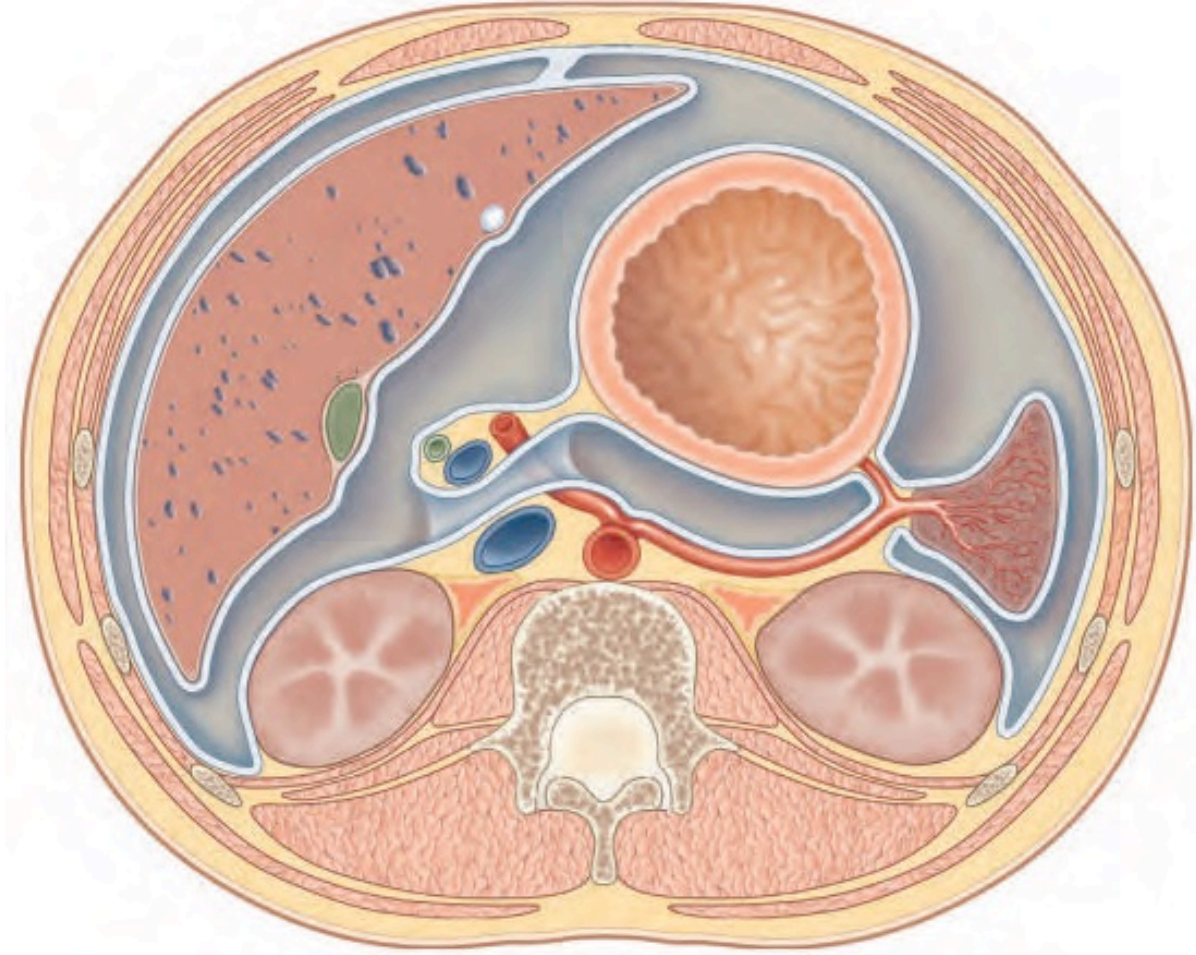
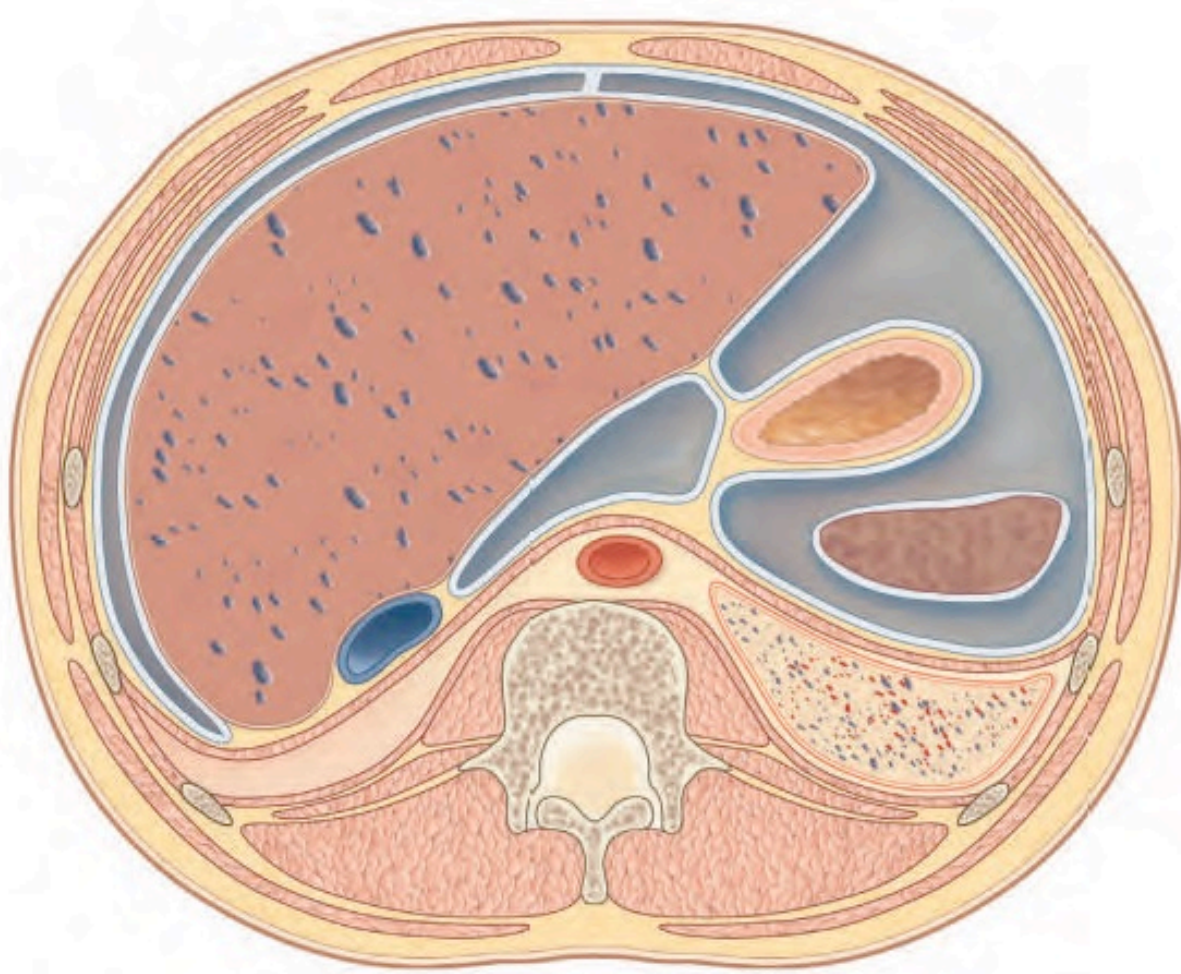
ABDOMEN 3

Prof. MUDr. Jiří Ferda, Ph.D.

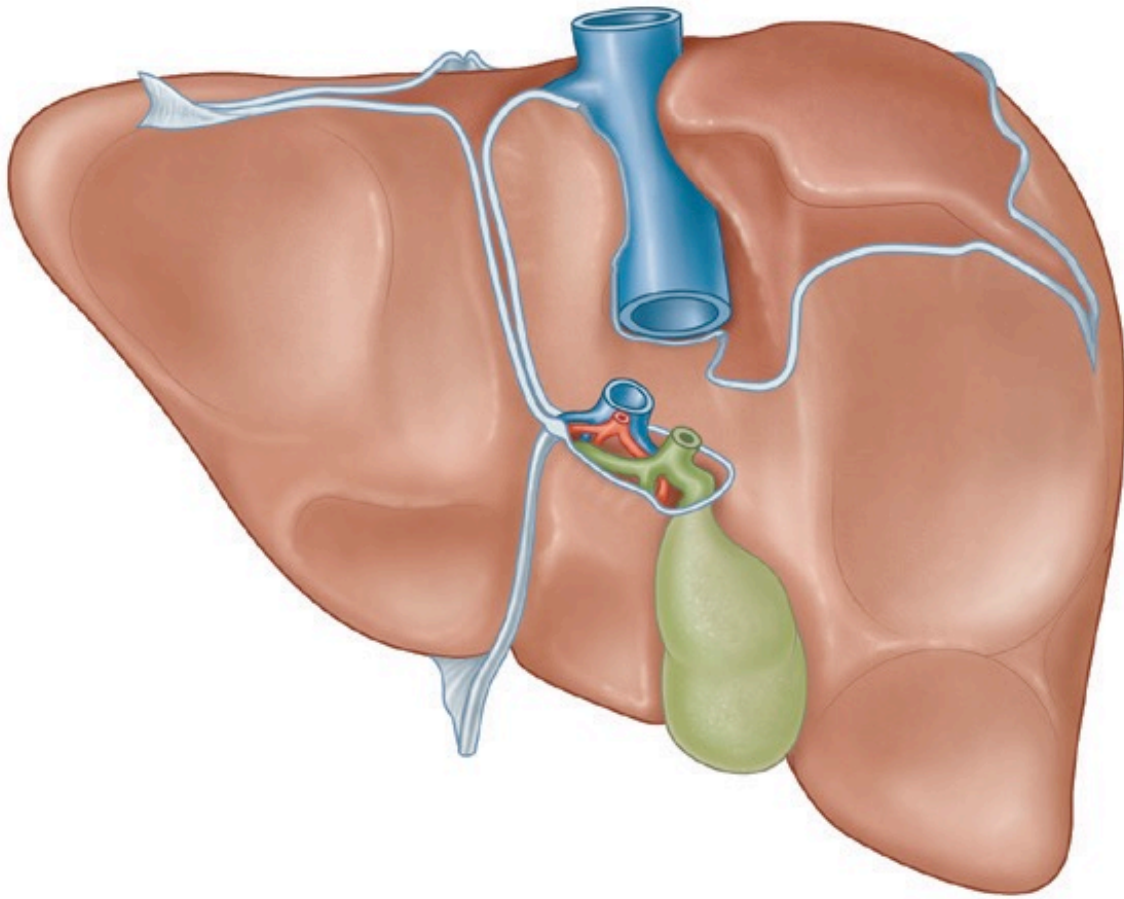


- 🔴 Recessus subdiaphragmaticus
- 🔴 Recessus hepatorenalis (Morrisoni)
- 🔴 Bursa omentalis

LIVER

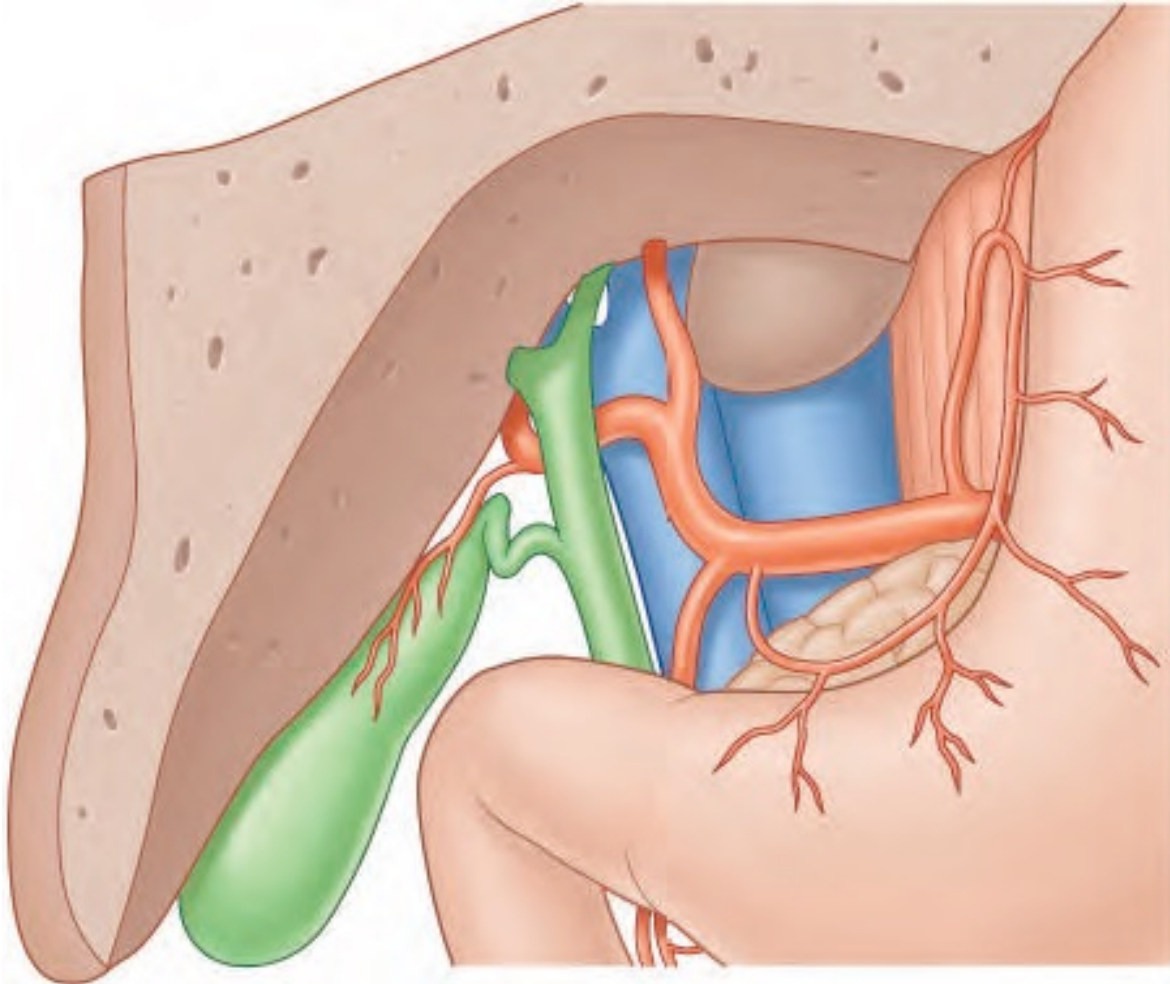


LIVER POSITION



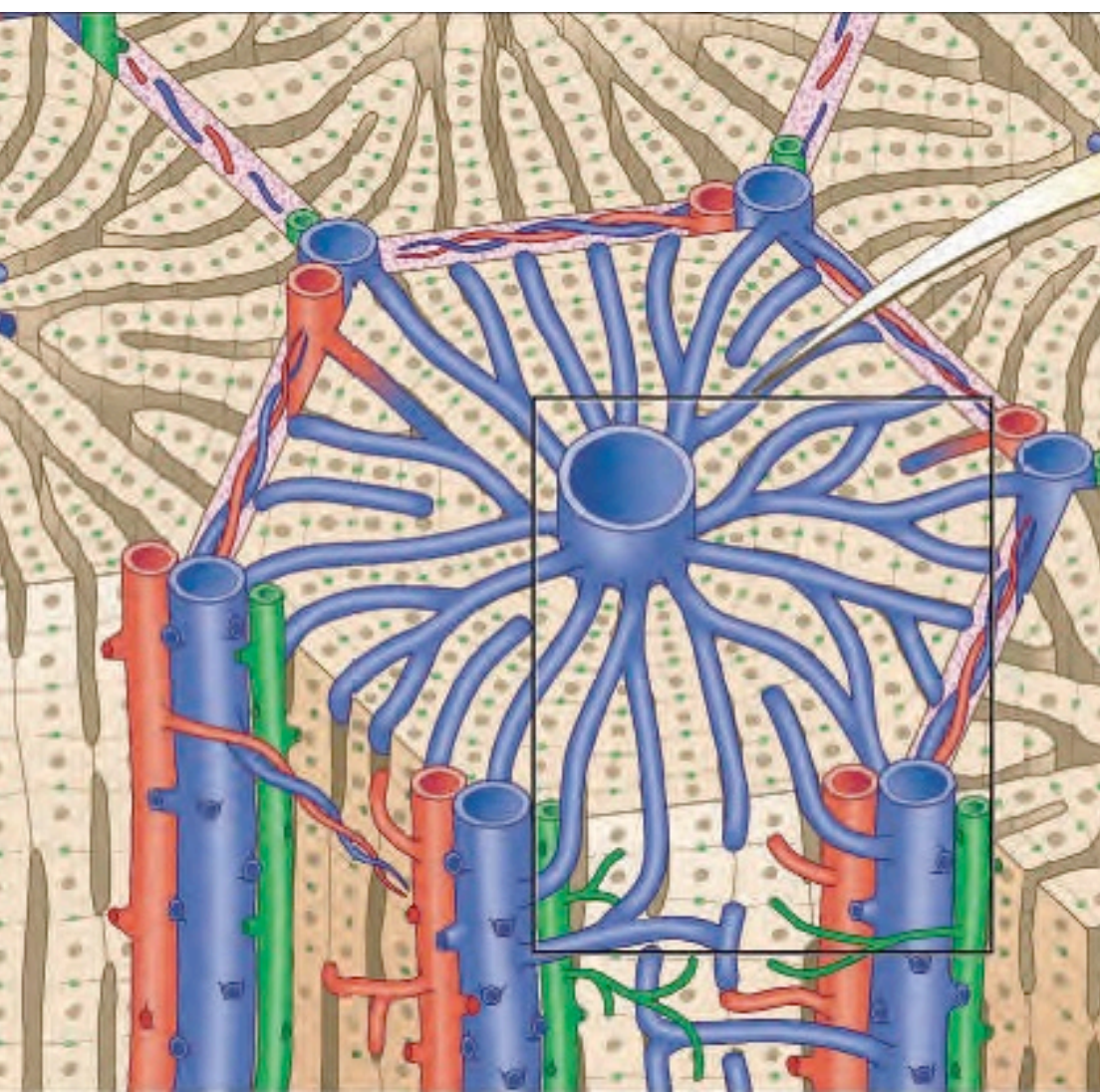
- ♦ **Fissura sagittalis dextra**
 - ♦ Sulcus venae cavae inferioris
 - ♦ Fossa vesicae felleae
- ♦ **Fissura sagittalis sinistra**
 - ♦ Ligamentum venosum Arantii (ductus venosus)
 - ♦ Ligamentum teres hepatis - v. umbilicalis
- ♦ **Porta hepatis (zprava doleva)**
 - ♦ dc. hepaticus, v. portae h., a. hepatica propria
- ♦ **Lobus dexter**
- ♦ **Lobus sinister**
- ♦ **Lobus caudatus**
- ♦ **Lobus quadratus**

HEPAR



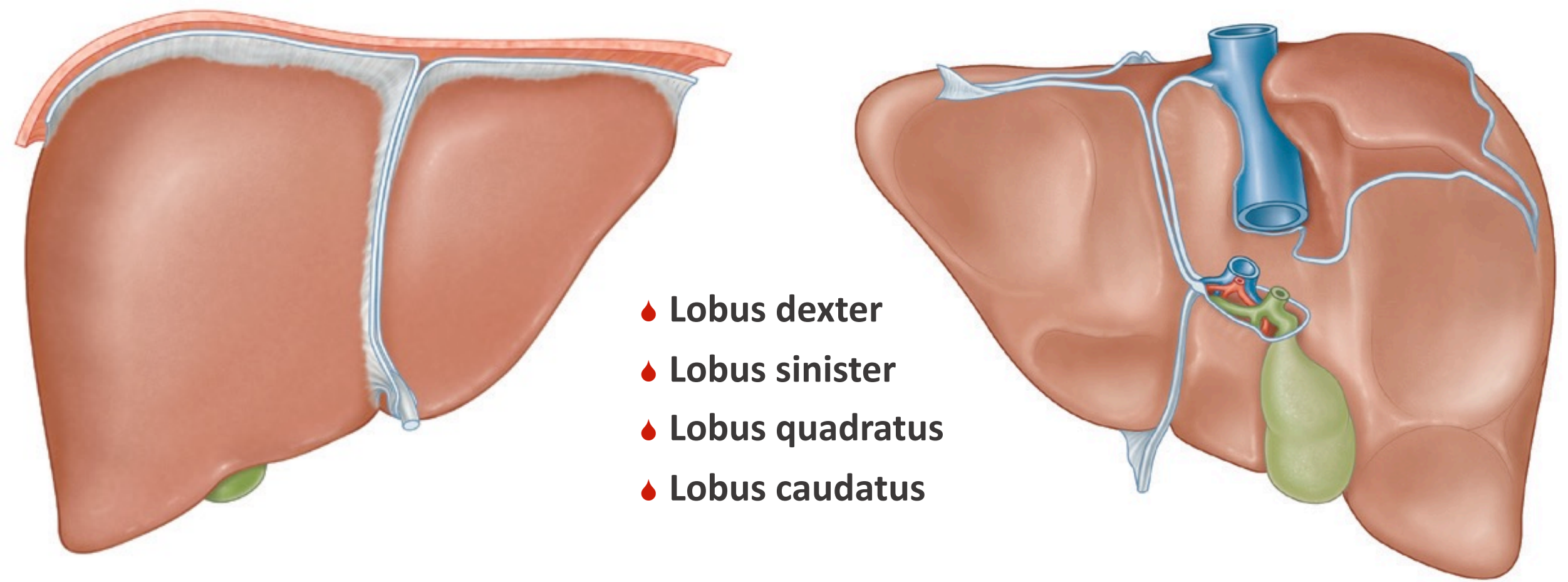
- ♦ nutritive
- ♦ **A. hepatica propria**
 - ♦ Glucose a O₂
- ♦ functional
 - ♦ V. portae hepatis
 - ♦ Radices v. portae - v. lienalis, v. mesenterica sup, inf
 - ♦ Proteins, sacharides, degradation product of ahemoglobine
- ♦ Vv. hepaticae

LIVER VASCULATURE

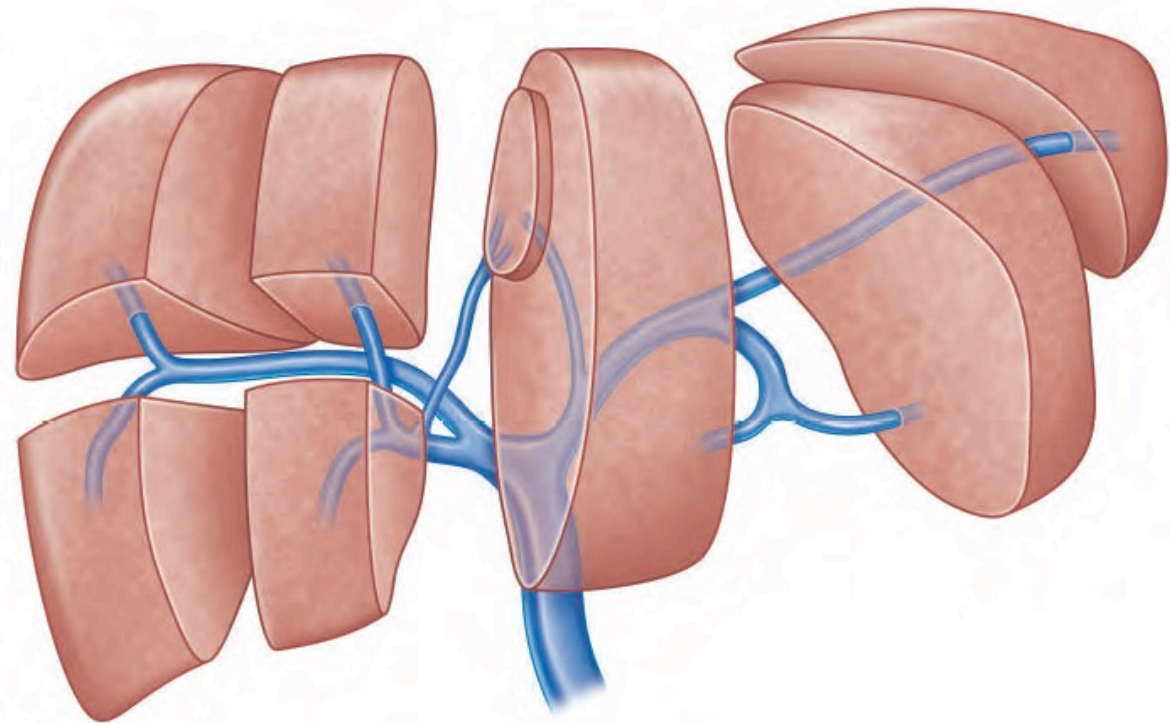
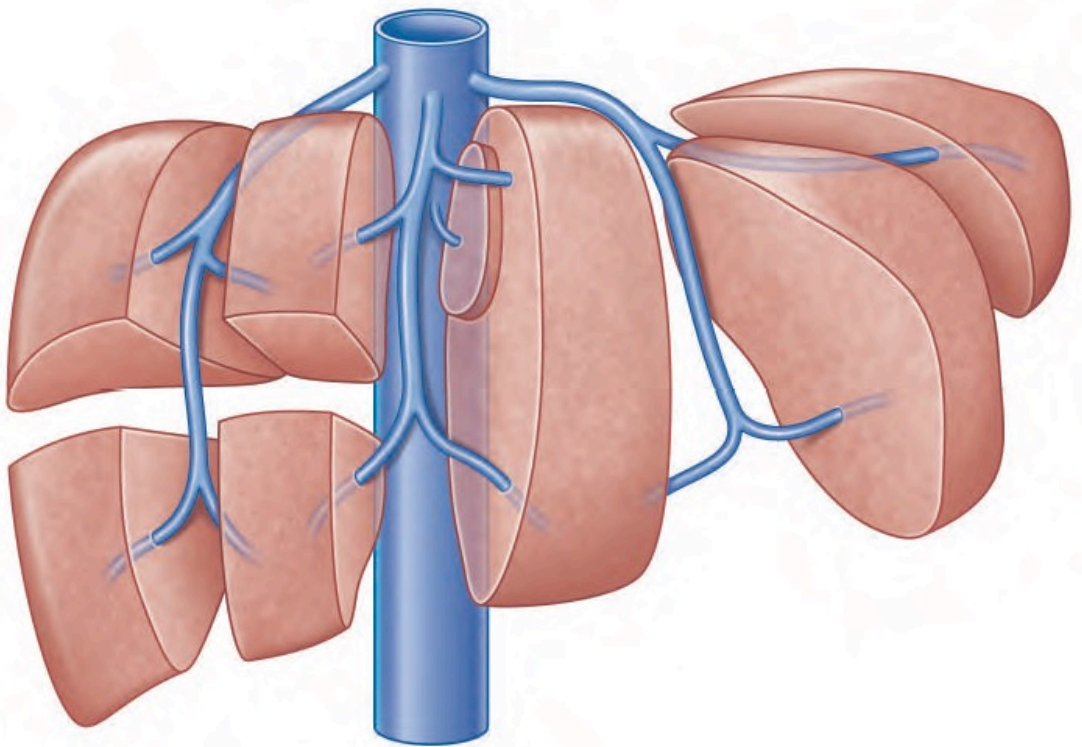


- ♦ lobulus hepatis
- ♦ Hexagonal prism
- ♦ Hepatobiliary spaces
 - ♦ Interlobular branches
 - ♦ A. interlobularis hepatica
 - ♦ V. interlobularis hepatica (v. portae)
 - ♦ Ductus interlobularius
- ♦ Lobular centre
 - ♦ V. centralis
- ♦ units
 - ♦ Morfological - lobulus
 - ♦ Functional - portal lobulus triangular vv . Hep.
 - ♦ Smallest functional - primary acinus - lobulus v. circumlobularis

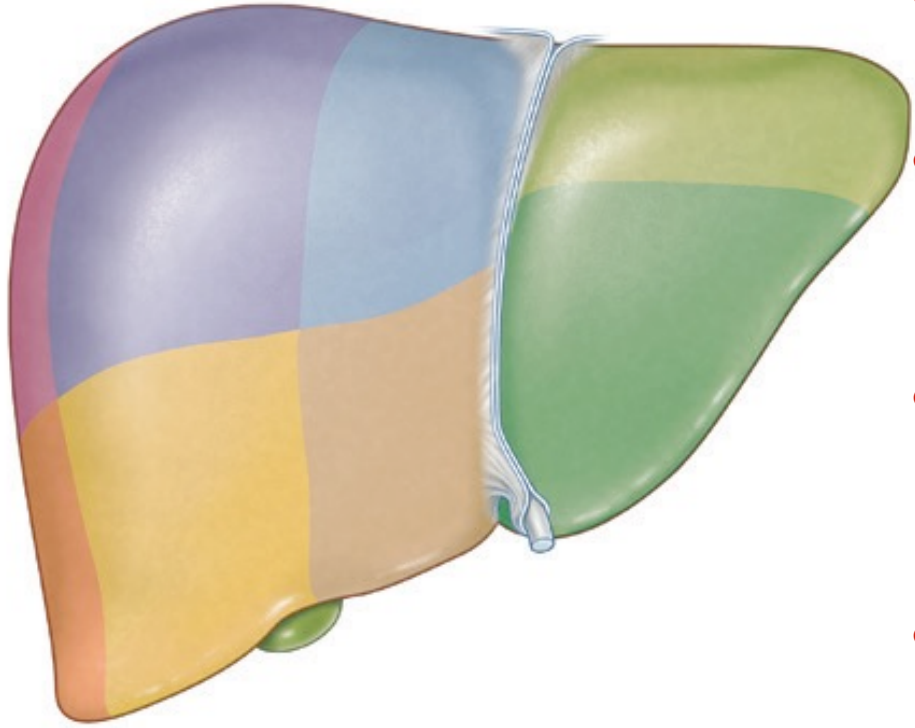
MICROSTRUCTURE



LIVER LOBES



LIVER SEGMENTS



♦ **L. caudatus**

- ♦ S1 - caudate

♦ **L. sinister**

- ♦ S2 - left lateral superior
- ♦ S3 - left medial inferior

♦ **L. quadratus**

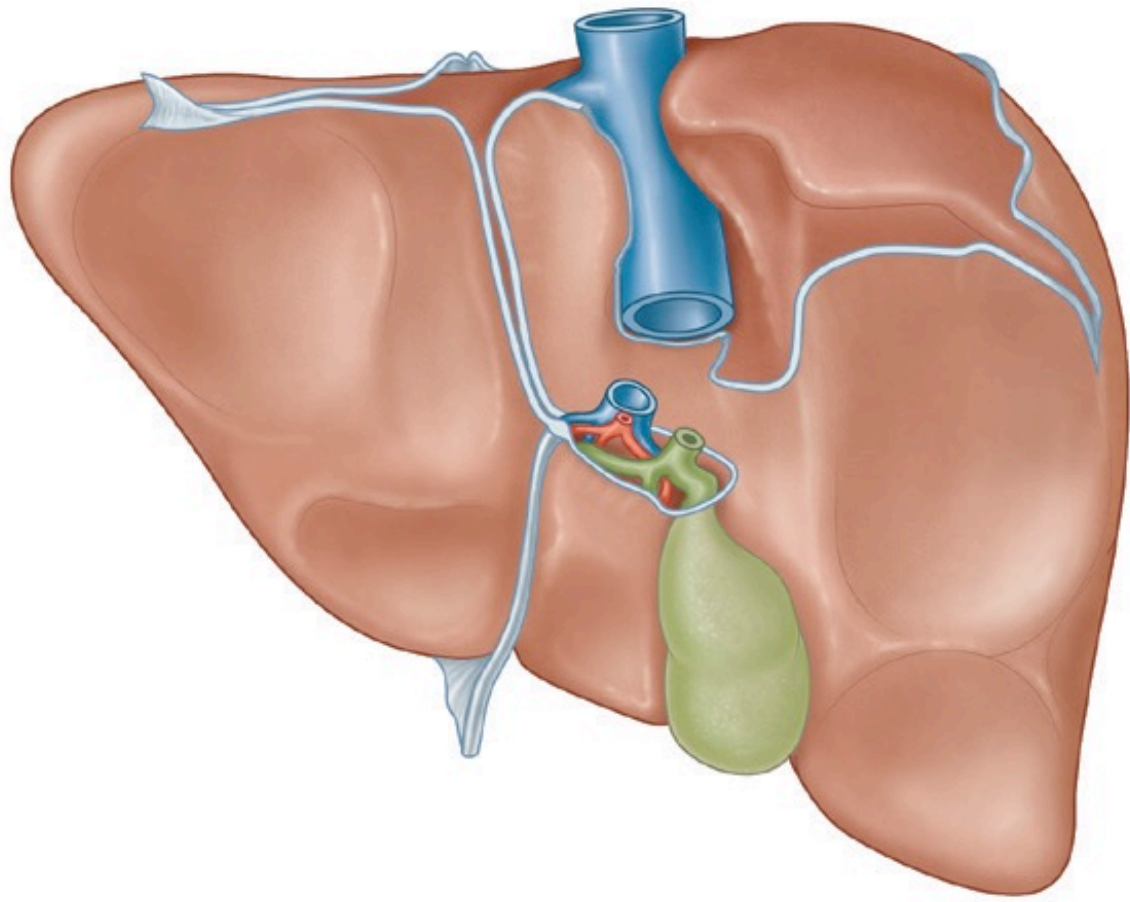
- ♦ S4a medial superior
- ♦ S4b medial inferior 4b

♦ **L. dexter**

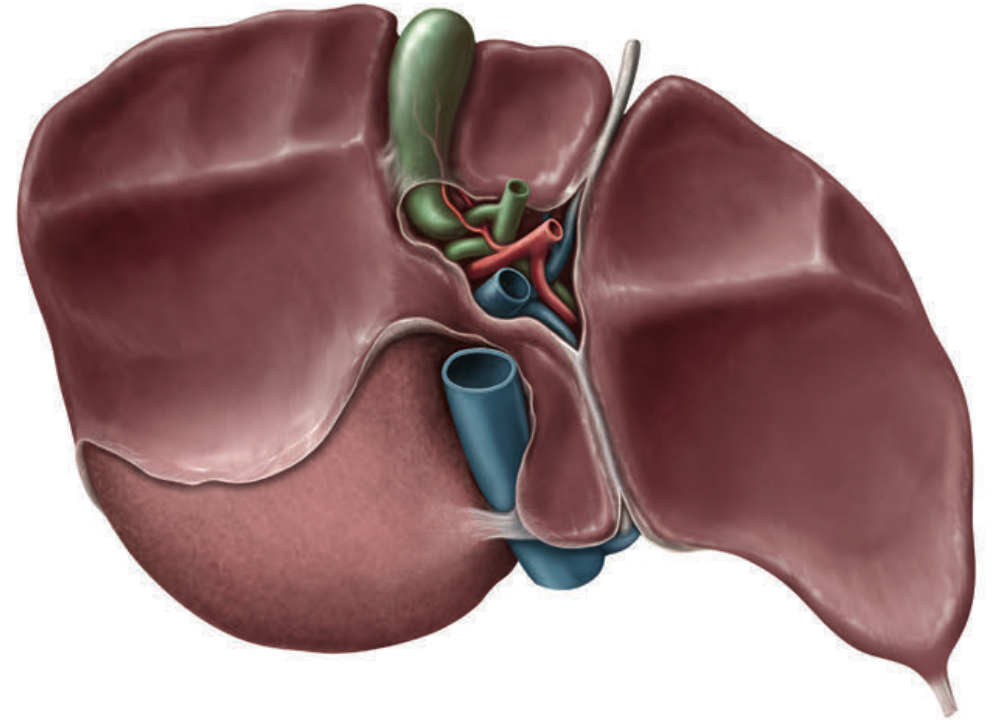
- ♦ S5 anterior medial
- ♦ S6 posterior inferior
- ♦ S7 posterior lateral
- ♦ S8 posterior medial



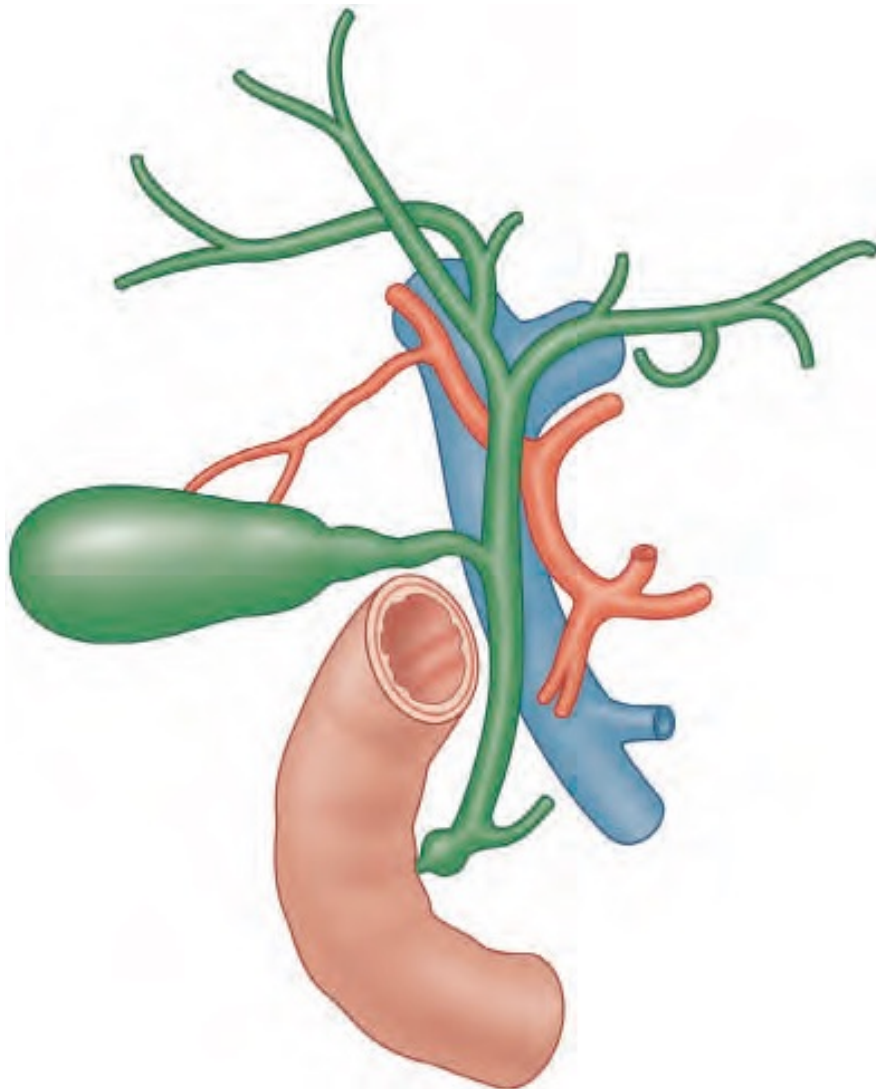
LIVER SEGMENTS



- Portal trias
- Biliary duct
- a. hepatica propria
- v. portae hepatis



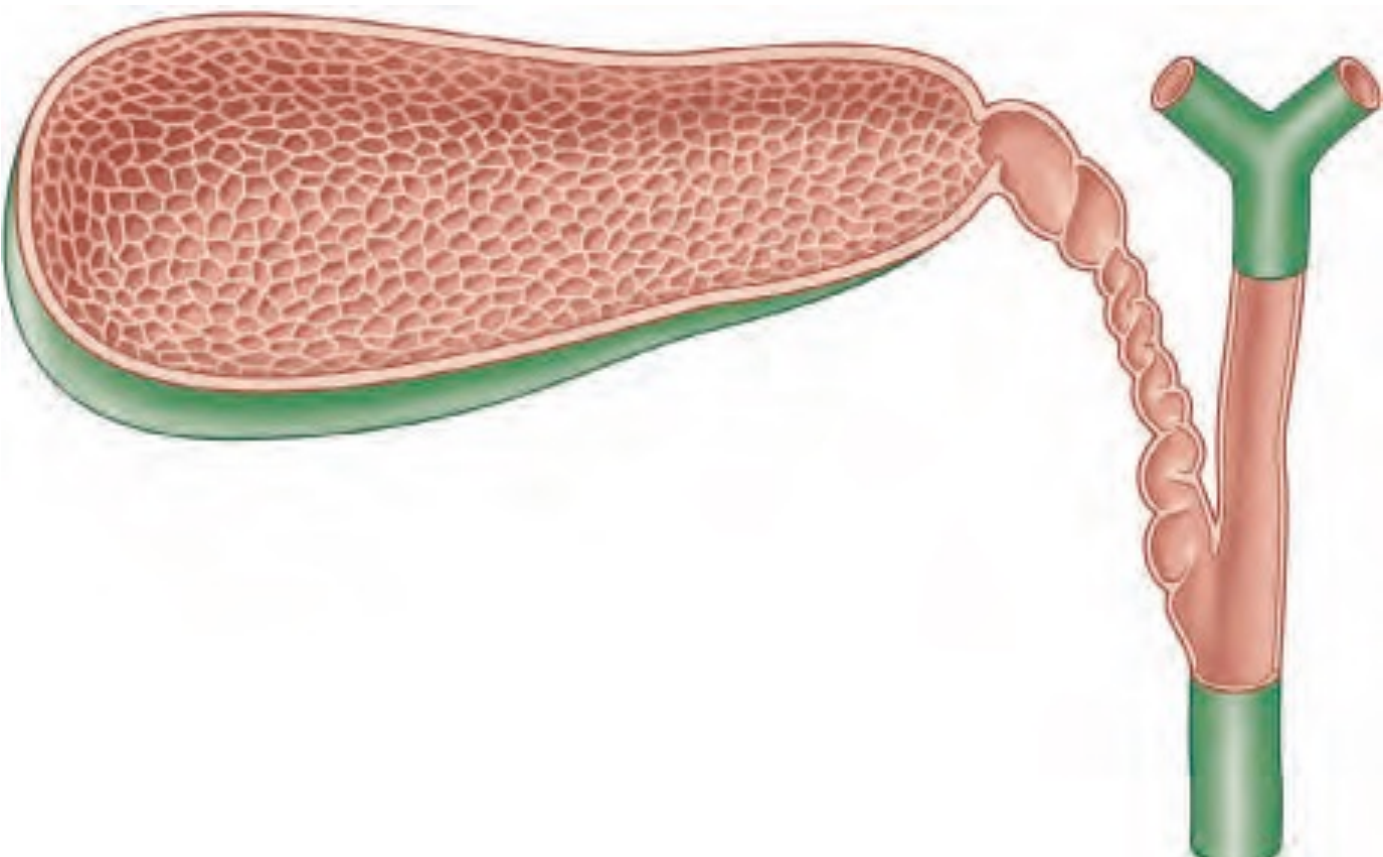
PORTA HEPATIS



- ♦ bile - bilis, fel
- ♦ Excrete and secrete
- ♦ Bile acids
- ♦ Cholesterol
- ♦ Bilirubin
- ♦ 1 litre / day
- ♦ Dcc. segmentales
- ♦ Dc. hepaticus dx
- ♦ Dc. hepaticus sinister
- ♦ Dc. hepaticus communis
- ♦ Dc. cysticus
- ♦ Vesica fellea
- ♦ Dc. choledochus



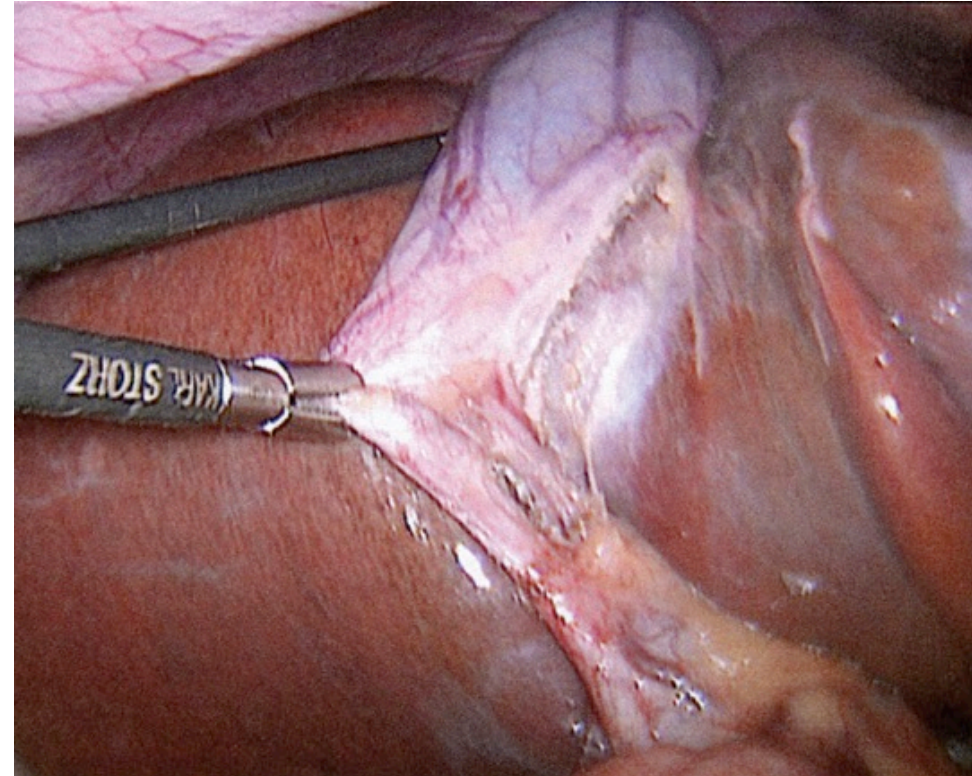
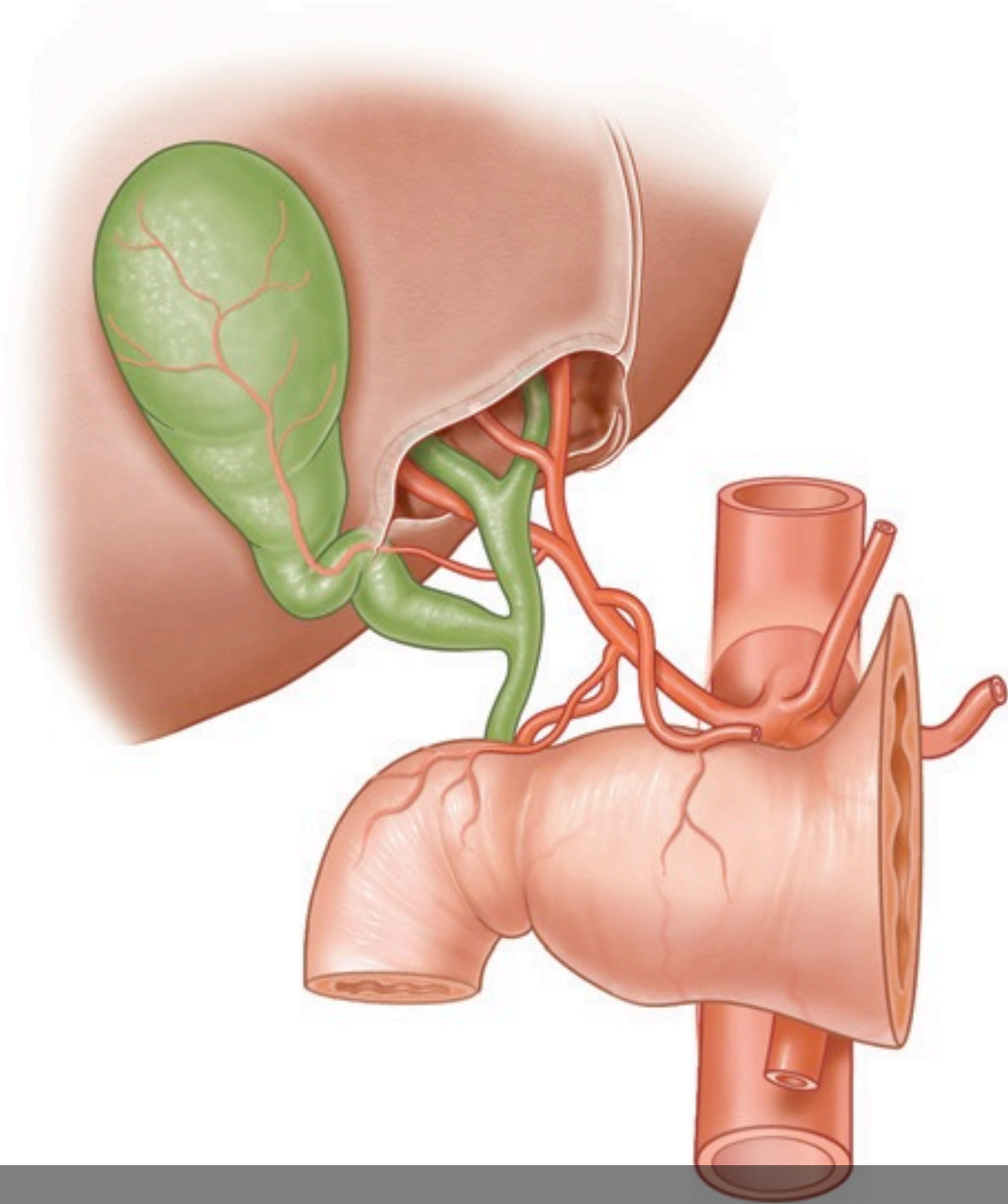
BILIARY SYSTEM



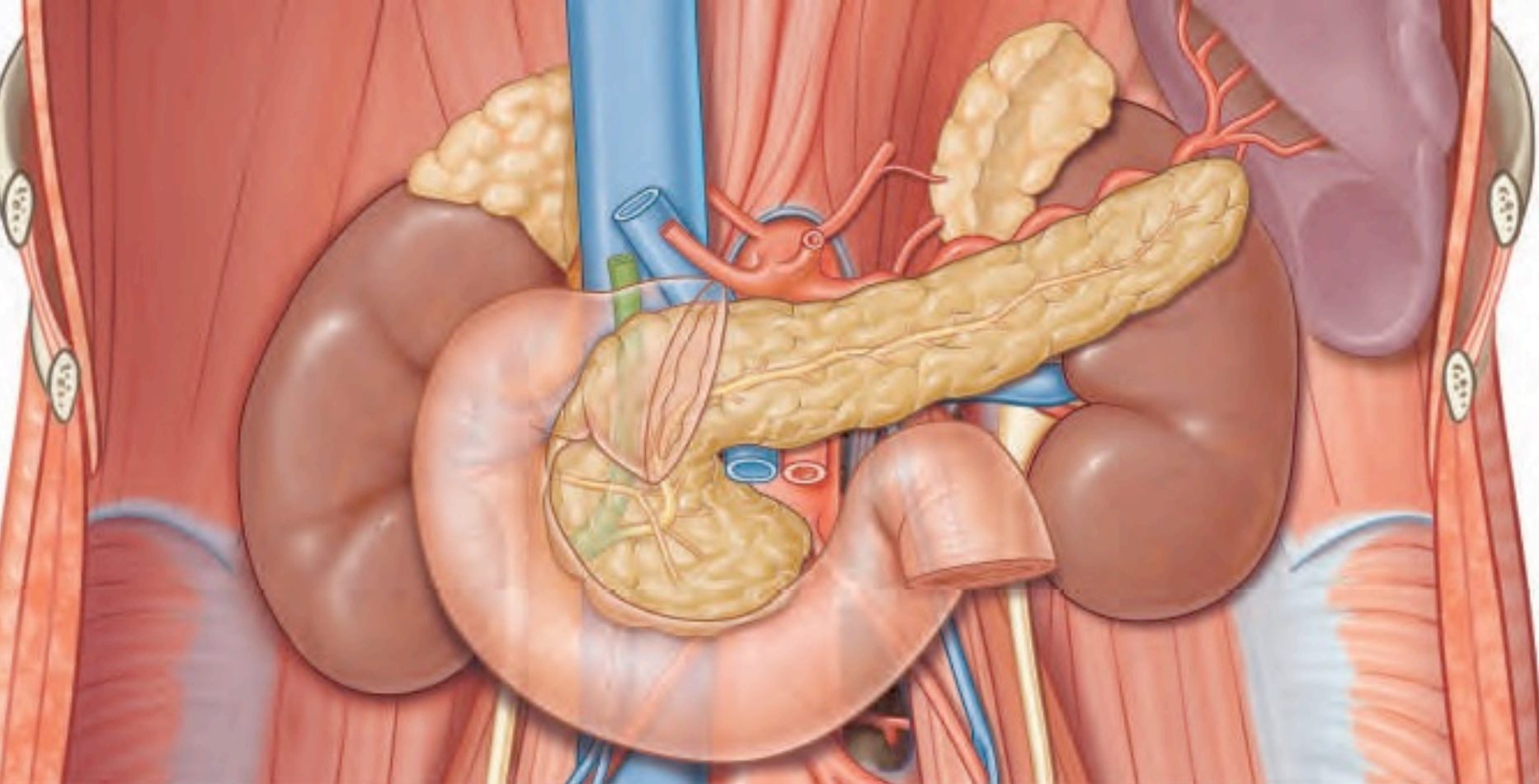
- Fundus
- Corpus
- Collum
- Dc. cysticus
- Biliary stones

VESICA FELLEA

🔴 Arises from a. hepatica propria

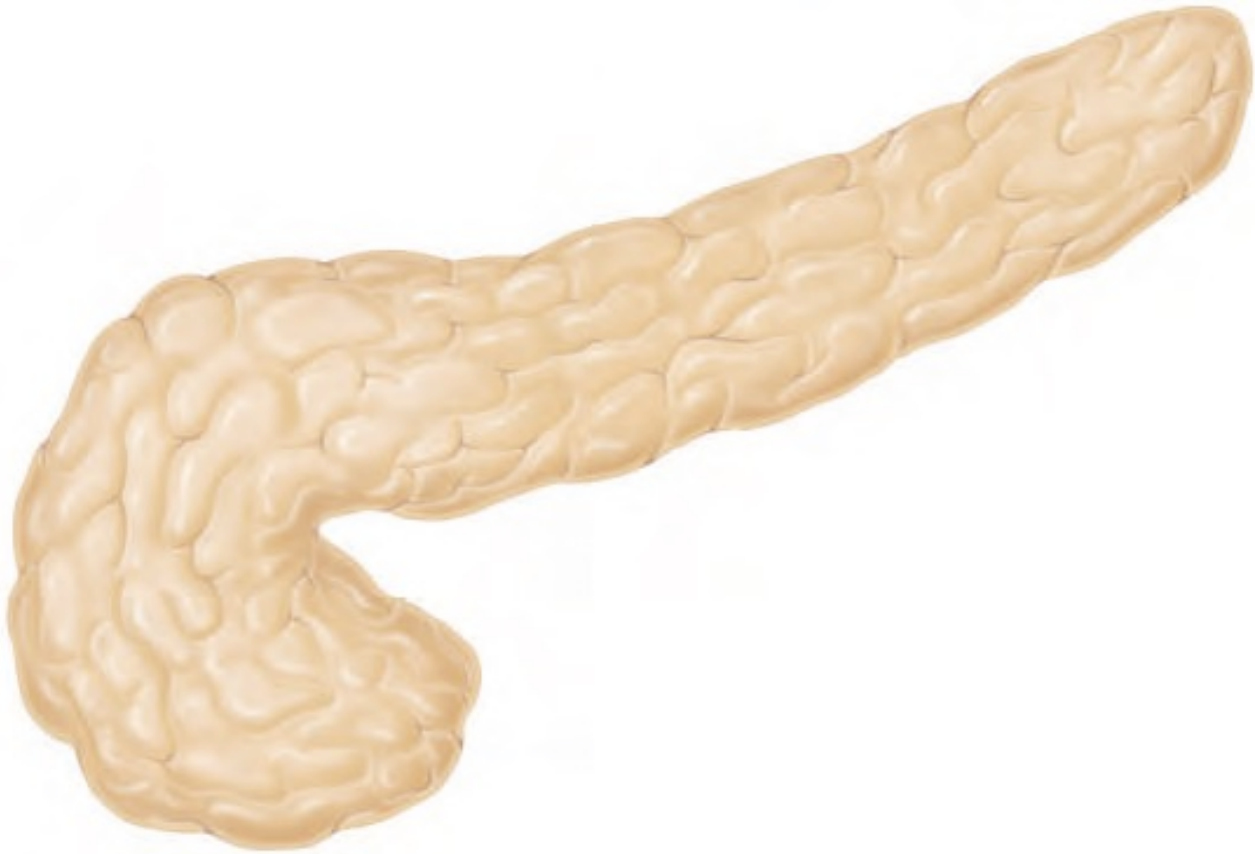


A. CYSTICA



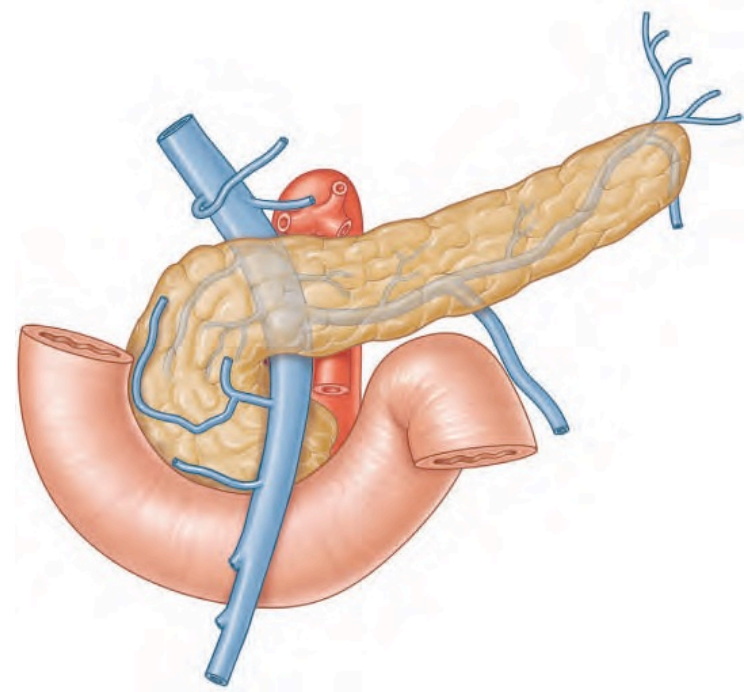
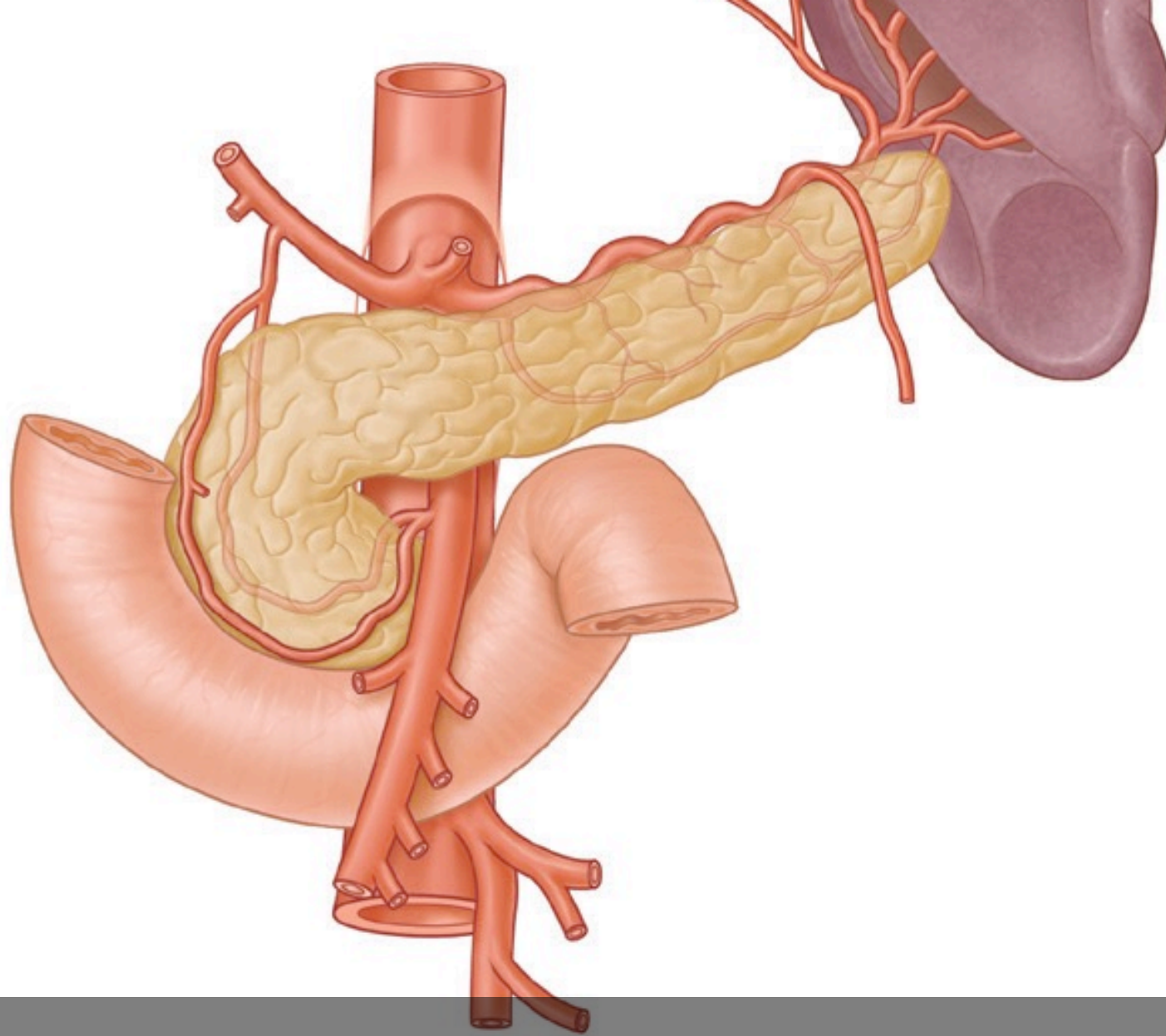
- Retroperitoneum
- DUODENAL WINDOW
- Vasa lienalis

PANCREAS

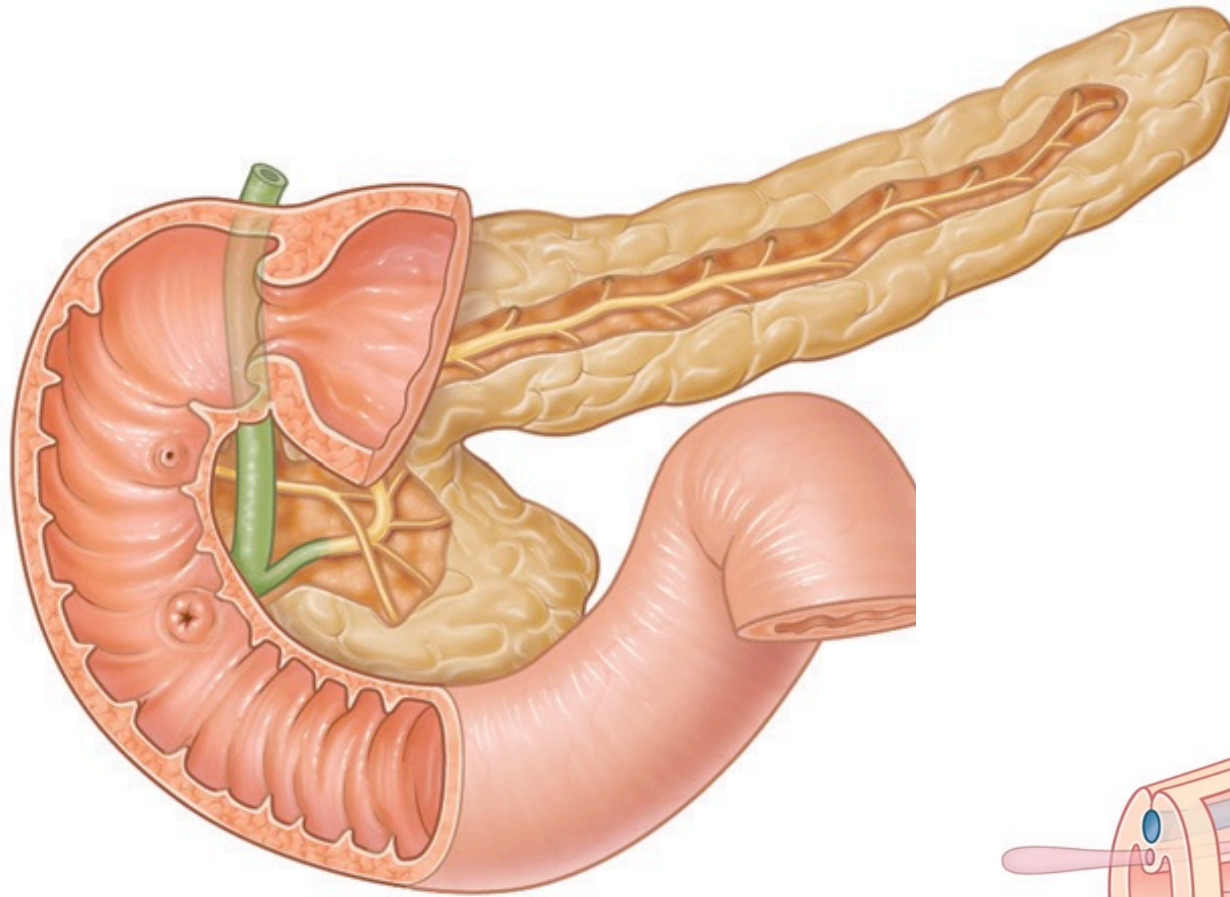


- ♦ **Caput**
- ♦ **Processus uncinatus**
- ♦ **Incissura pancreatis**
- ♦ **Collum**
- ♦ **Corpus**
- ♦ **Cauda**
 - ♦ **Apex caudae**

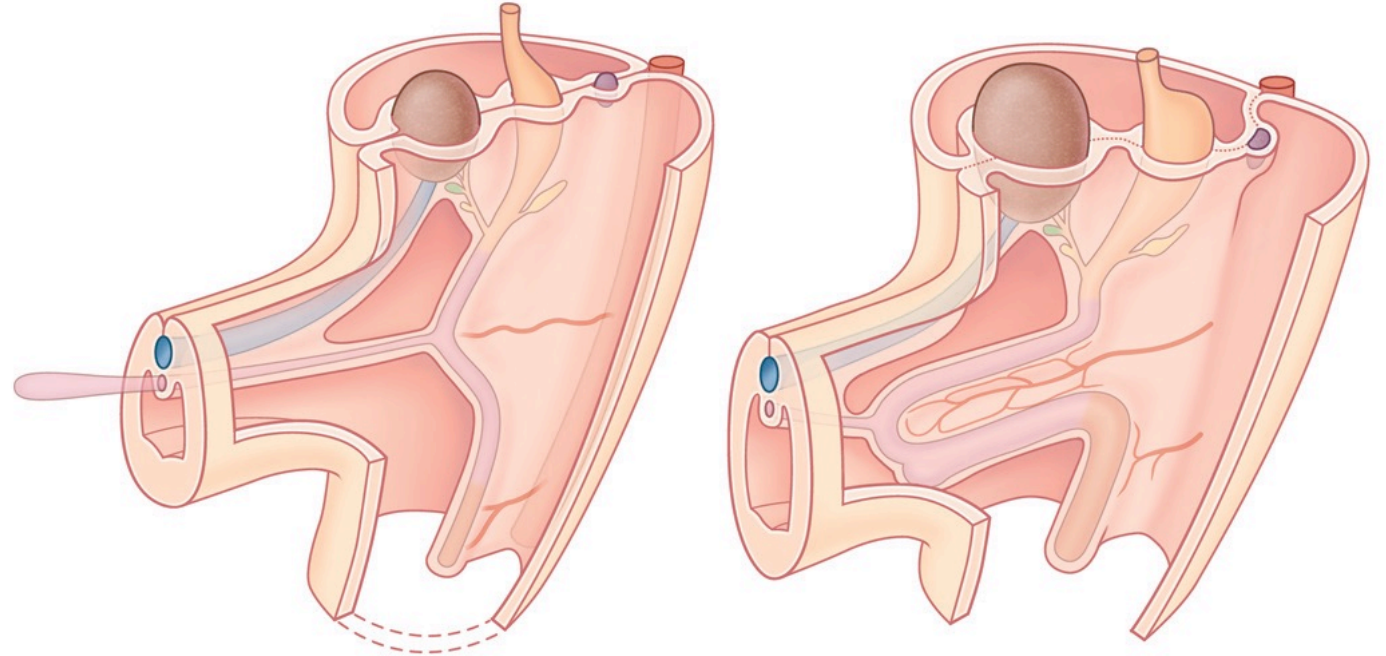
PANCREAS



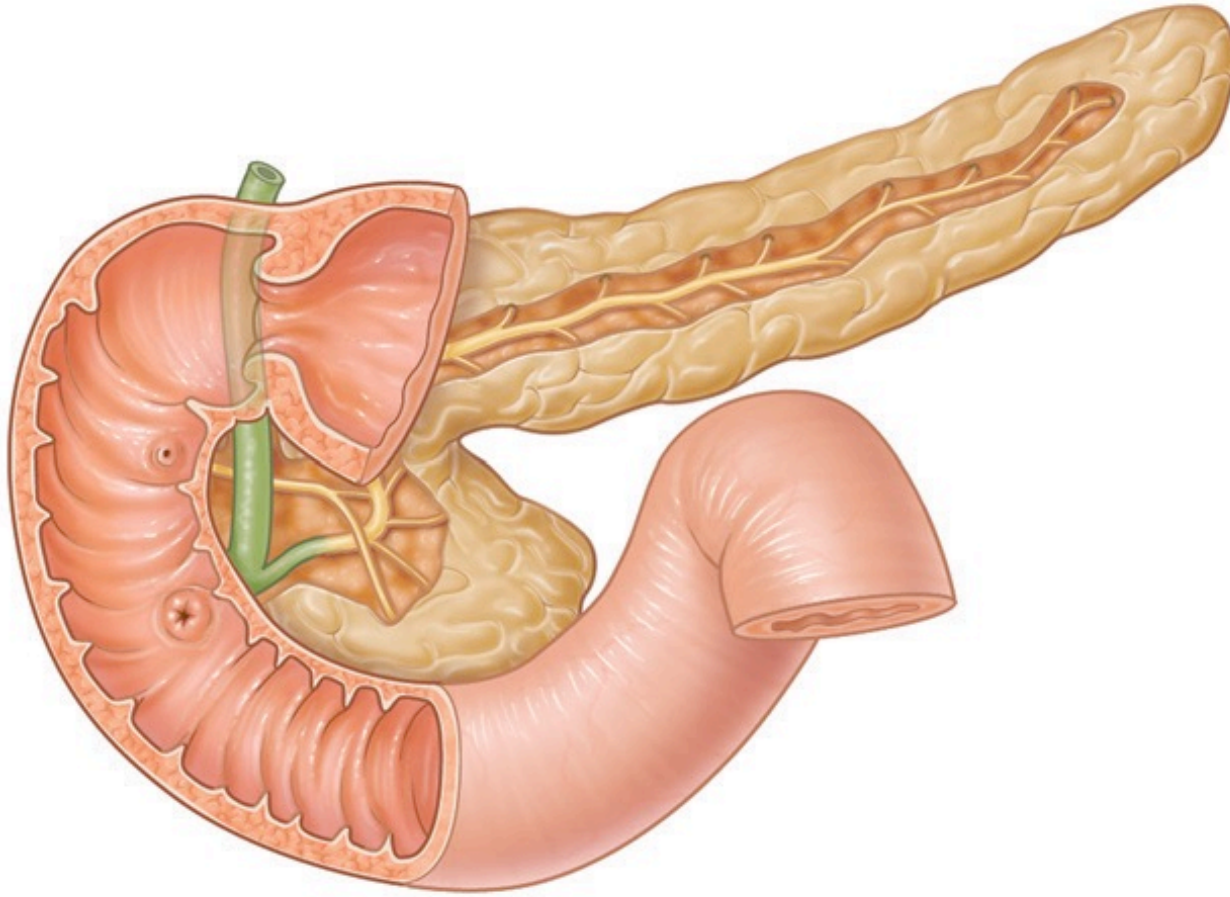
PANCREAS AND VESSELS



- 🔴 Pankreatic buds
- 🔴 Pancreas ventralis
 - 🔴 Proc. uncinatus
- 🔴 Pancreas dorsalis

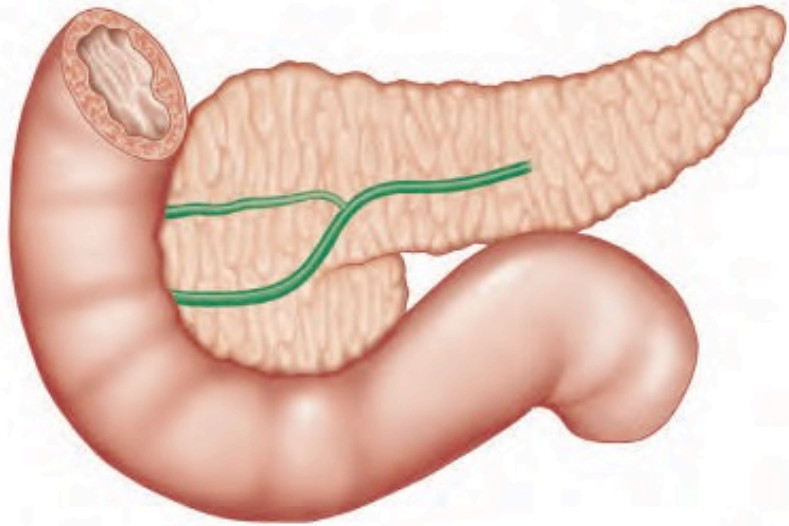


PANCREATIC DEVELOPMENT

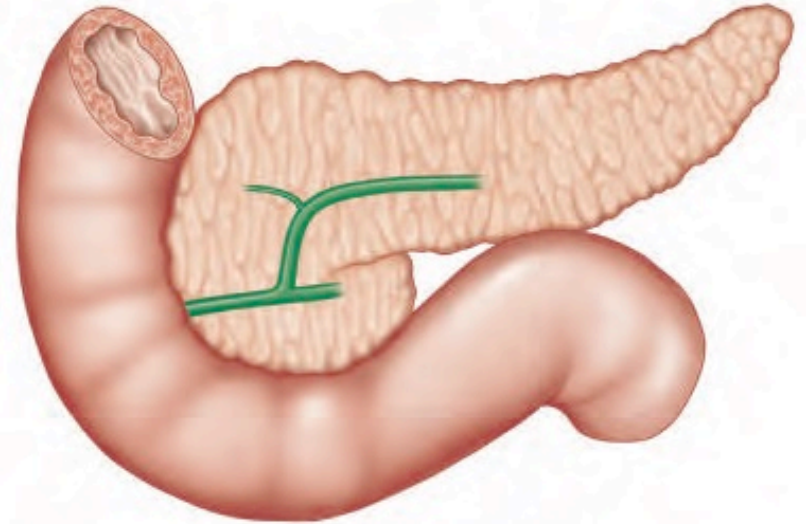
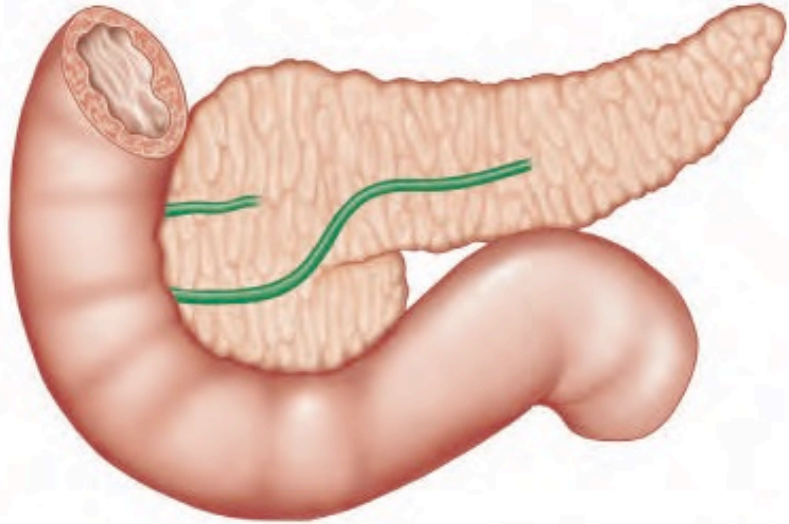
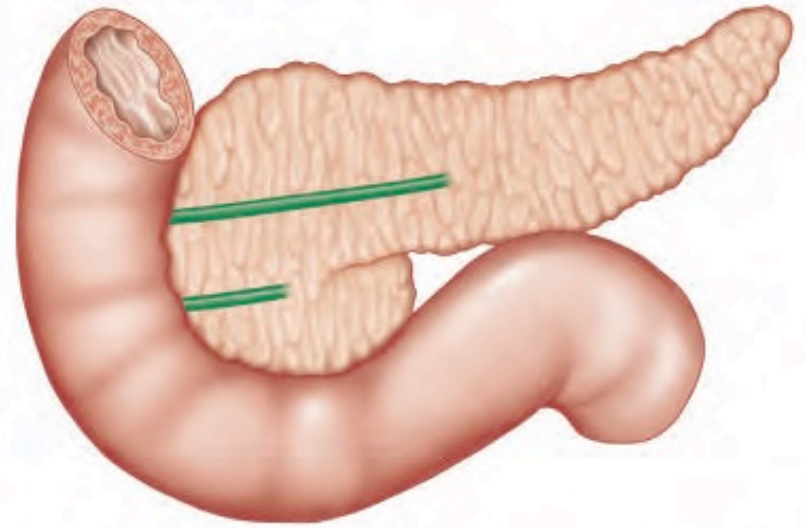


- ♦ Dc. pancreatrus maior Wirsungi
- ♦ Papilla duodenalis major
- ♦ Dc. pancreaticus minor Santorini
- ♦ Papilla duodenalis minor

DUCTUS PANCREATICUS



- **Pancreas ventralis**
- **Pancreas dorsalis**



DUCTUS PANCREATICI

SPHINCTERIC TONE

Neural control Parasympathetic fibres
Sympathetic fibres

BICARBONATE IONS AND WATER TRANSPORT (Ductal and centro-acinar cells)

Neural control Mainly vagal cholinergic fibres
Hormonal control Mainly secretin (duodenum and jejunum)

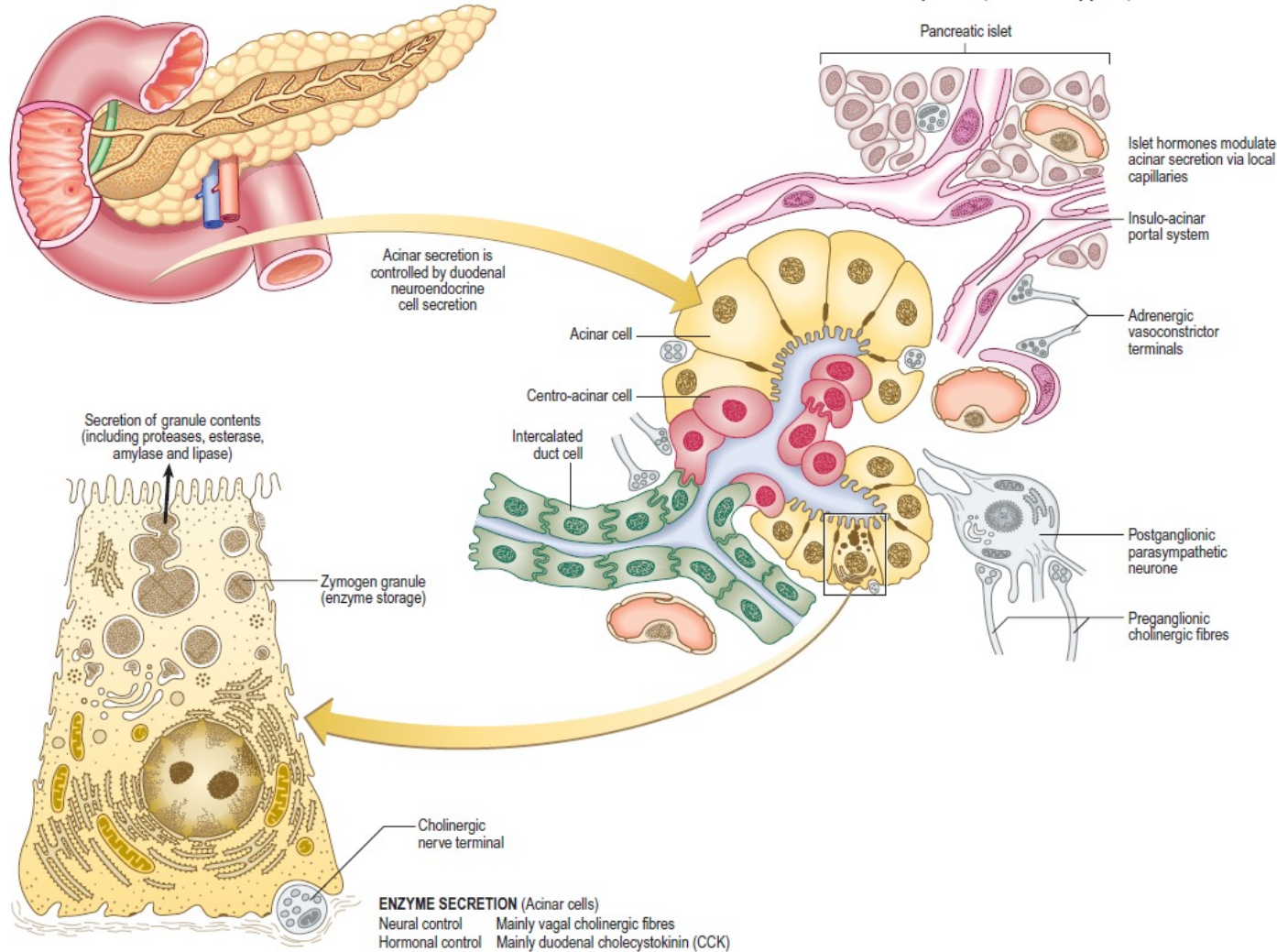


Fig. 69.8 The microstructure of the exocrine pancreas and the mechanisms by which its secretion is controlled. Pancreatic stellate cells (see text) are not shown.

◆ Aciary cels

◆ enzymes

◆ amylase

◆ Trypsine

◆ Lipase

◆ Excretion of HCO_3^-

◆ Hormonal interaction

◆ Cholecystikinine

◆ Pankreozy mine

◆ Sekretine

EXOCRINE PANCREAS

Cell types	Secretion
● A (Alpha cells)	Glucagon
● B (Beta cells)	Insulin
● D (Delta cells)	Somatostatin, gastrin
● F cells	Pancreatic polypeptide

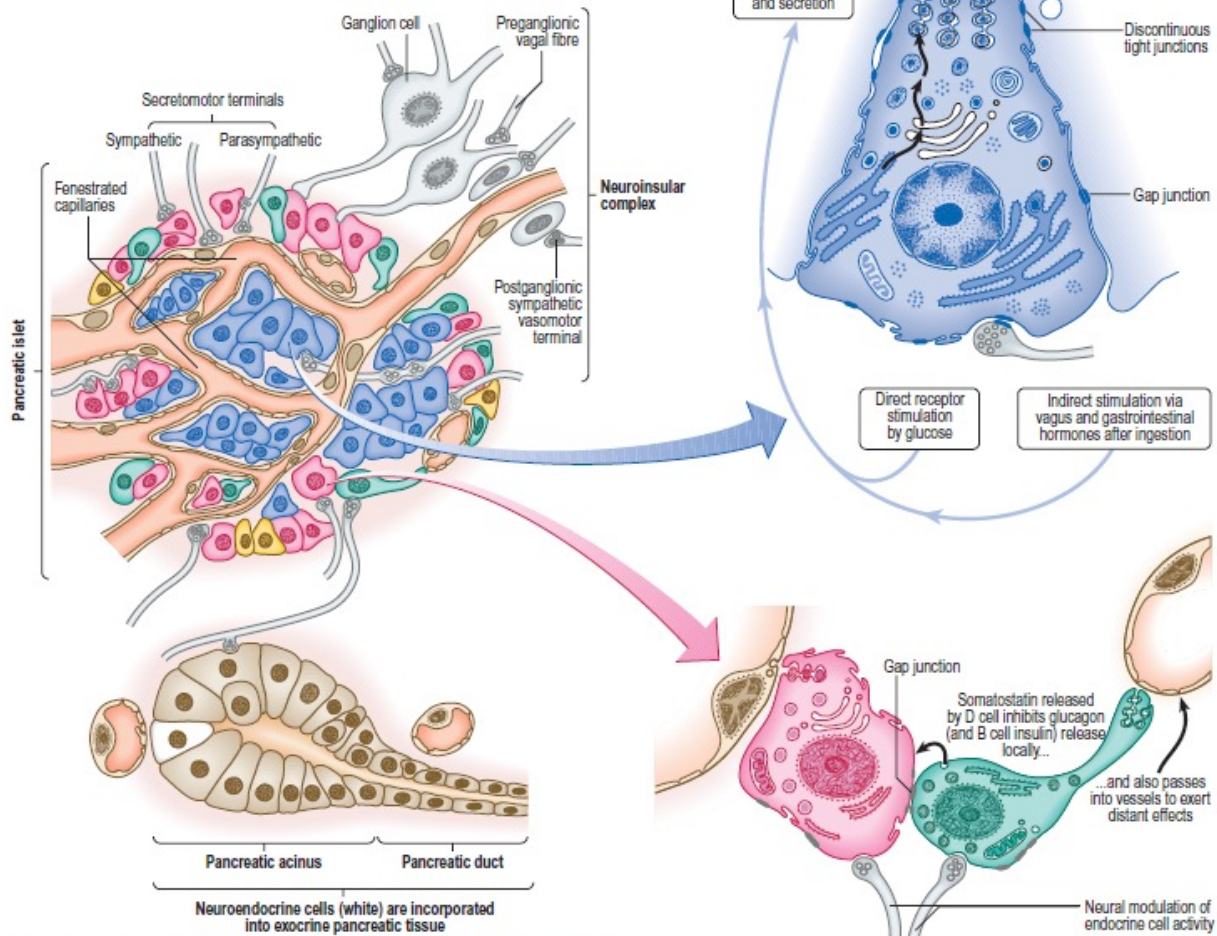
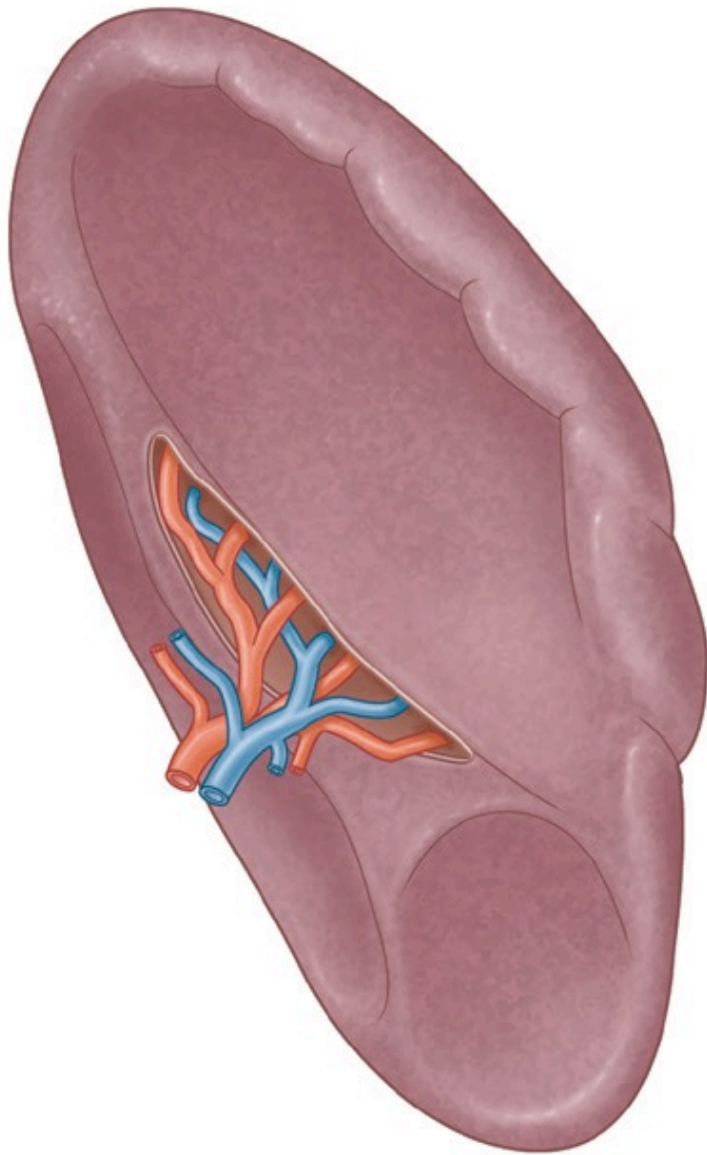


Fig. 69.10 The microstructure and control of function of the endocrine pancreas.

- Langerhans islands
- Neuroectoderma origin
- Insulin - B - beta - cells
 - central
- Glukagon - A - alfa - cells
 - peripheral
- Somatostatin - D - delta- cells
 - peripheral
- Gastrin - D - delta -
 - perif.
- Pancreatic polypeptid F - cells
 - Minority

ENDOCRINE PANCREAS



- ♦ **Facies diaphragmatica**

- ♦ **Costa IX - XI**

- ♦ **Facies visceralis**

- ♦ **Margo crennatus**

- ♦ **Hilus lienis**

- ♦ **A. et. v. lienalis - několik větví**

- ♦ **size**

- ♦ *10 -13 cm*

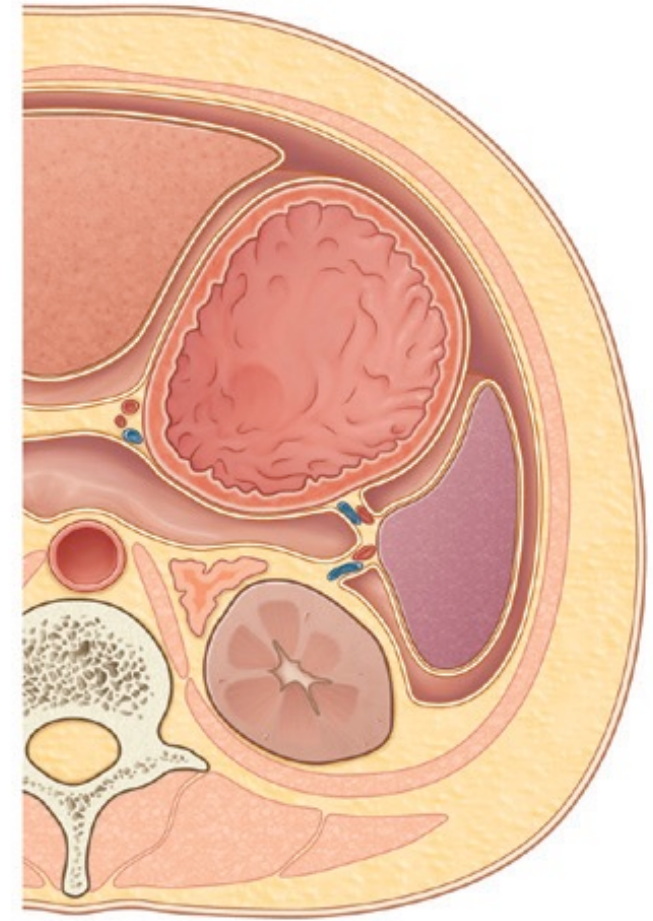
- ♦ *6 -8 cm*

- ♦ *4 cm*

SPLEEN



- ♦ **Axis**
- ♦ ***Parallel with costa X.***
- ♦ ***Costa IX-XI***
- ♦ **Lig. gastrosplenicum**
- ♦ **Lig. splenorenalis**



SPLEEN



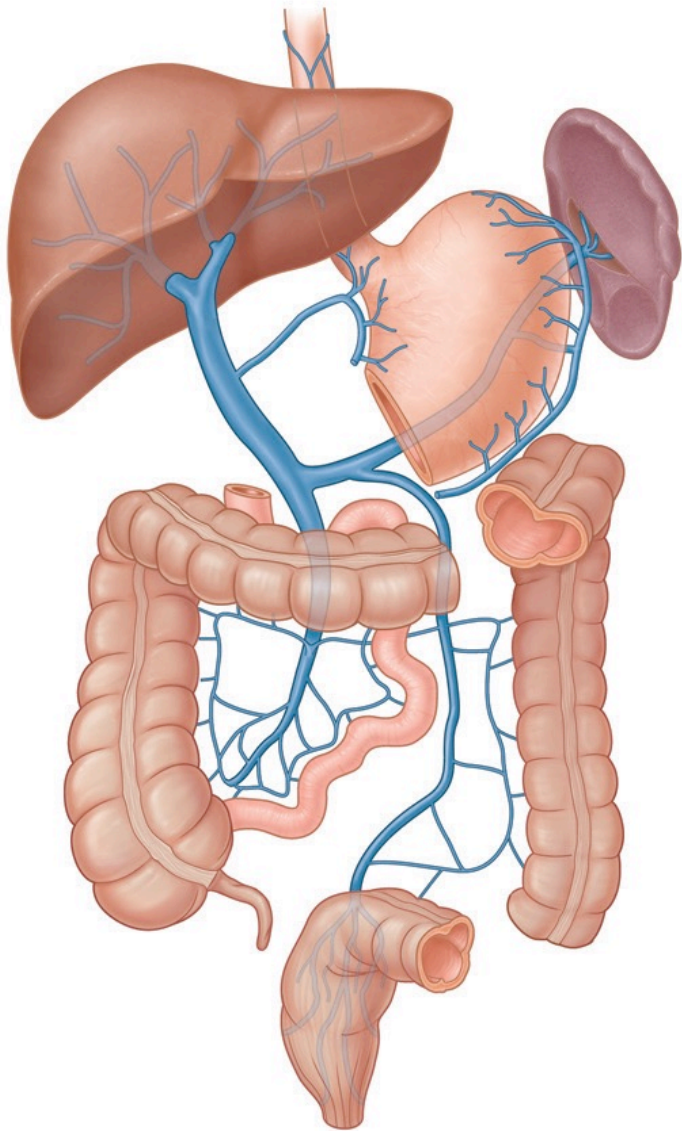
🔥 Red pulp - 80%

- 🔥 *Sinus lienis – sinusoids 80 -150 um*
 - 🔥 *Incomplete basement membrane*
- 🔥 *Reticulum settled by blood cells*
 - 🔥 *ery, B-ly, plasmatic cells, trombo, macrophages*
- 🔥 *Macrophage ingest spherocytes*

🔥 White pulp - 20%

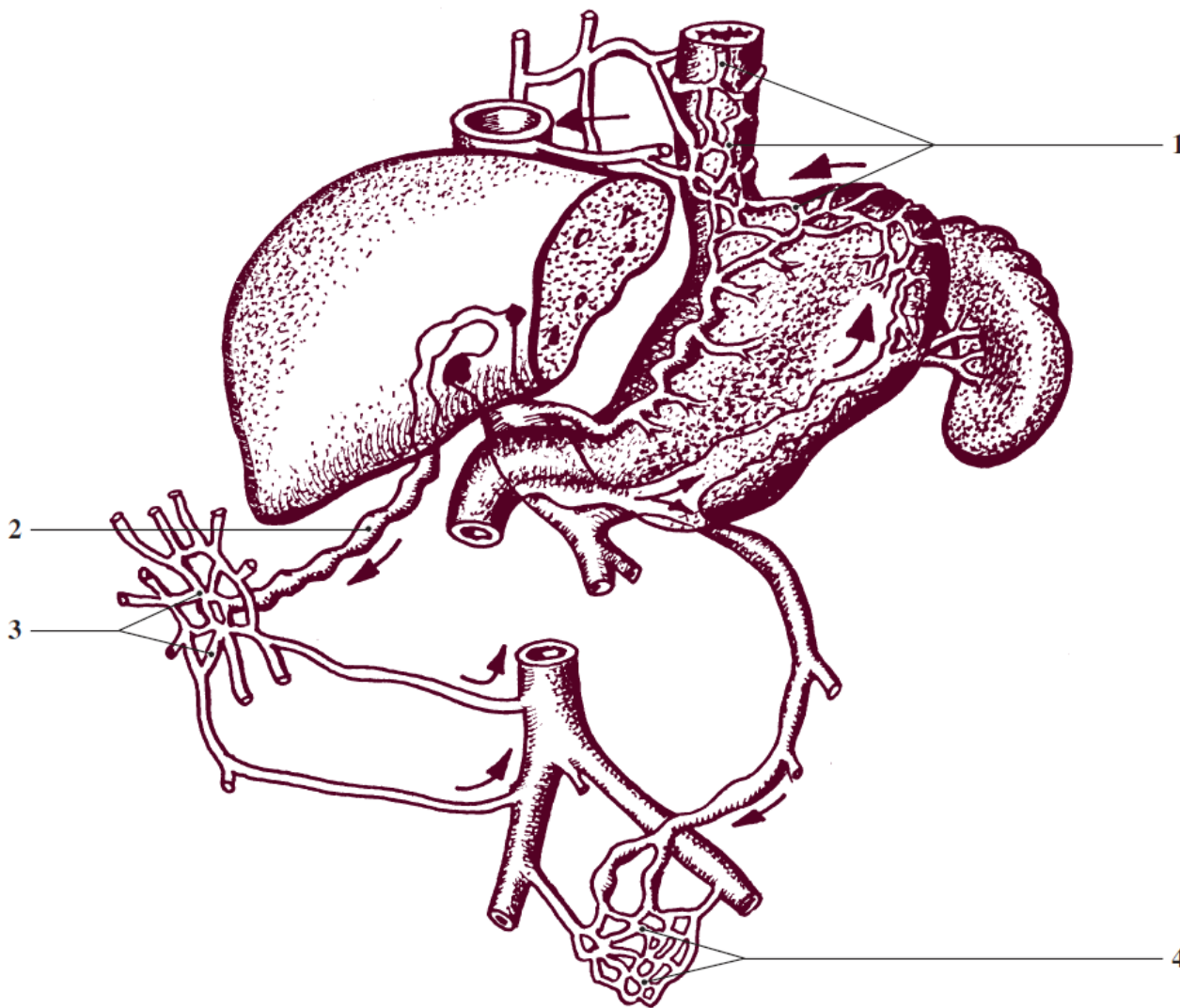
- 🔥 *Periarteriolar lymphatic sheath*
 - 🔥
- 🔥 *Folliculi lymphatici (corpuscula Malpighi)*
 - 🔥 *Primay - non-activated*
 - 🔥 *secondary - activated*

RED AND WHITE PULP



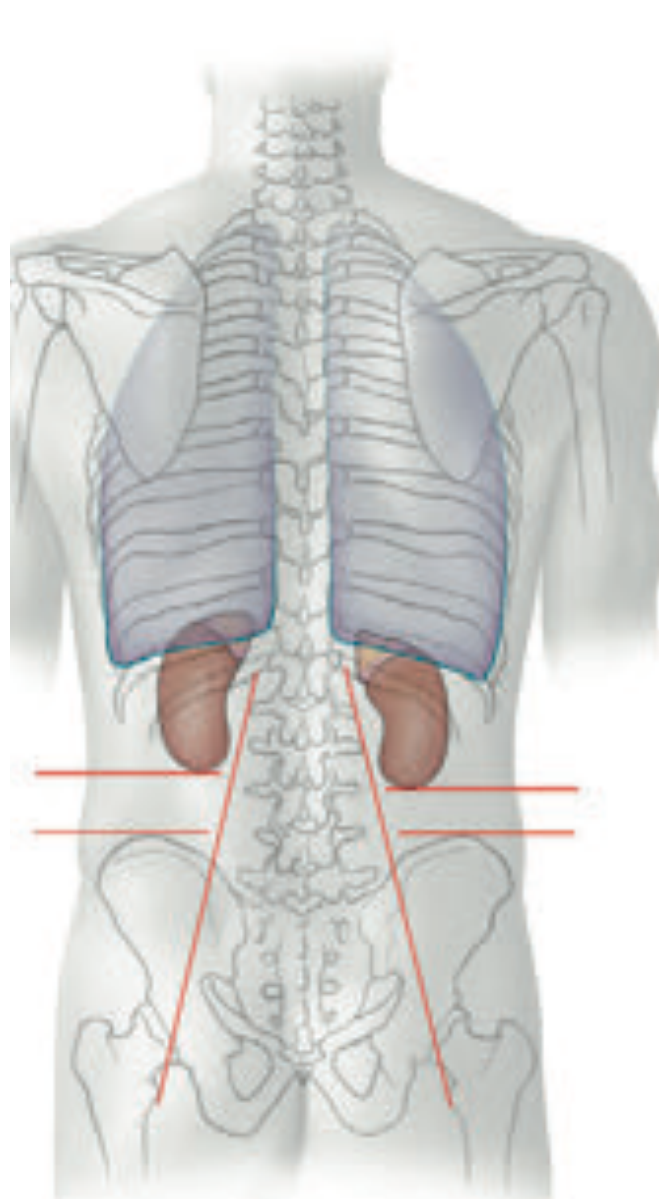
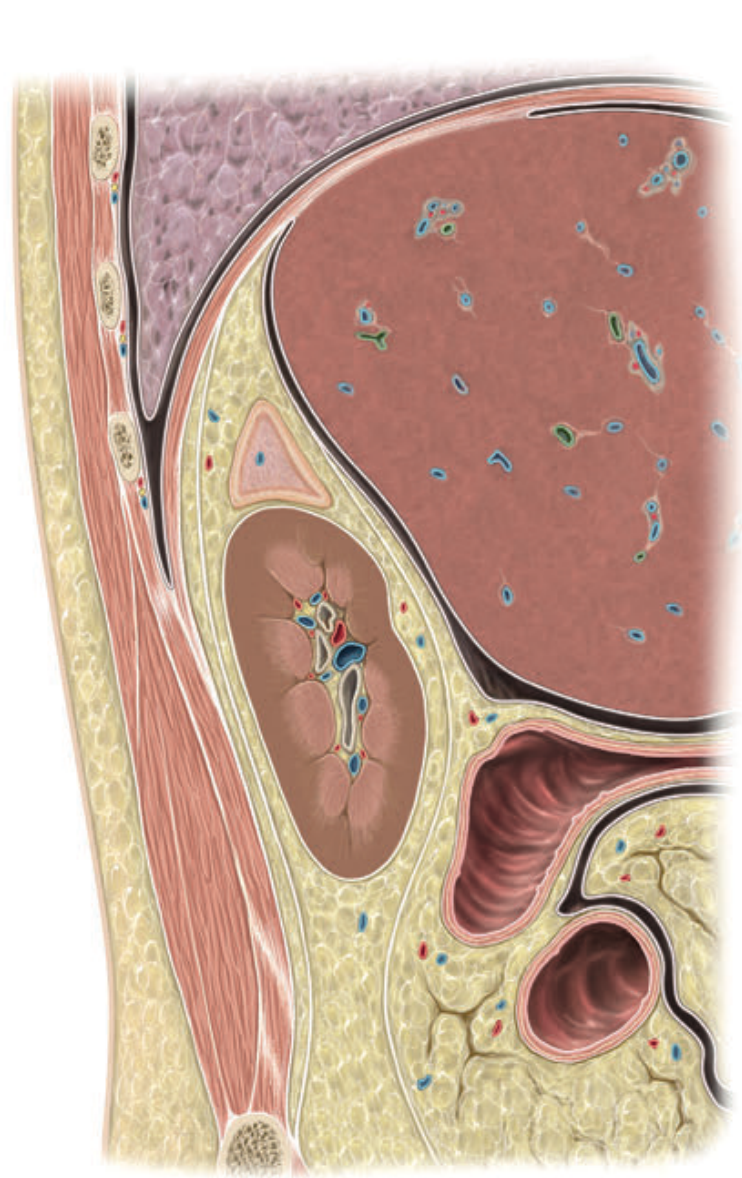
- Visceral blood outflow
- Ventriculus
- Lien
- Pancreas
- Intestinum tenue
- Intestinum crassum
- V. portae hepatis
 - Radices
 - V. lienalis
 - V. mesenterica superior
 - V. mesenterica inferior

PORTAL SYSTEM



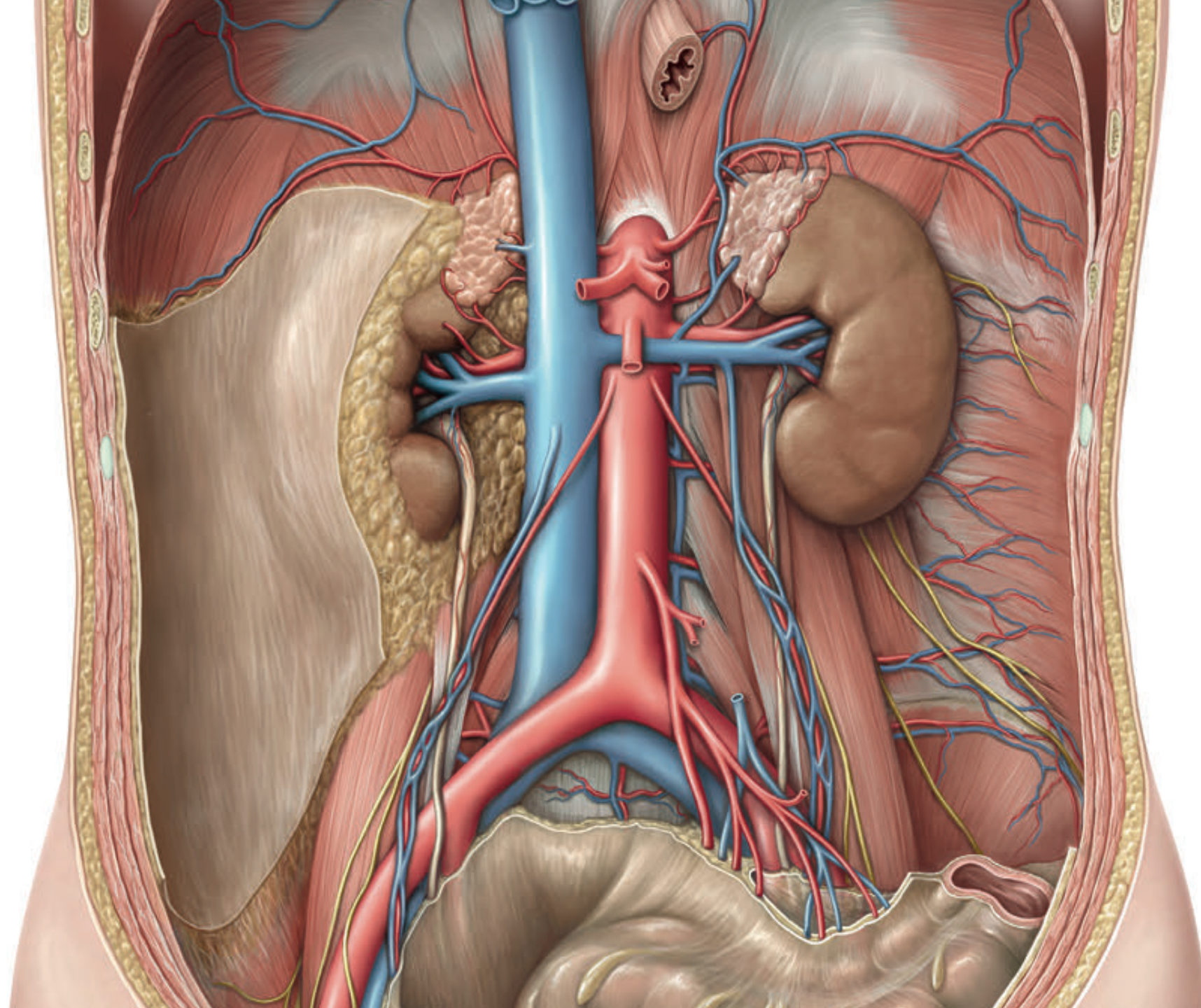
- *Vv. gastricae breves*
 - **Varices oesophageales (1)**
- *V. umbilicalis (2) (rekanalizace)*
 - **Caput Medusae (3)**
- *V. mesenterica inferior*
 - **Plexus hemorrhoidalis (4)**

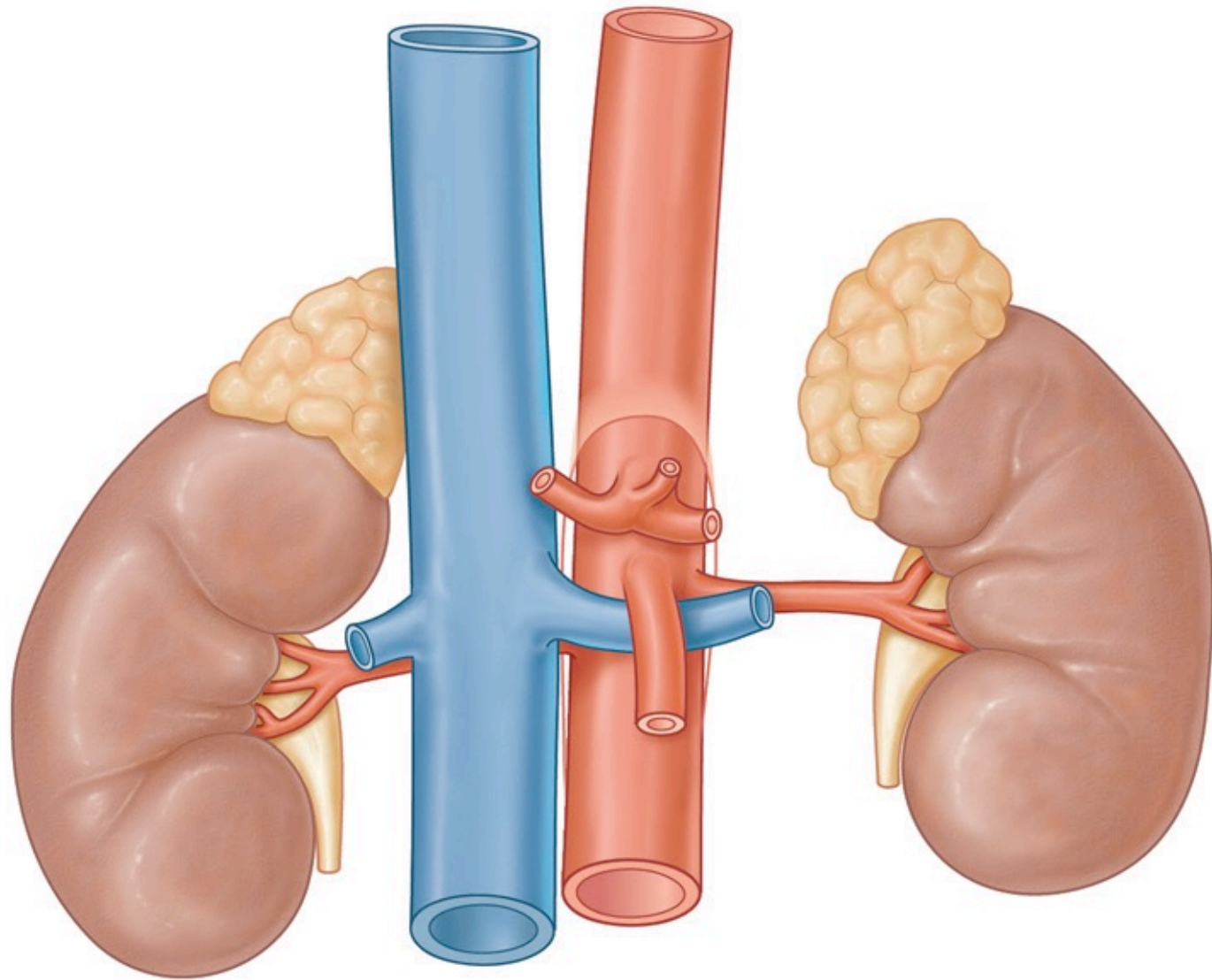
PORTOCAVAL ANASTOMOSES



- ♦ In retroperitoneum
- ♦ Th12 - L3
- ♦ Hilum L1
- ♦ Right kidney lower position - liver
- ♦ upper 1/3 -1/2 touches diaphragm
 - ♦ Pleural dorsal recessus
 - ♦ Infection spread

KIDNEY - REN

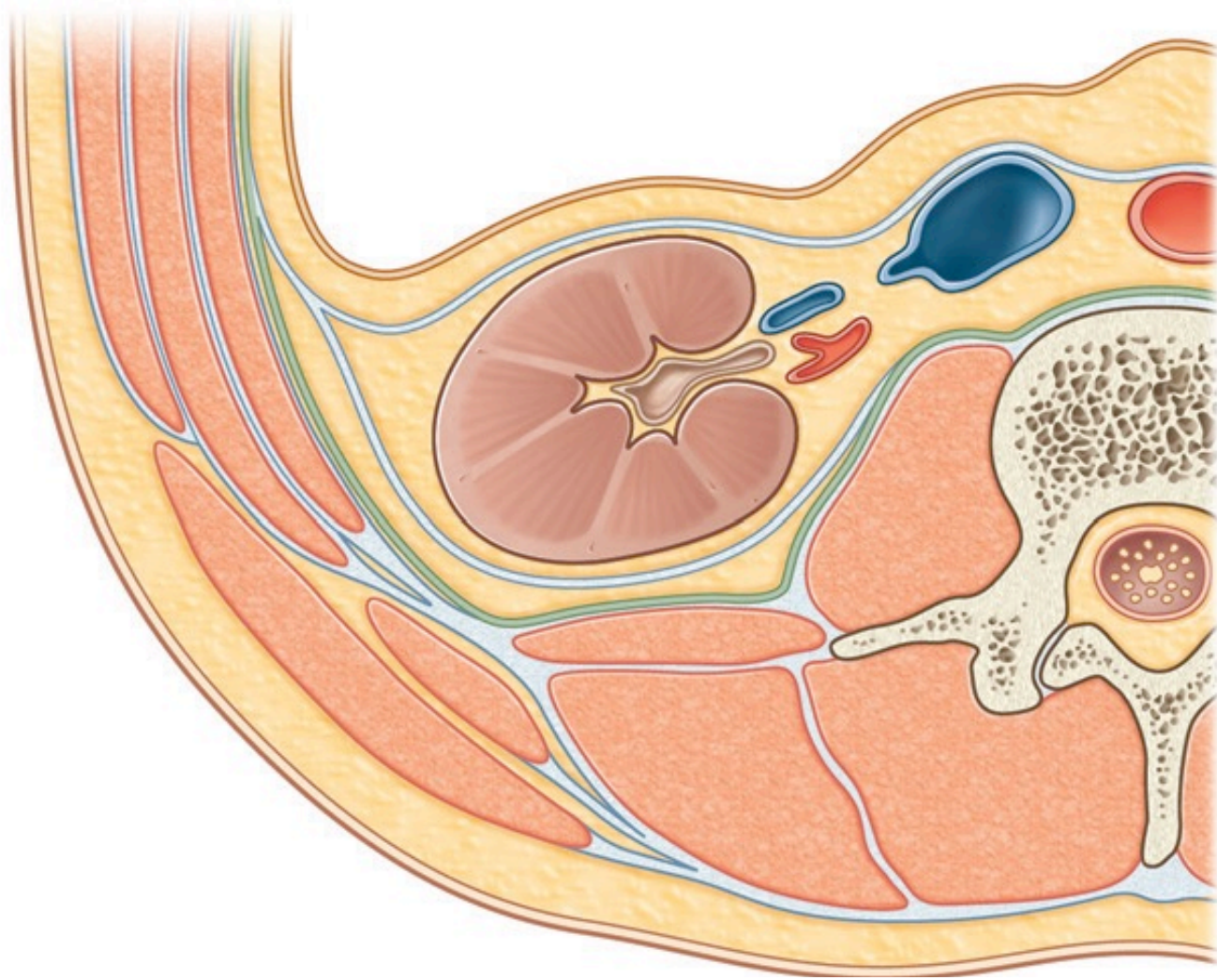




• 12 x 6 x 3 cm

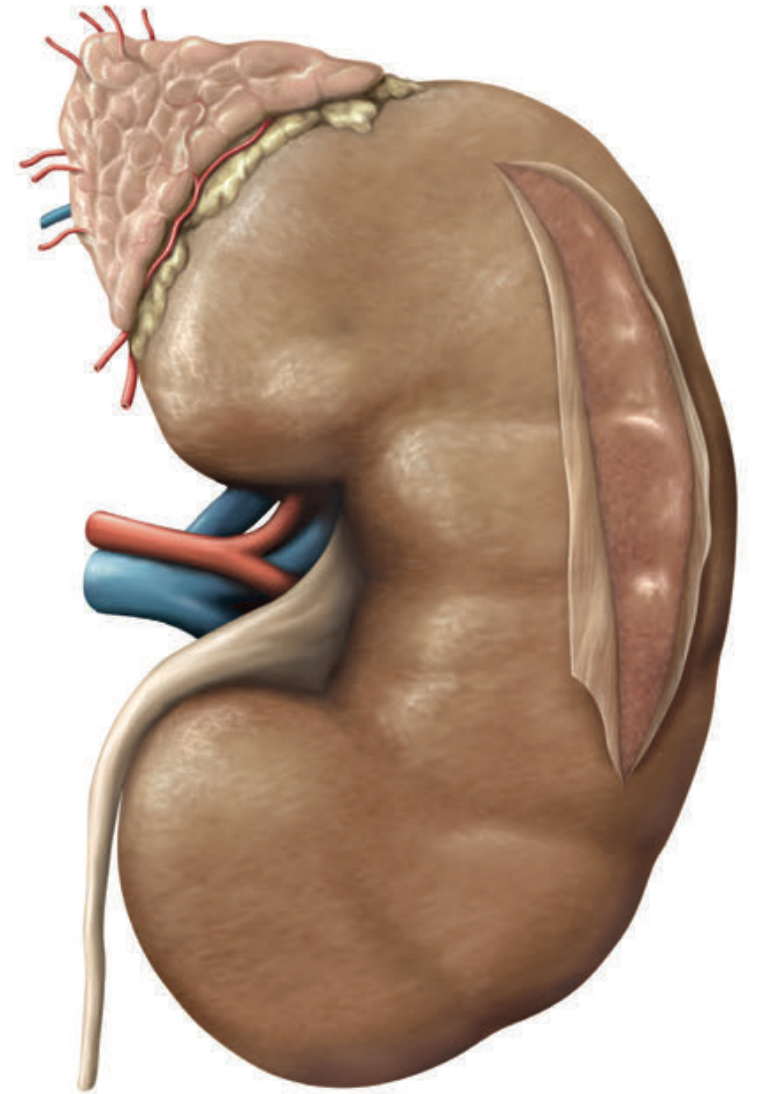
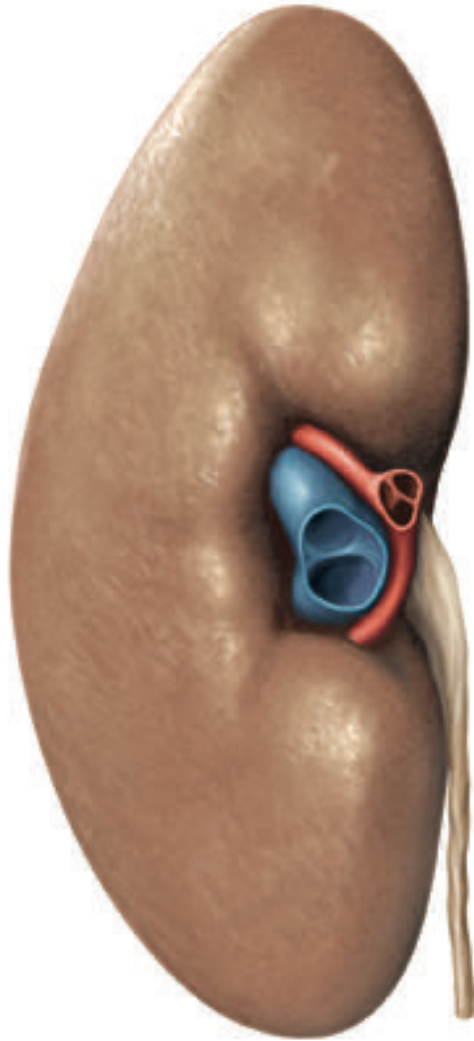
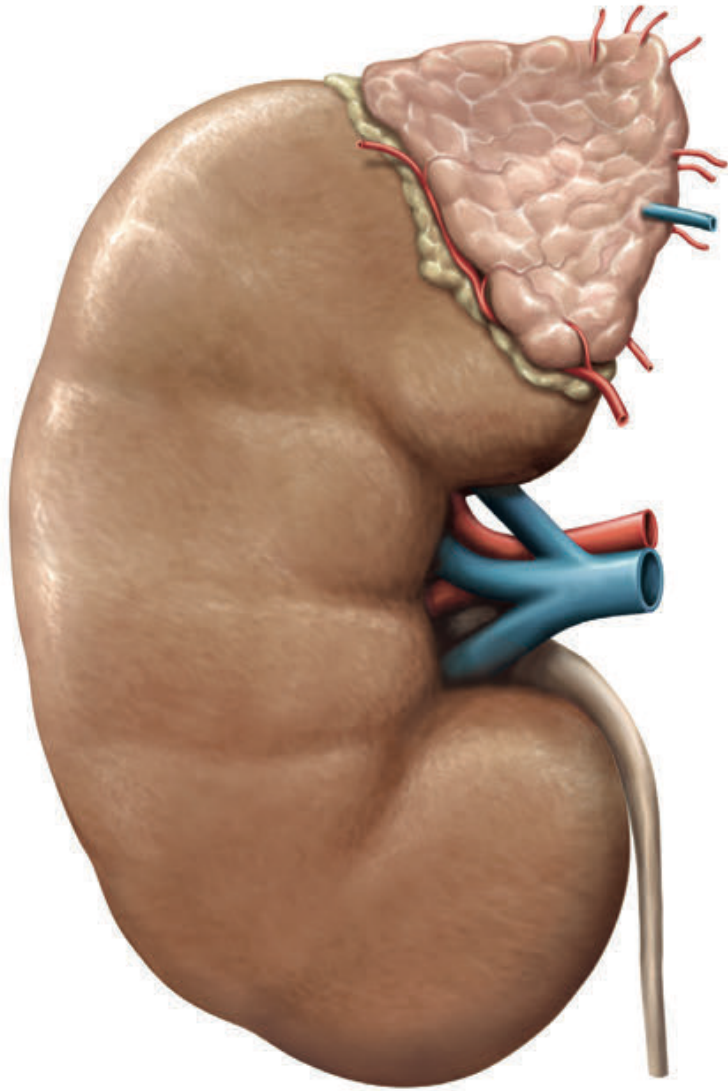
• 150 – 180 g

SIZE AND WEIGHT

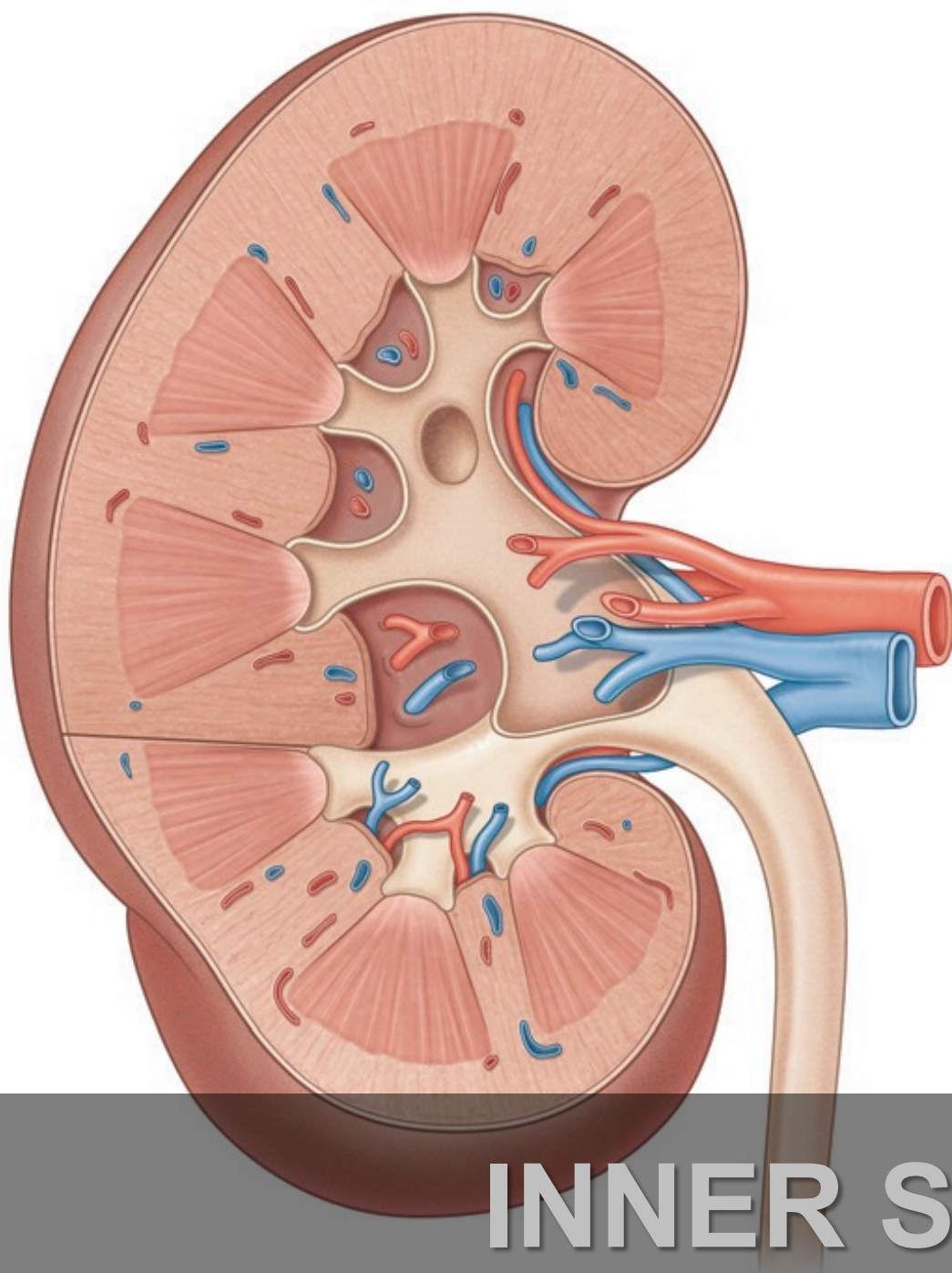


- ♦ **M. transversus abdominis**
- ♦ **M. quadratus lumborum**
- ♦ **M. psoas major**
- ♦ **Corpus adiposum pararenalis**
- ♦ **Fascia transversalis**
- ♦ **Fascia renalis**
 - ♦ **Pars anterior - Gerota**
 - ♦ **Pars posterior - Zuckermandel**
- ♦ **Capsula adiposa**
- ♦ **Capsula fibrosa**

KIDNEY POSITION

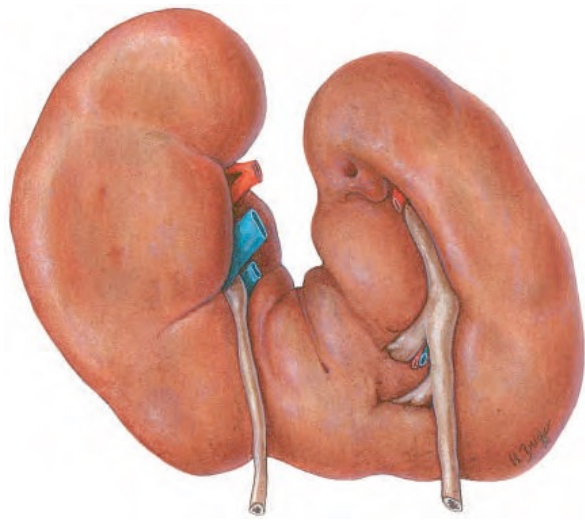


SUPERFICIAL STRUCTURES



- ♦ Capsula
- ♦ Cortex
- ♦ Columna
- ♦ Medulla
- ♦ Pyramis
- ♦ Papilla
- ♦ Calix minor
- ♦ Calix major
- ♦ Pelvis
- ♦ Junctio ureteropelvica

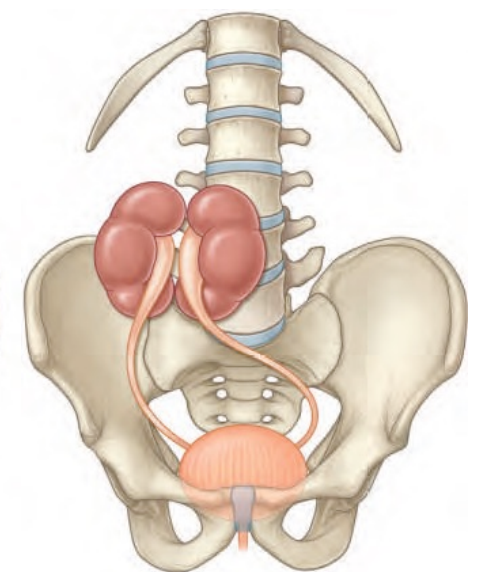
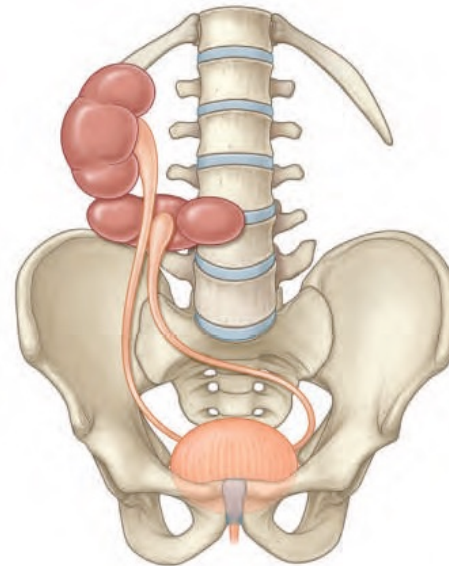
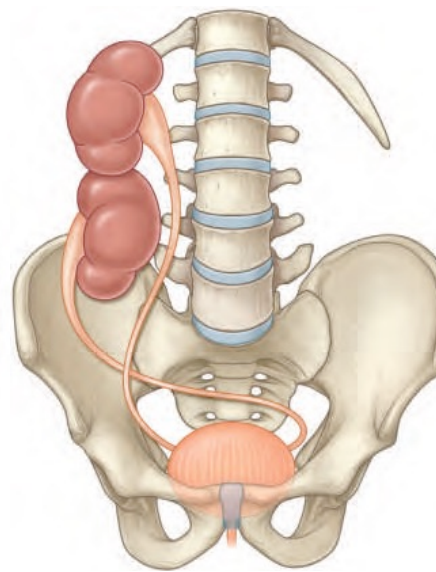
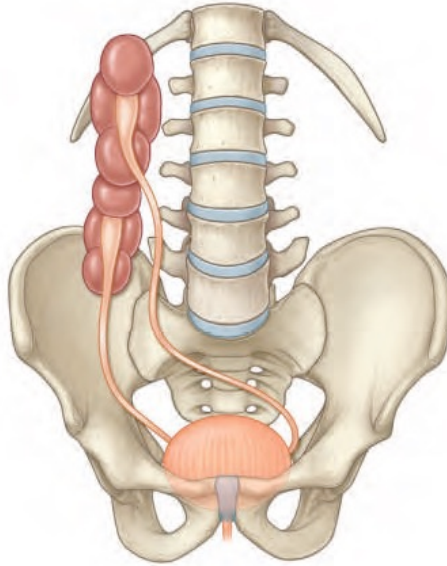
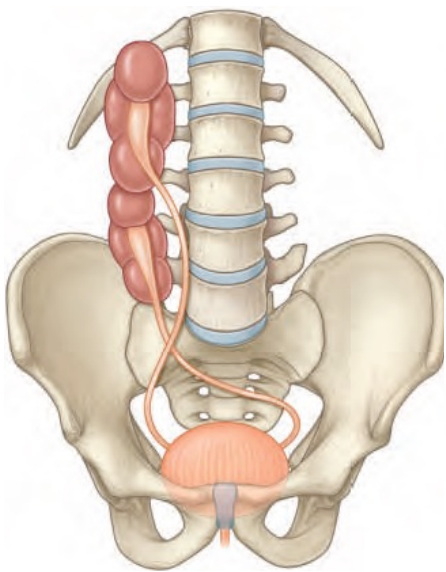
INNER STRUCTURES



🔴 position

🔴 shape

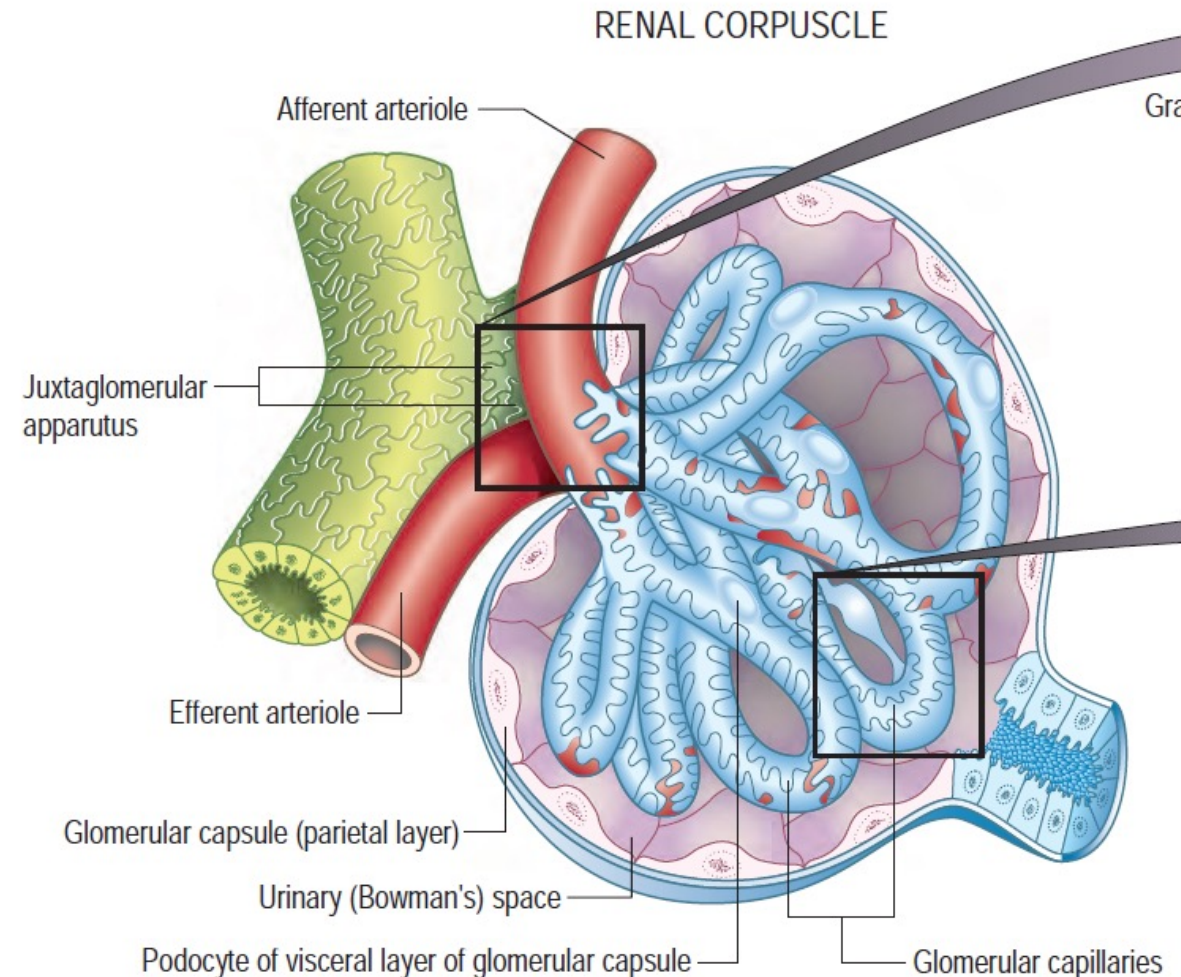
🔴 number



ANOMALOUS KIDNEYS

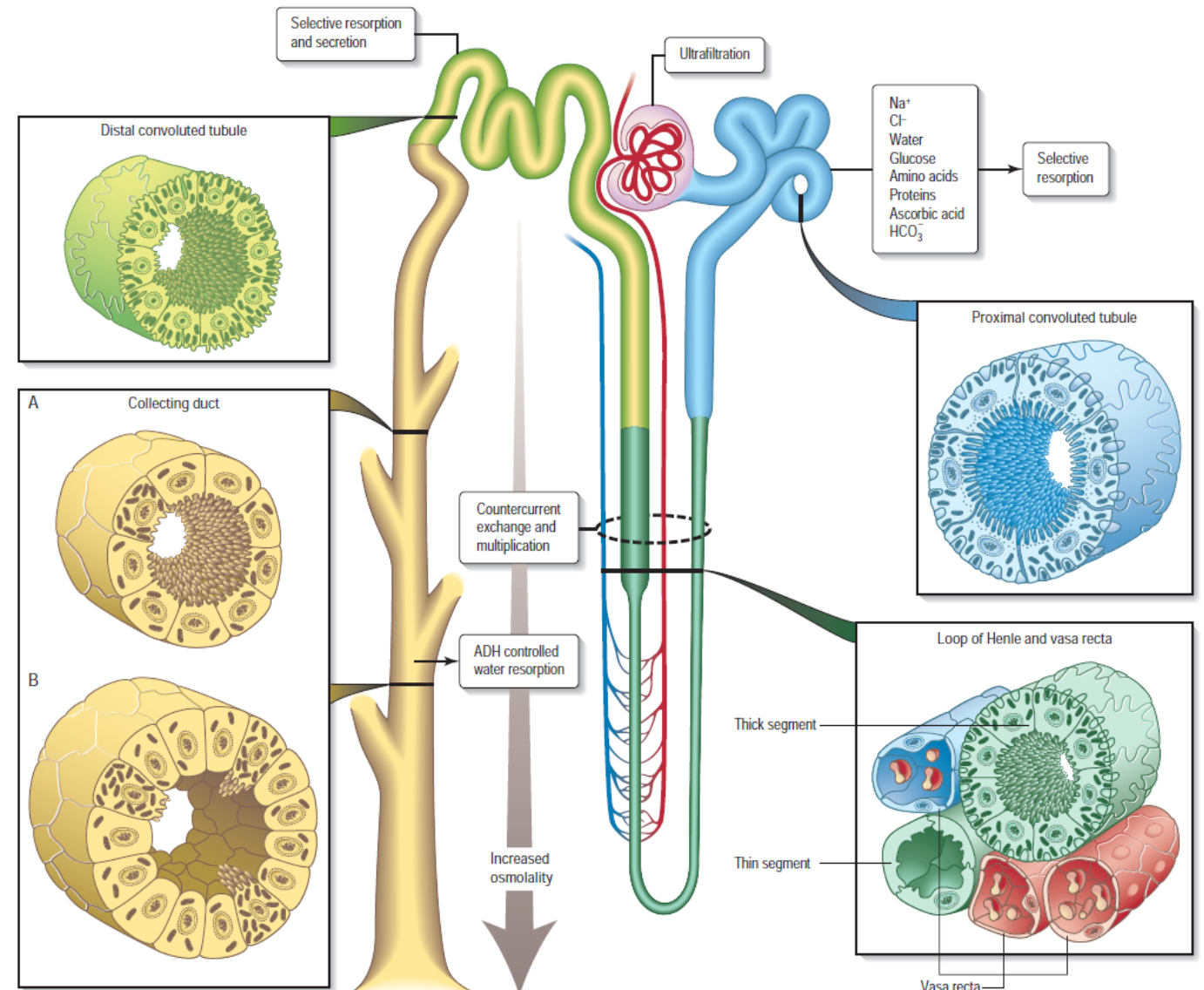
CORPUSCULUM RENIS MALPIGHI

- ♦ Glomerulus + capsula glomeruli
- ♦ Glomerulus - rete mirabile arteriosum
 - ♦ Vas afferens
 - ♦ Pory v endotelu
 - ♦ Vas efferens
- ♦ Capsula glomeruli - inner and outer sheath
 - ♦ Bowmann's sac – outer sheath
 - ♦ Inner sheath – flat cells - podocytes



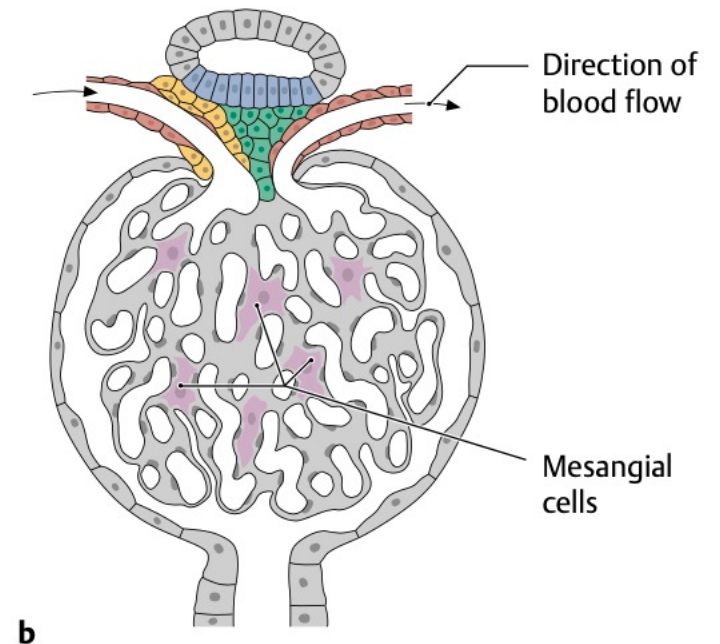
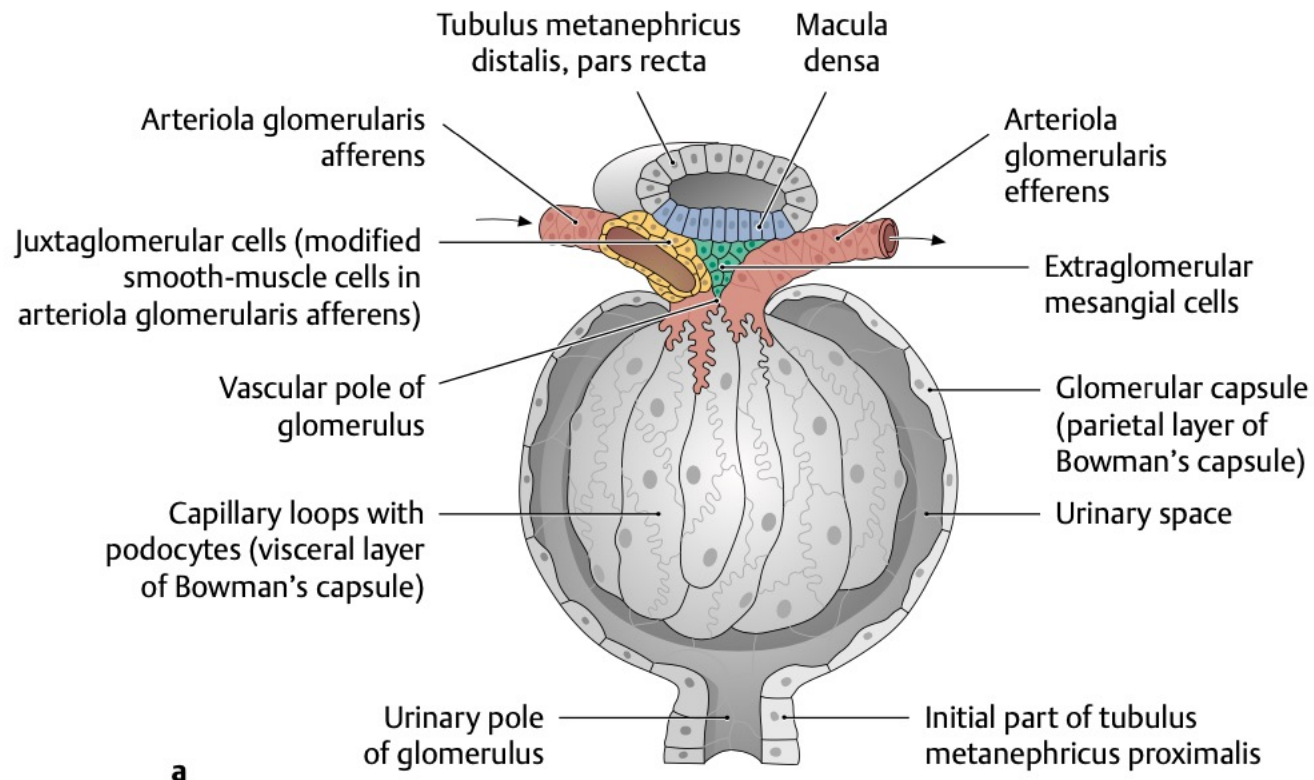
KIDNEY FUNCTION

- ♦ exocrine secretion
- ♦ Corpusculum renis
 - ♦ Filtration of primary urine
 - ♦ 170 -200 ml/day (1 glomerulus)
- ♦ Following sections
 - ♦ Reverse resorption
 - ♦ 99,5%
 - ♦ Aldosteron - Na
 - ♦ Antidiuretic hormone - water
- ♦ endocrine secretion
- ♦ Juxtaglomerular apparatus
 - ♦ Renin (vasoconstriction)
 - ♦ Erythropoietin



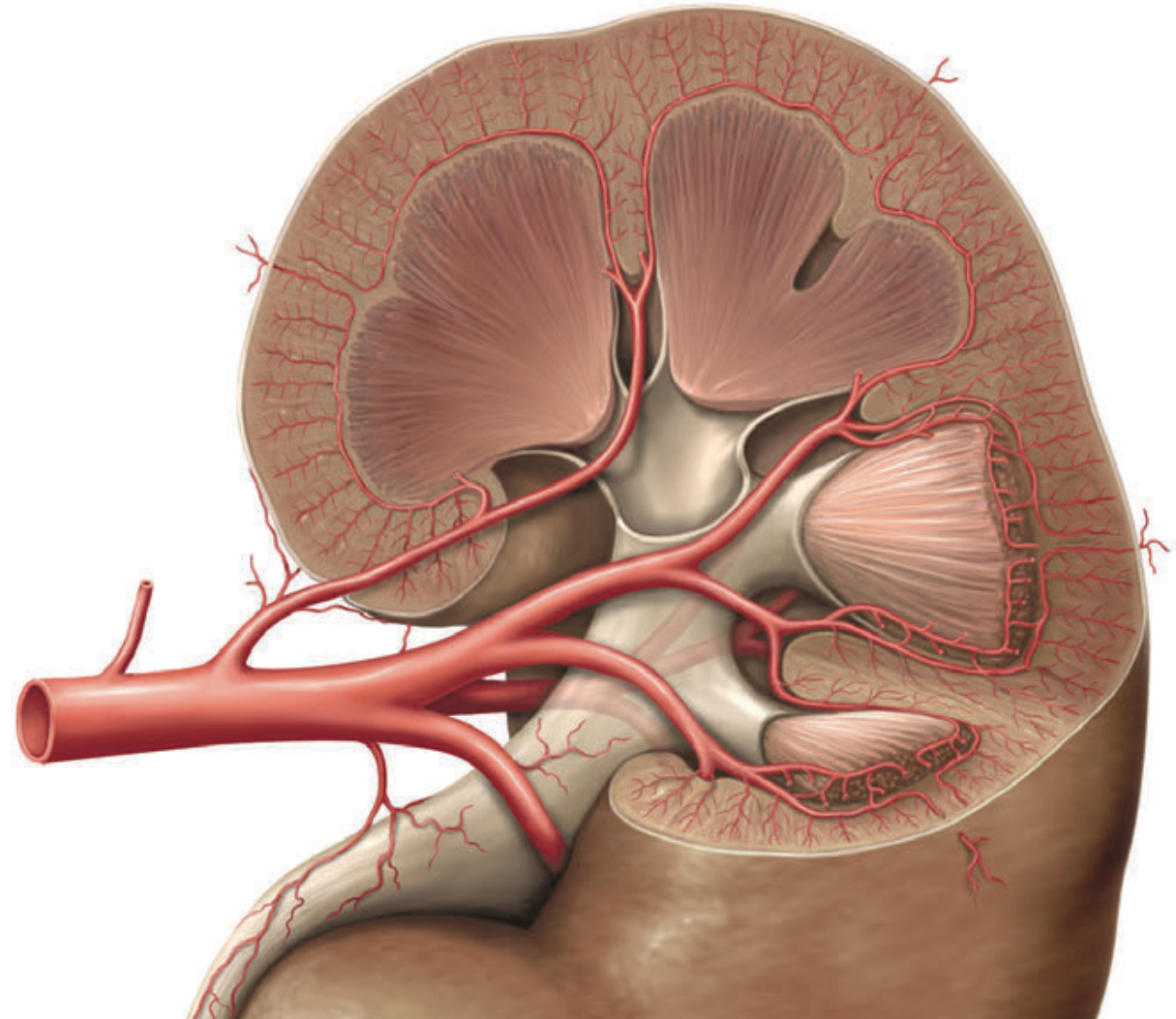
JUXTAGLOMERULAR APPARATUS

- ♦ Juxtaglomerula cells – renin (system renin angiotenzin)
- ♦ Mesangial cells – prostaglandines , peptides etc



KIDNEY VESSELS

- ♦ A. renalis
- ♦ v. renalis
- ♦ A. interlobaris
- ♦ A. arcuata
- ♦ A. interlobularis
 - ♦ glomeruli
 - ♦ A. radiata
 - ♦ Rr. capsulares
- ♦ arteriola recta
- ♦ venula recta

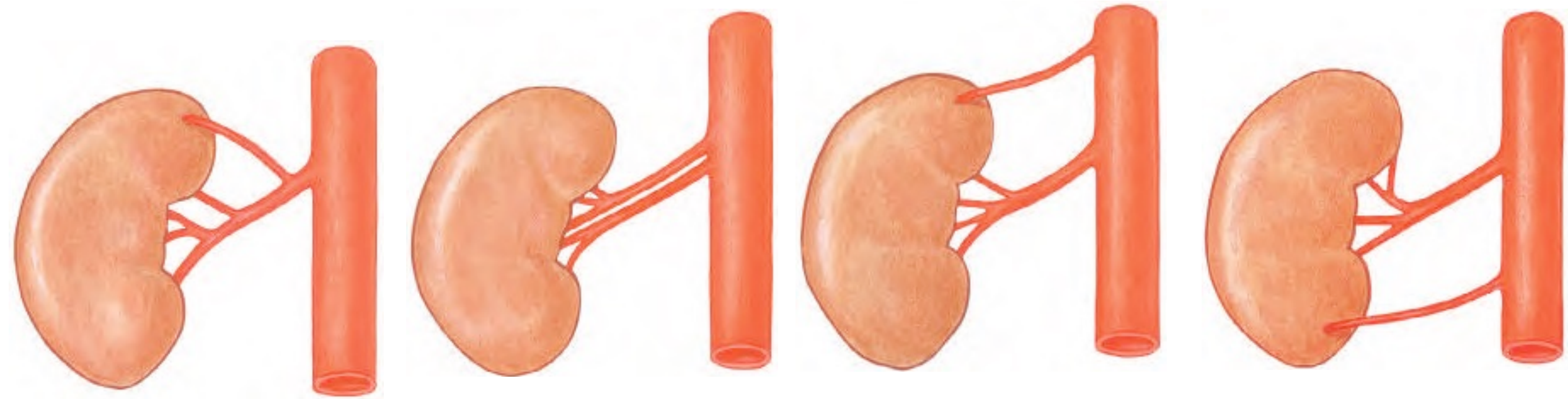


13%

10%

7%

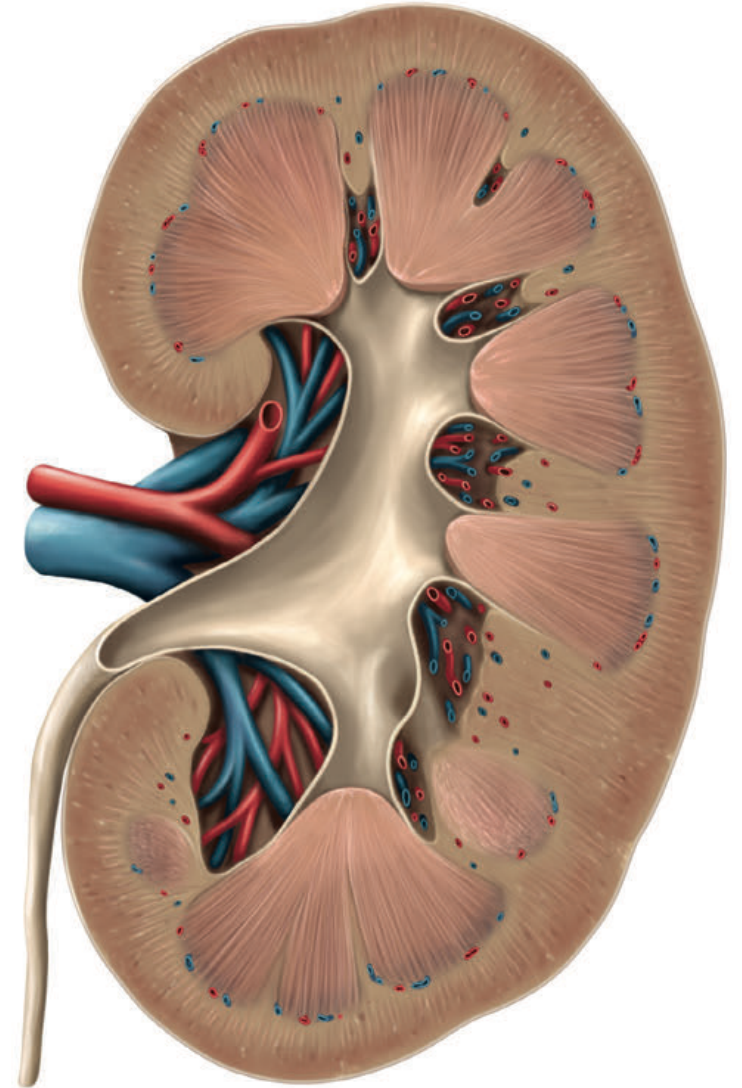
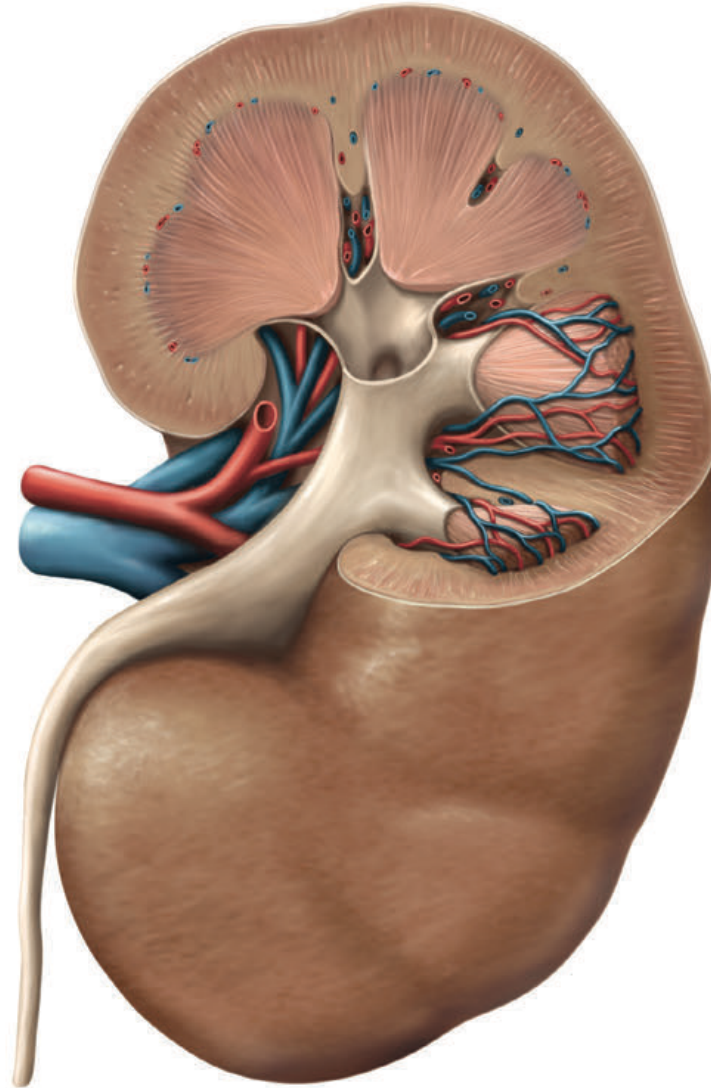
5%



VARIABILITY OF THE ARTERIES

COLLECTING SYSTEM

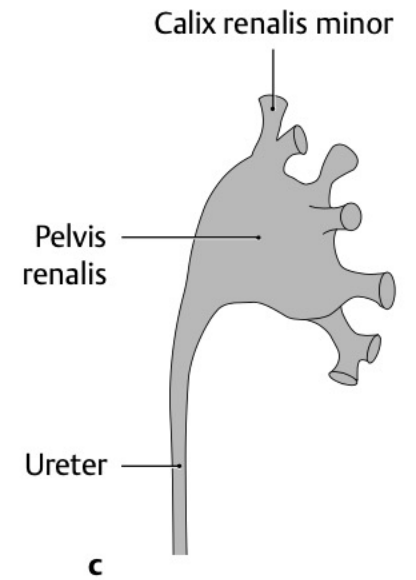
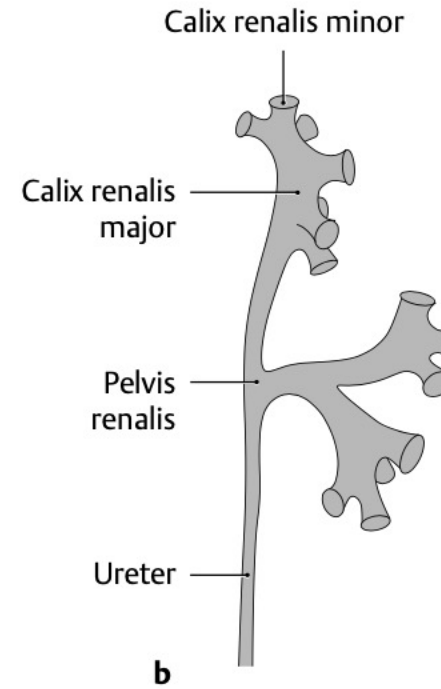
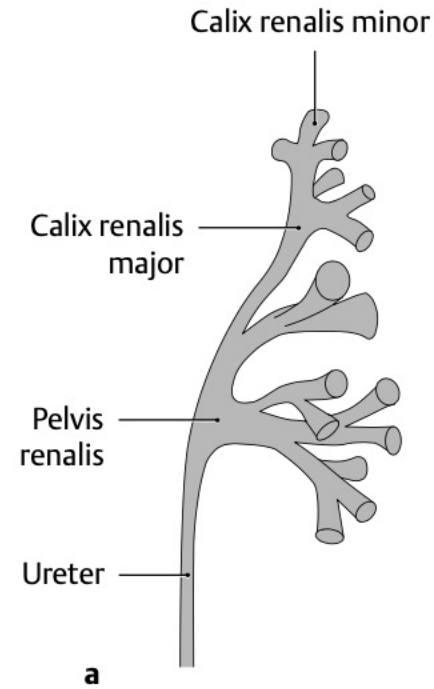
- 🔴 **Calices renales**
 - 🔴 Calyx minor
 - 🔴 Calyx major
- 🔴 **Pelvis renalis**
- 🔴 **Dorsal to vessels**
 - 🔴 surgery
 - 🔴 Retroperitoneal approach





🔴 Dendritic type

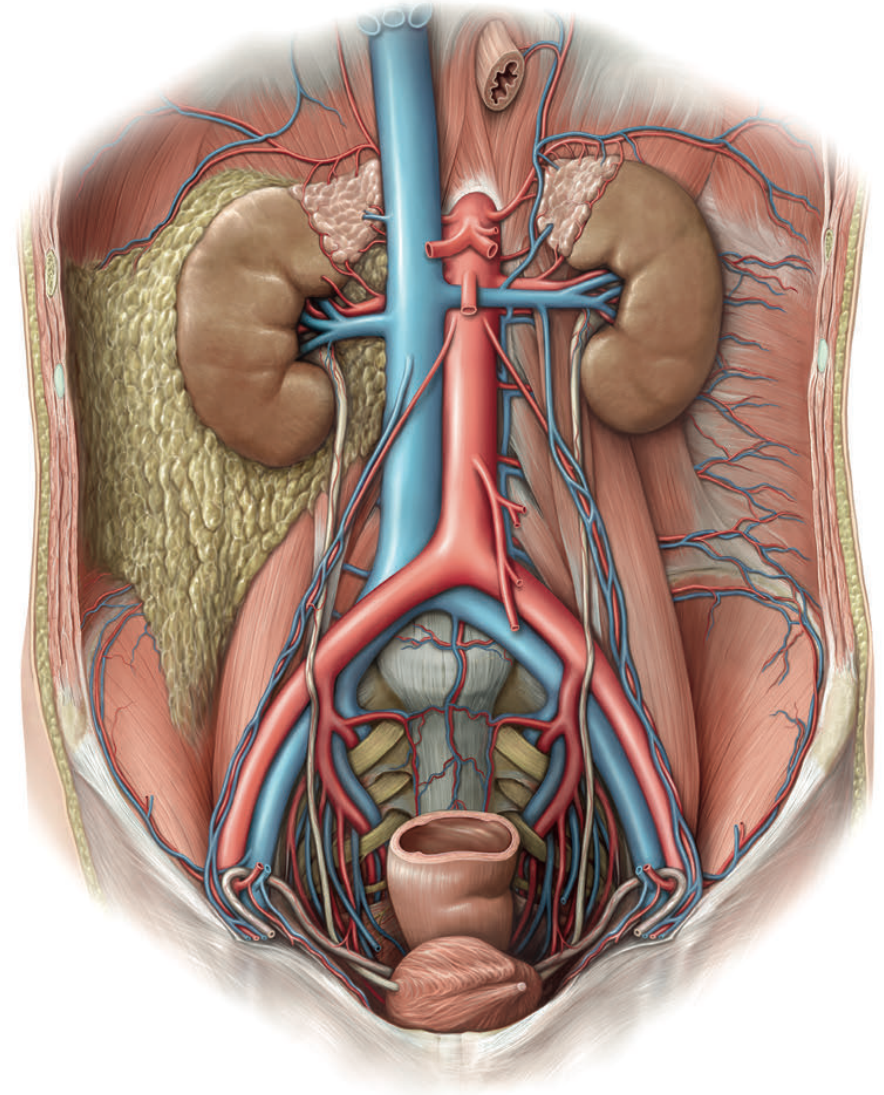
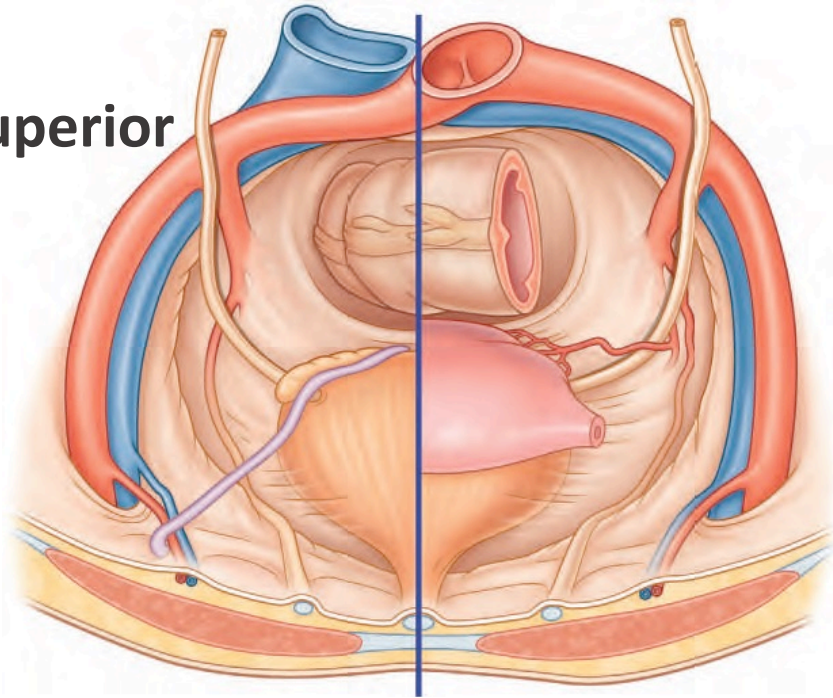
🔴 Ampullary type



RENAL PELVIS

URETER

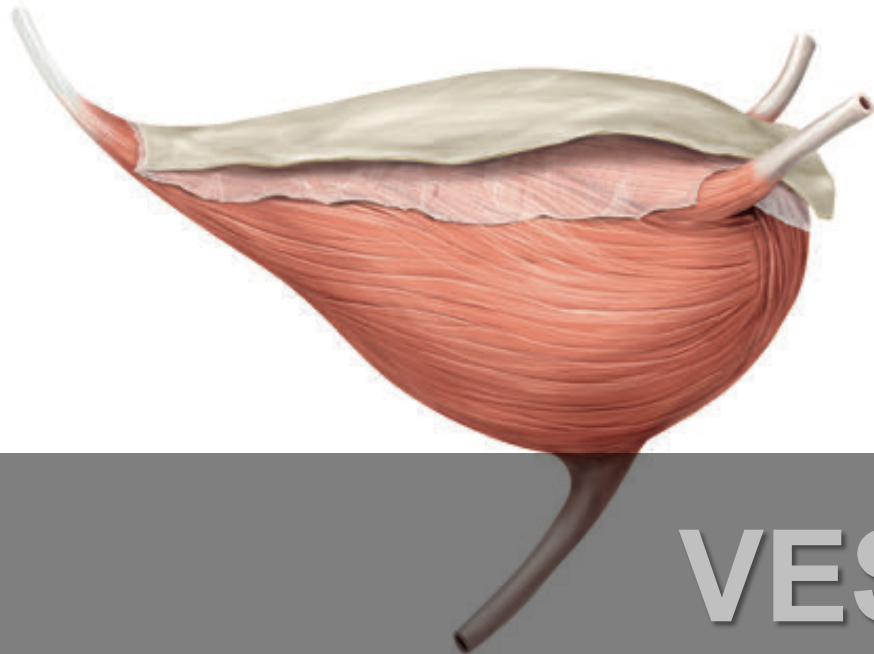
- ♦ length 25 - 30 cm
- ♦ width 5- 6 mm
- ♦ Pars abdominalis
 - ♦ Apertura pelvis superior
 - ♦ Vasa iliaca
 - ♦ Thinner parts
- ♦ Pars pelvica
- ♦ Portio parietalis



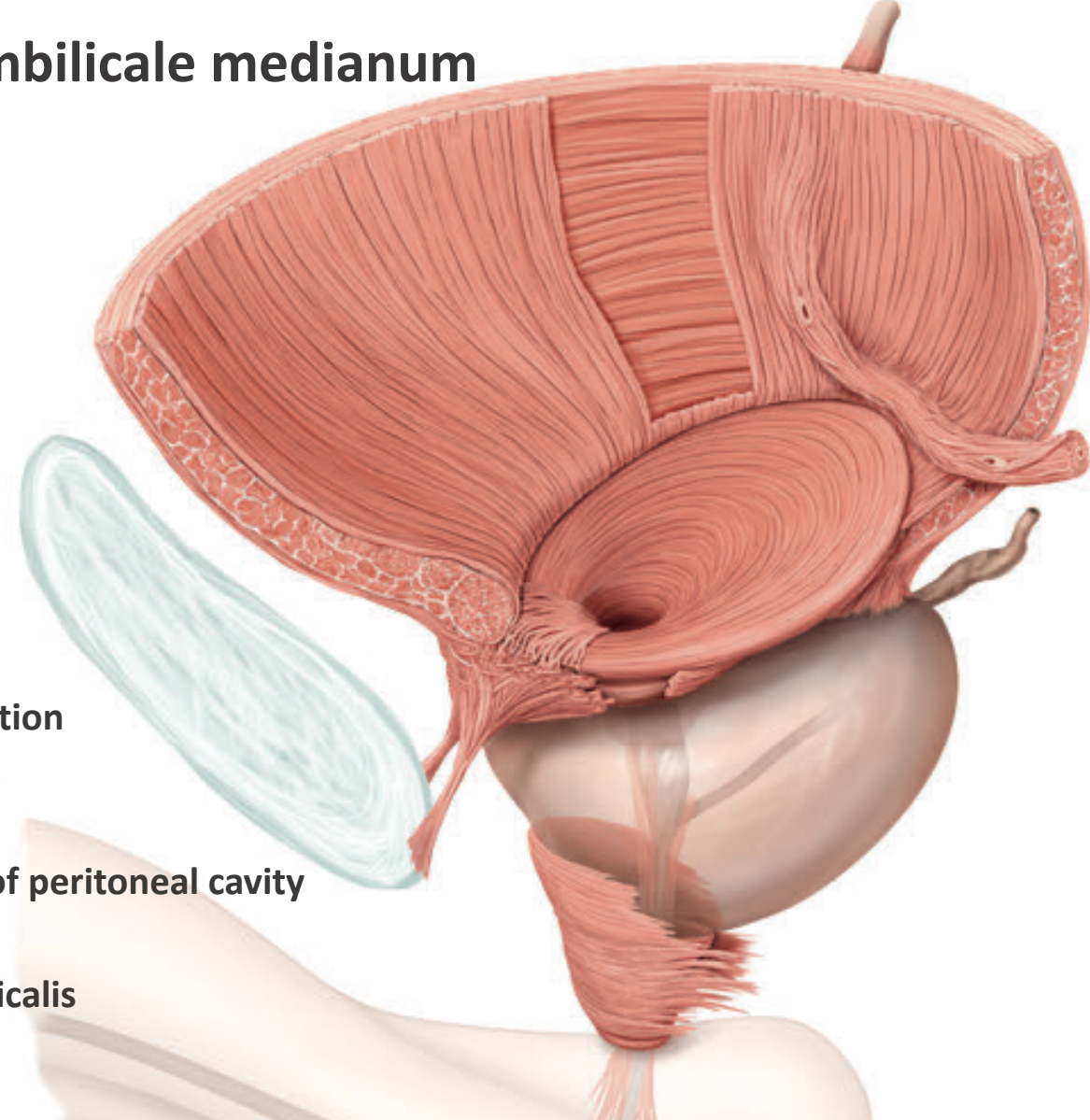
Gray's Anatomy 41th ed.



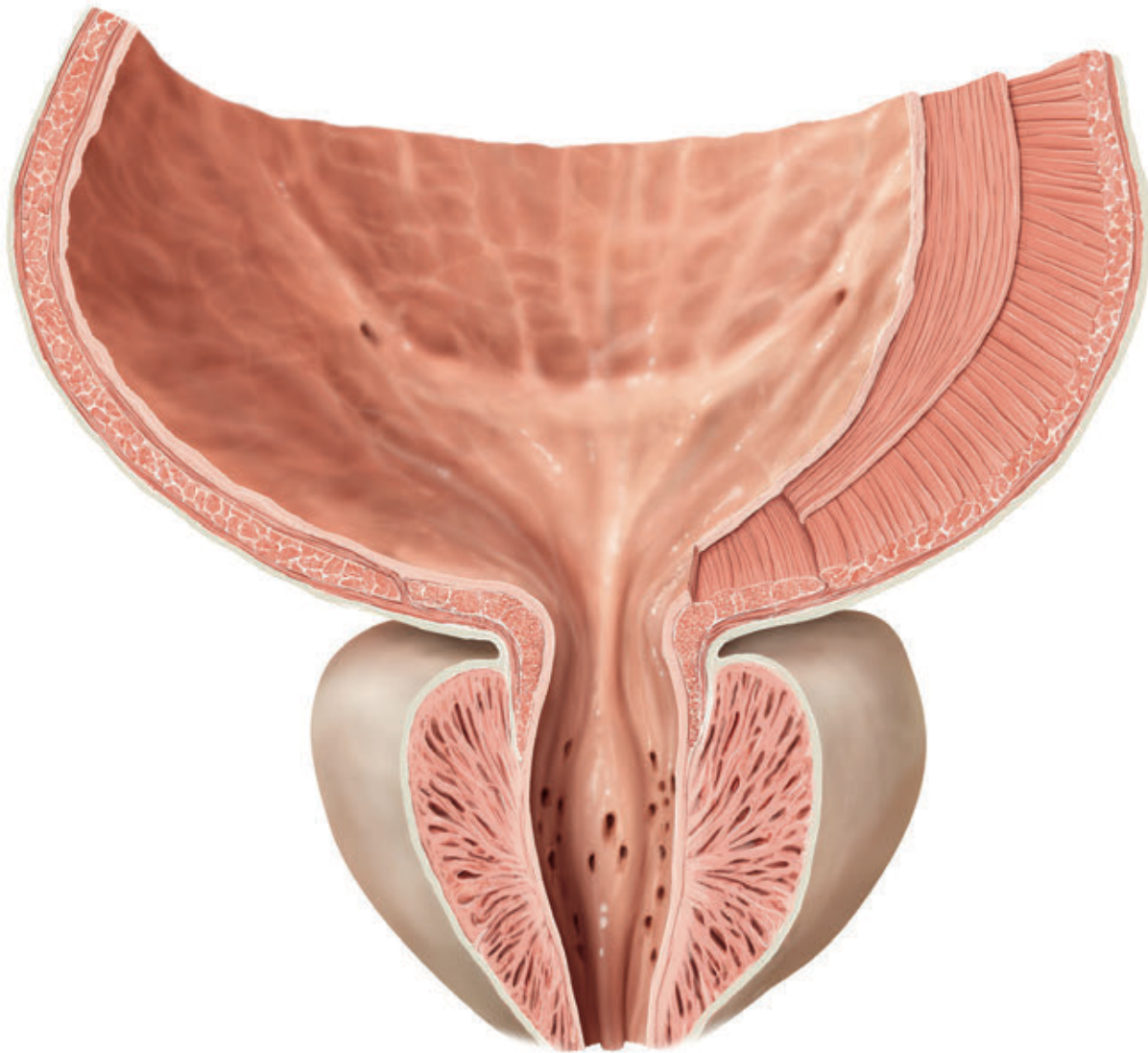
- Ligamentum umbilicale medianum
- Apex
- Corpus
- Fundus



- capacity 250 - 300 ml
 - Preperitoneal position
 - Behind symphysis
 - Sectio alta
 - Without opening of peritoneal cavity
 - Over symphysis
 - Excavatio retrovesicalis



VESICA URINARIA

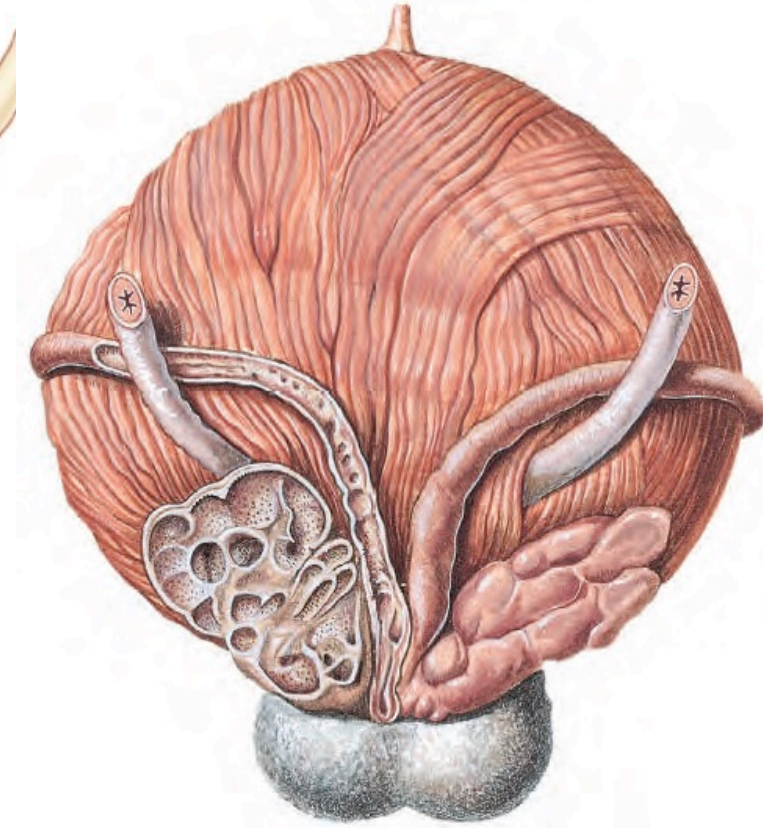
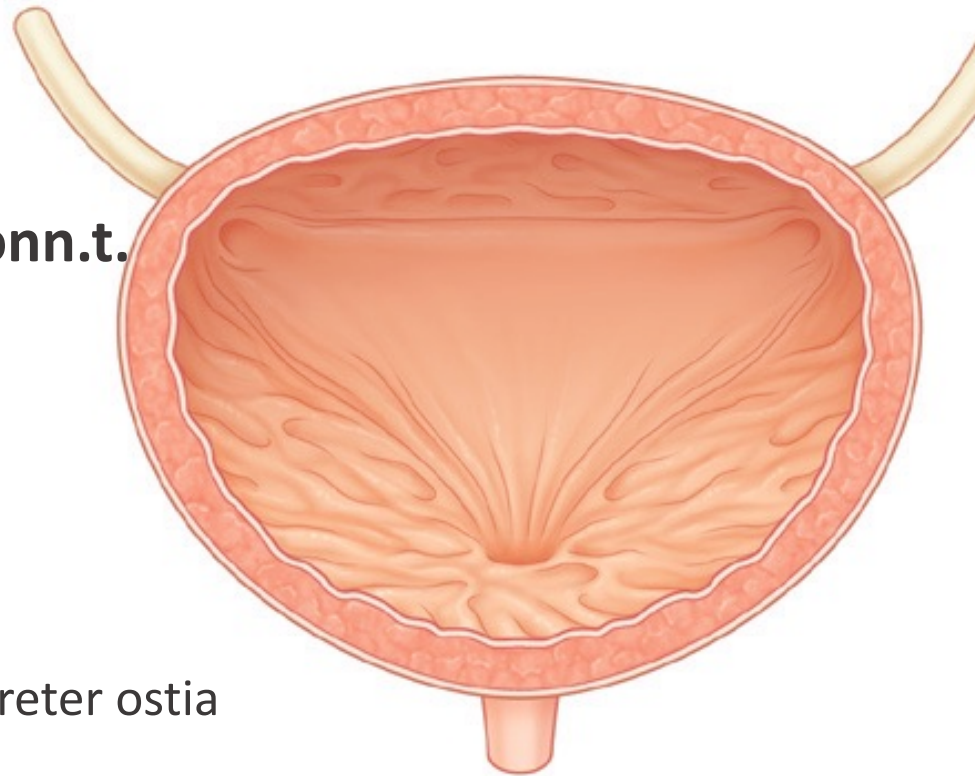


- ♦ **Trigonum vesicae**
 - ♦ *Ostium ureteri dx.*
 - ♦ *Ostium ureteri sin.*
 - ♦ *Ostium urethrae*
- ♦ **Plica interureterica**
 - ♦ *Fossa retrotrigonalis*

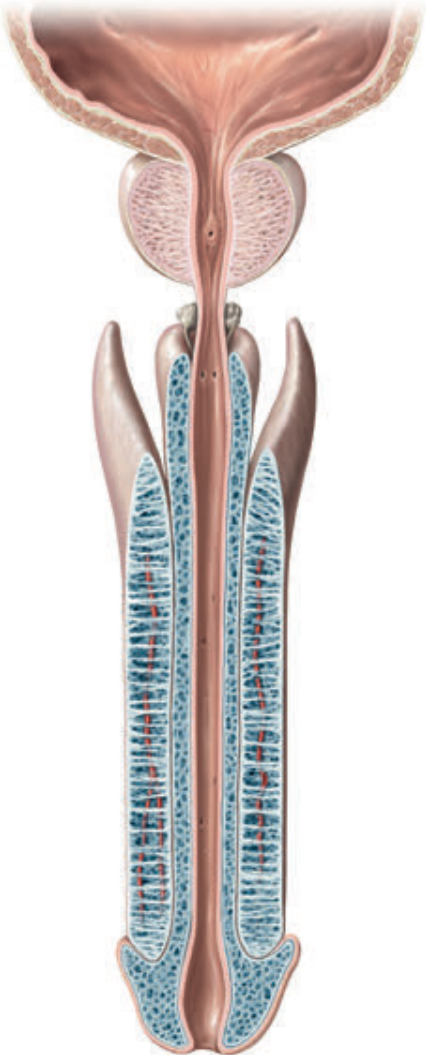
VESICA URINARIA

VESICA URINARIA

- ♦ **Tunica mucosa**
 - ♦ Transitional epithelium
 - ♦ folds
- ♦ **Tela submucosa – loose conn.t.**
- ♦ **Tunica muscularis**
 - ♦ 3 layers
 - ♦ M. detrusor
 - ♦ M. sphincter vesicae
 - ♦ spiral
 - ♦ Ventile mechanism in the ureter ostia
- ♦ **Tunica adventicia**
 - ♦ Follows to paracystium

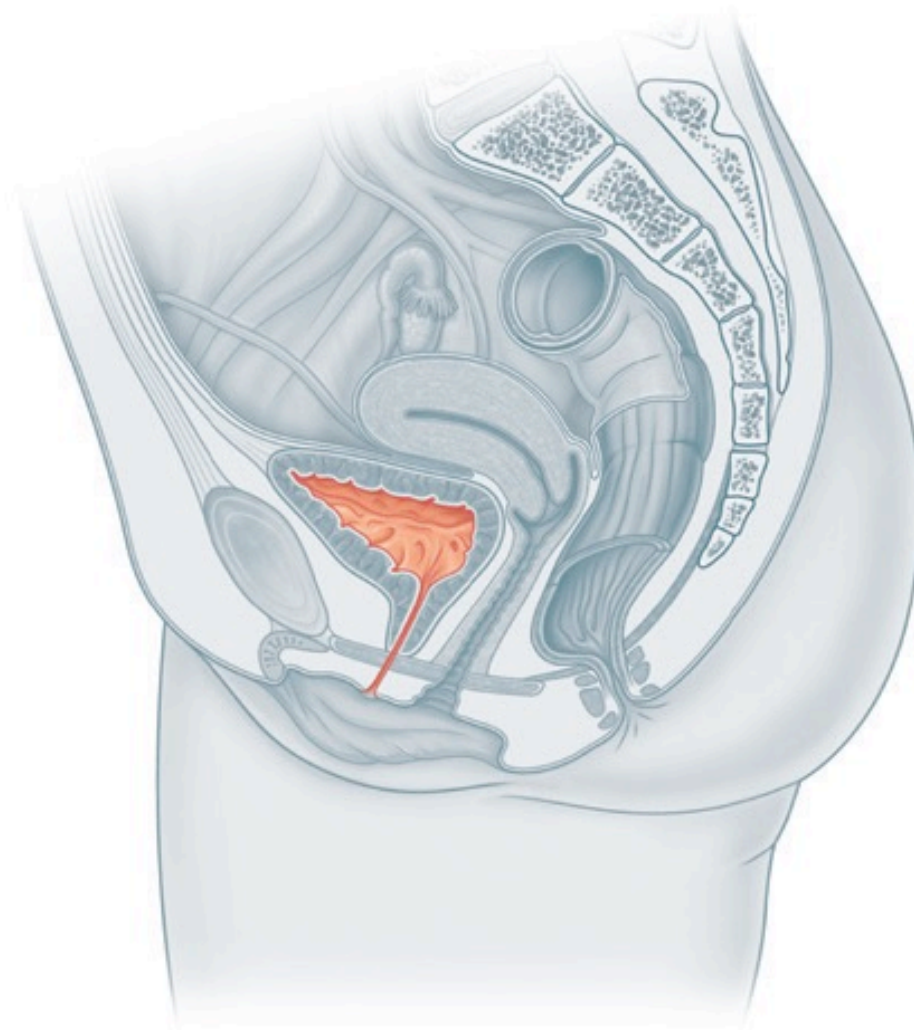
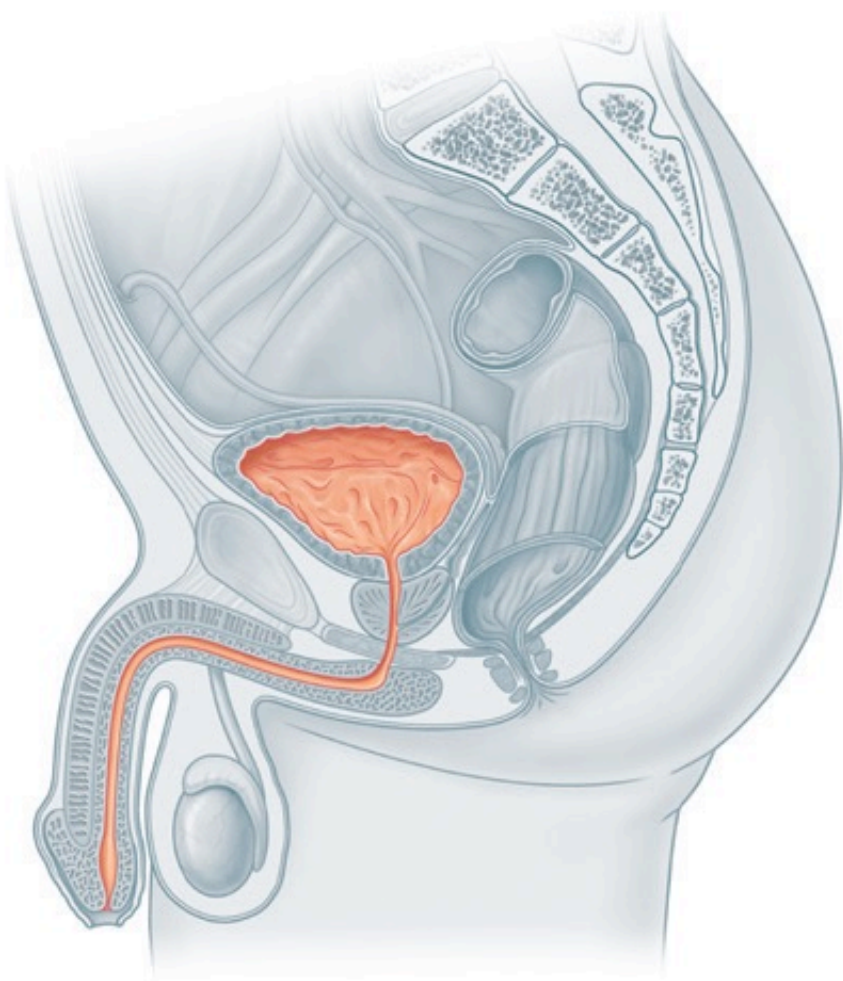


URETHRA



- ♦ **Ostium urethrae internum**
- ♦ **Ostium urethrae externum**
- ♦ **Tunica mucosa**
 - ♦ Transitional epithelium – upper part
 - ♦ Multilayered squamous – lower part
 - ♦ Tela submucosa
 - ♦ Tunica muscularis
 - ♦ Connective tissue - periurethrium

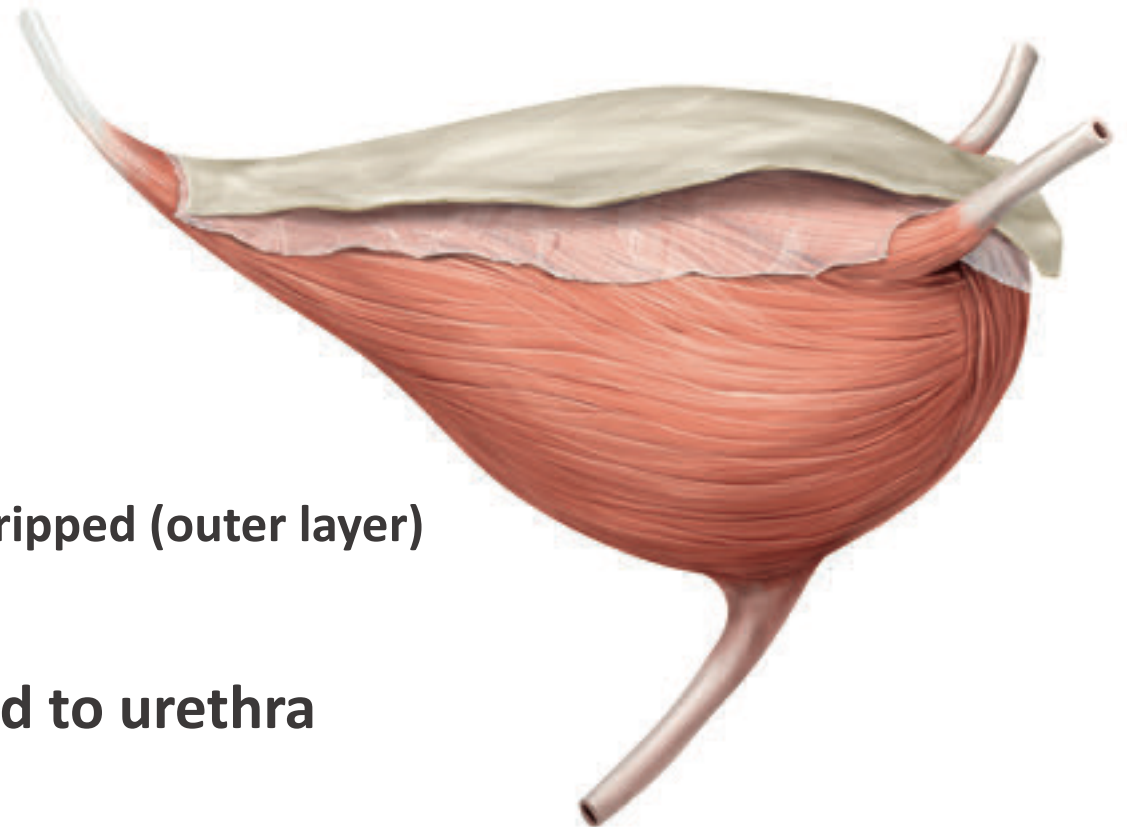




URETHRA FEMININA ET MASCULINA

URETHRA FEMININA

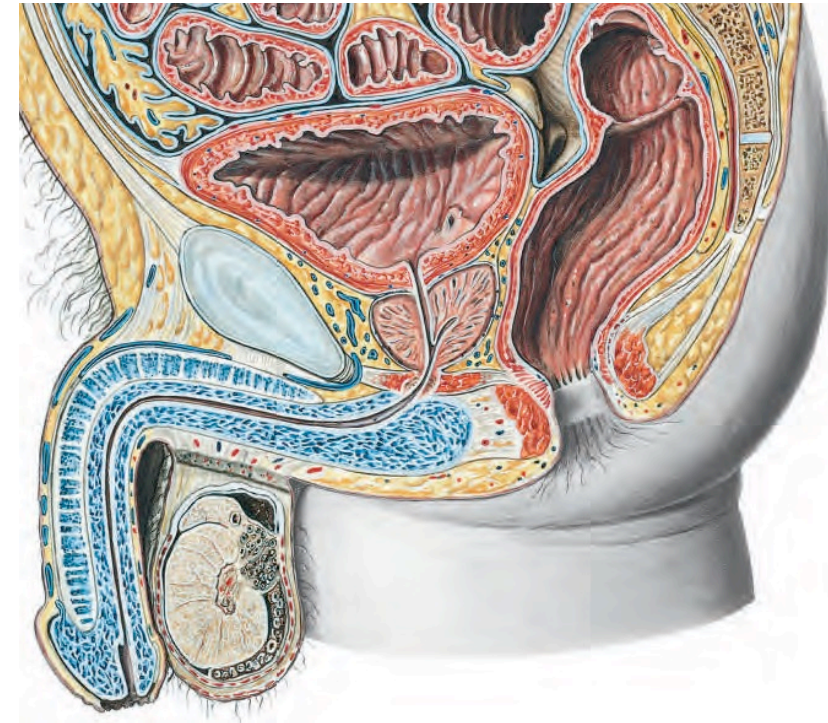
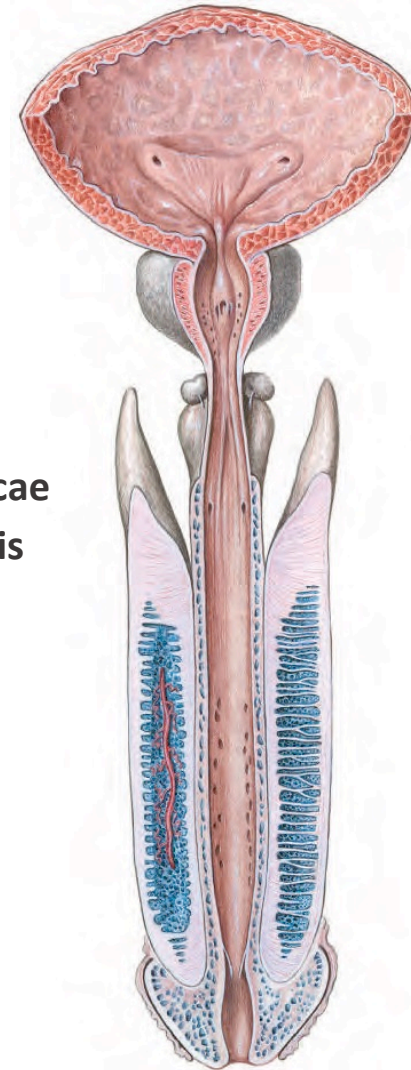
- ♦ Urethra feminina
 - ♦ 3-4 cm
 - ♦ 8 mm
 - ♦ Pars intramuralis
 - ♦ M sphincter vesicae urinariae - smooth
 - ♦ Pars pelvina
 - ♦ Pars perinealis
 - ♦ M. sphincter urethrae – smooth (inner layer) stripped (outer layer)
- ♦ Glandulae urethrales – mucinous glands
- ♦ Ductus paraurethralis - 1-2 cm long, opened to urethra

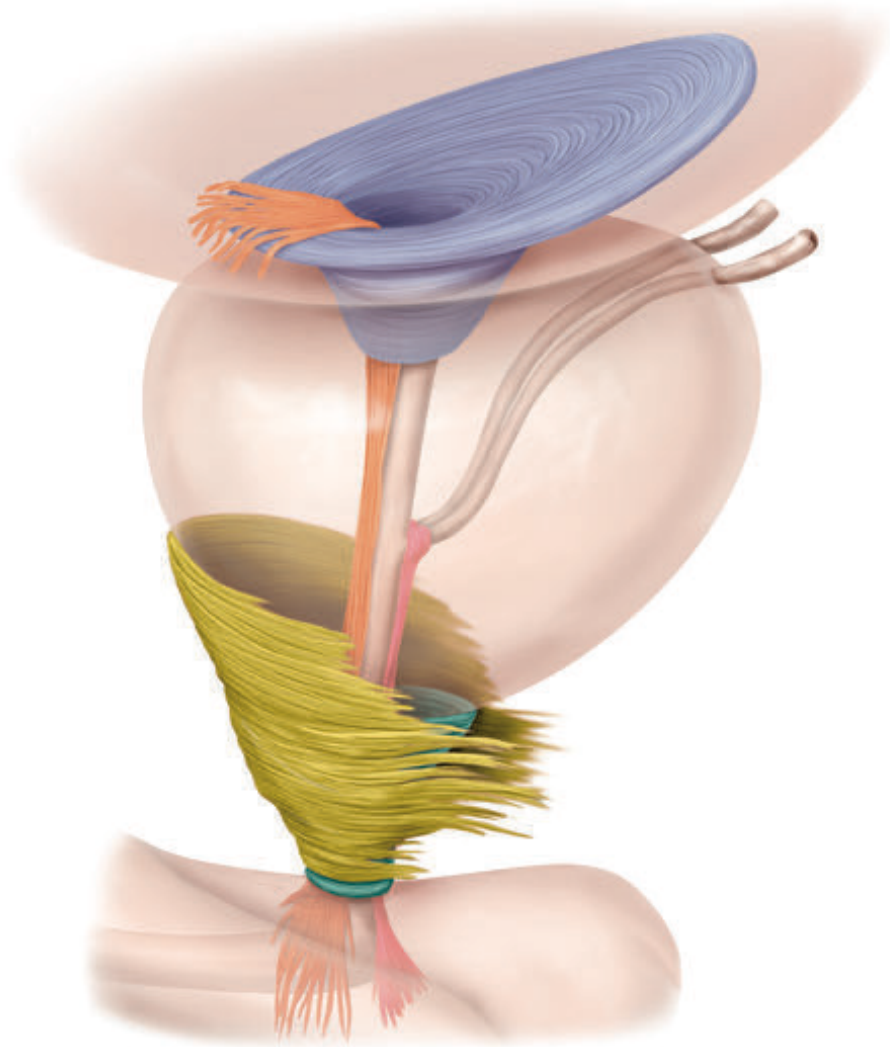


URETHRA MASKULINA / VIRILIS

♦ Urethra masculina

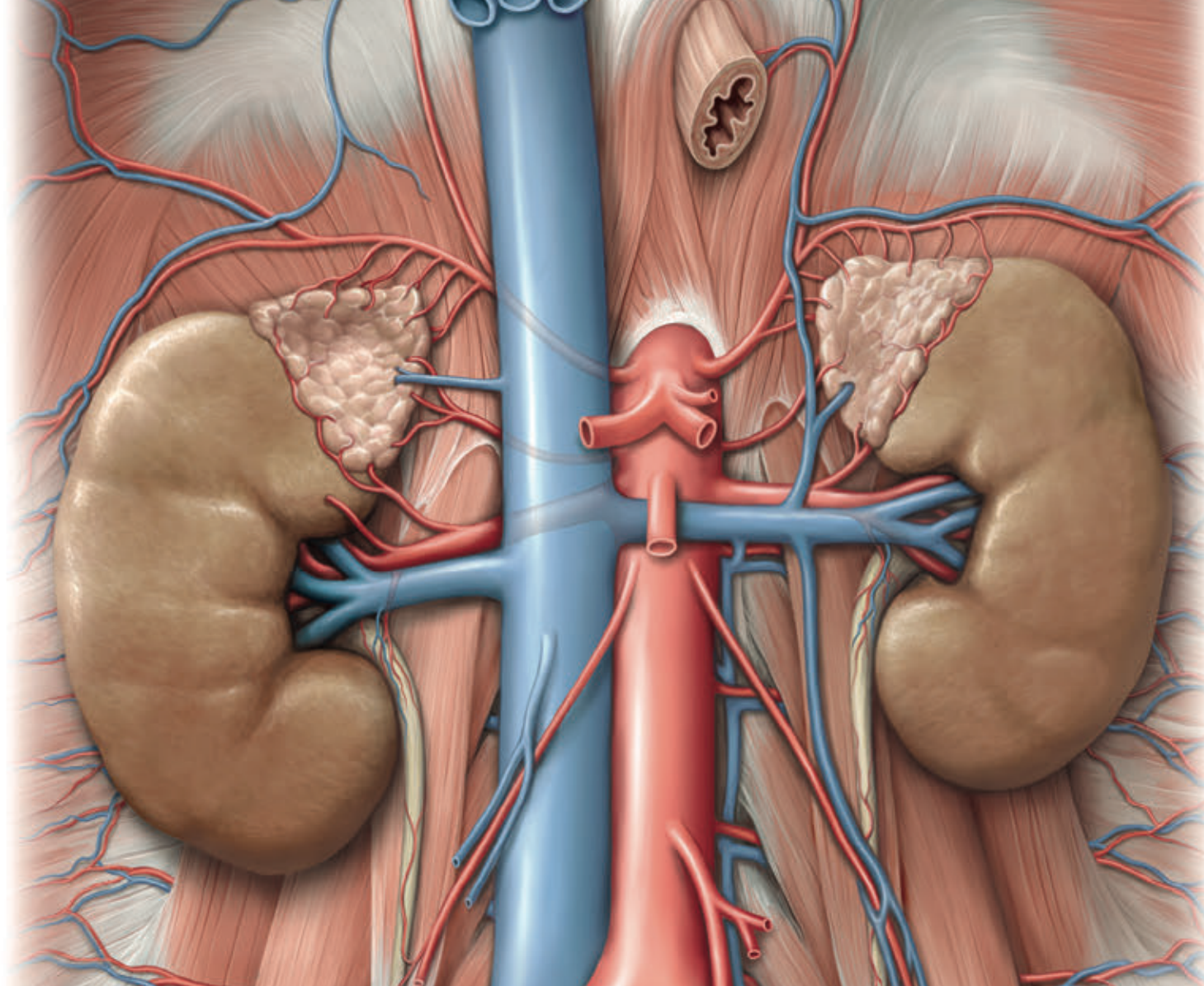
- ♦ 20 -25 cm
- ♦ 2x bowed
- ♦ **Pars intramuralis**
 - ♦ M sphincter vesicae urinae - smooth
- ♦ **Pars prostatica**
 - ♦ Colliculus seminalis - ductus eiaculatorius + gl prostaticae
 - ♦ Ductus eiaculatorius - dc. deferens et vesicula seminalis
 - ♦ Utriculus prostaticus – remnant of ductus Muelleri
- ♦ **Pars membranacea**
 - ♦ M. sphincter urethrae - smooth (inner) + stripped
- ♦ **Pars spongiosa**
 - ♦ Gl. bulbourethrales
 - ♦ Gl. urethrales



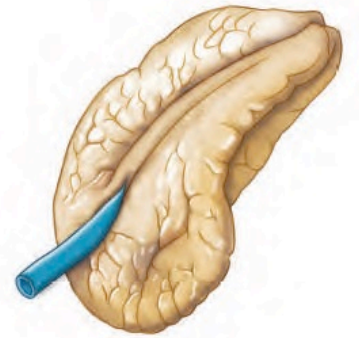
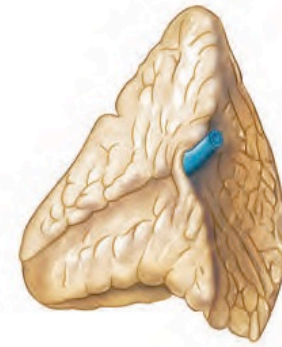
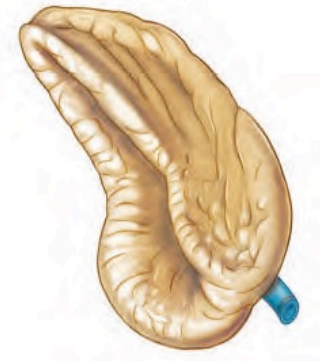


- **M. sphincter urethrae internus**
- **M. sphincter uretrae externus**
 - Inner - smooth
 - Outer - stripped
- **M. dilatator urethrae**
- **M. ejaculatorius**

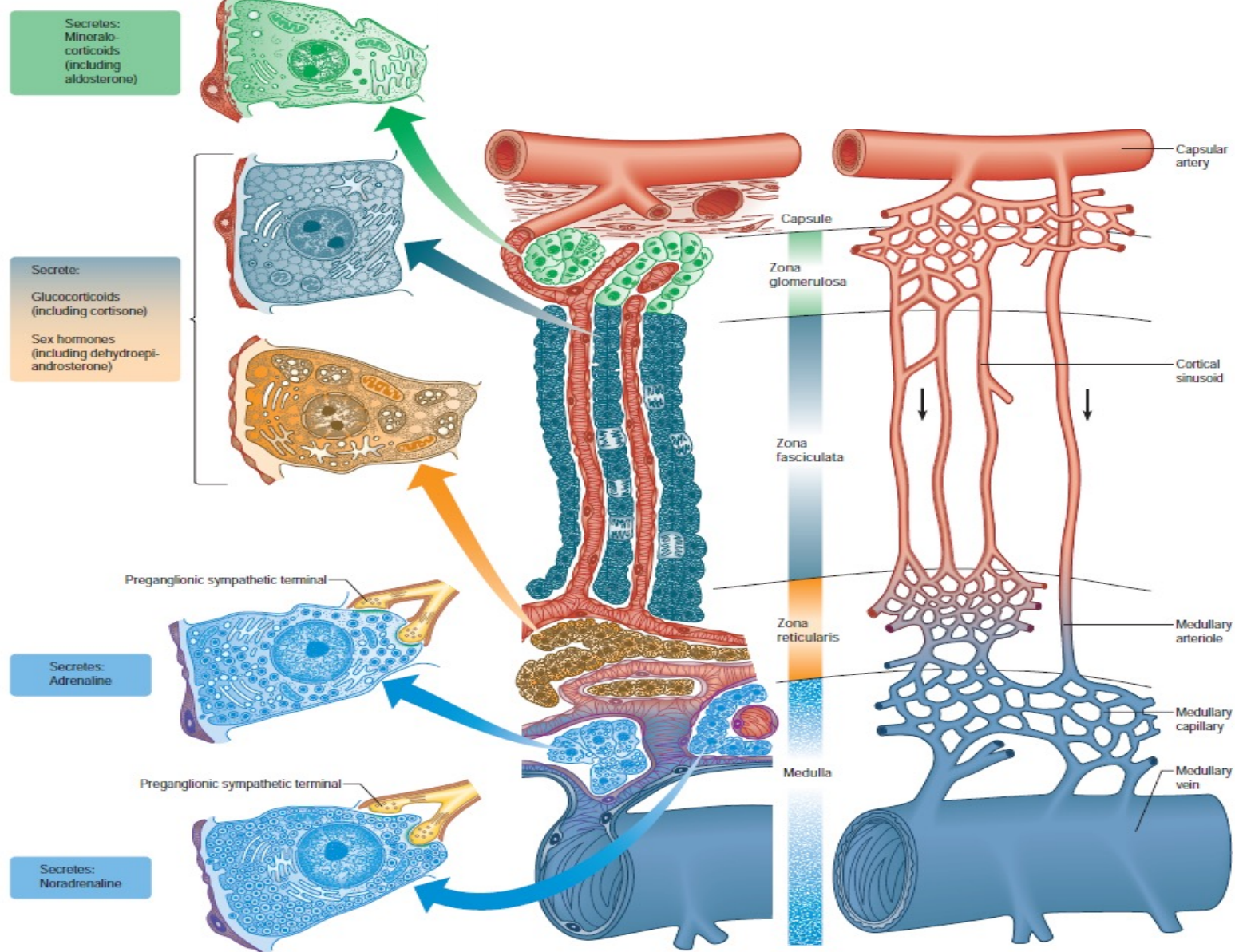
URETHRAL SPHINCTERS



- ♦ right
- ♦ V-shape
- ♦ left
- ♦ shape

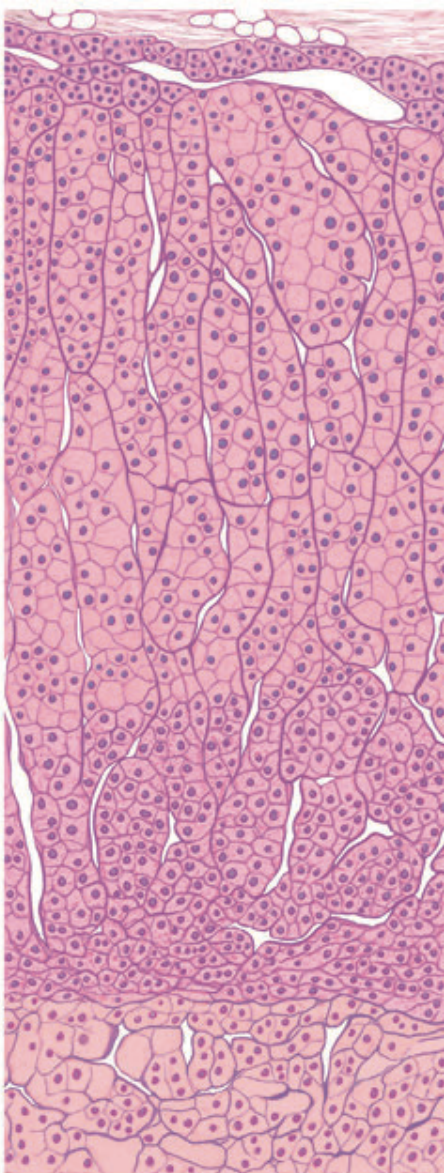


GLANDULAE SUPRARENALES



Grey's Anatomy, 41th ed.

GLL. SUPRARENALES / ADRENALES



💧 Cortex

💧 *Zona glomerulosa - mineralocortikoids*

💧 *Zona fasciculata - glukosortikoids*

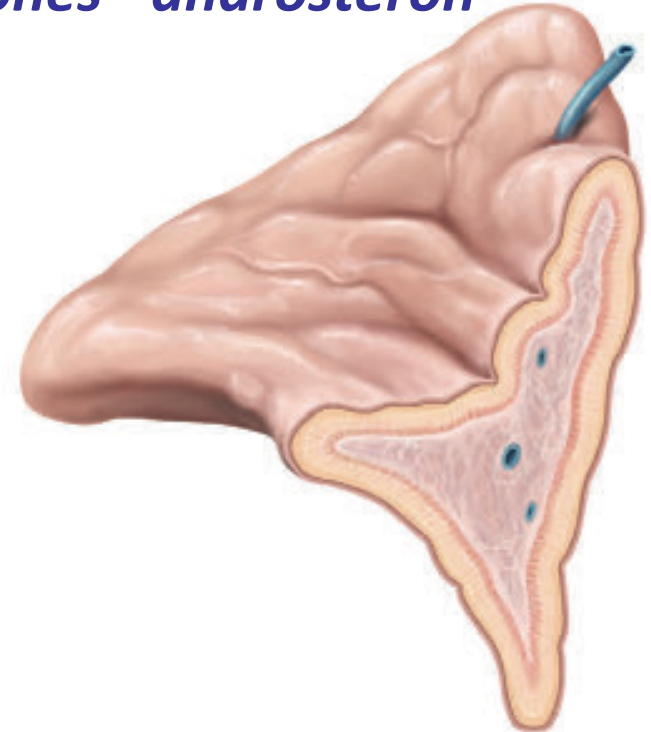
💧 *Zona reticularis – sexual hormones - androsteron*

💧 Medulla

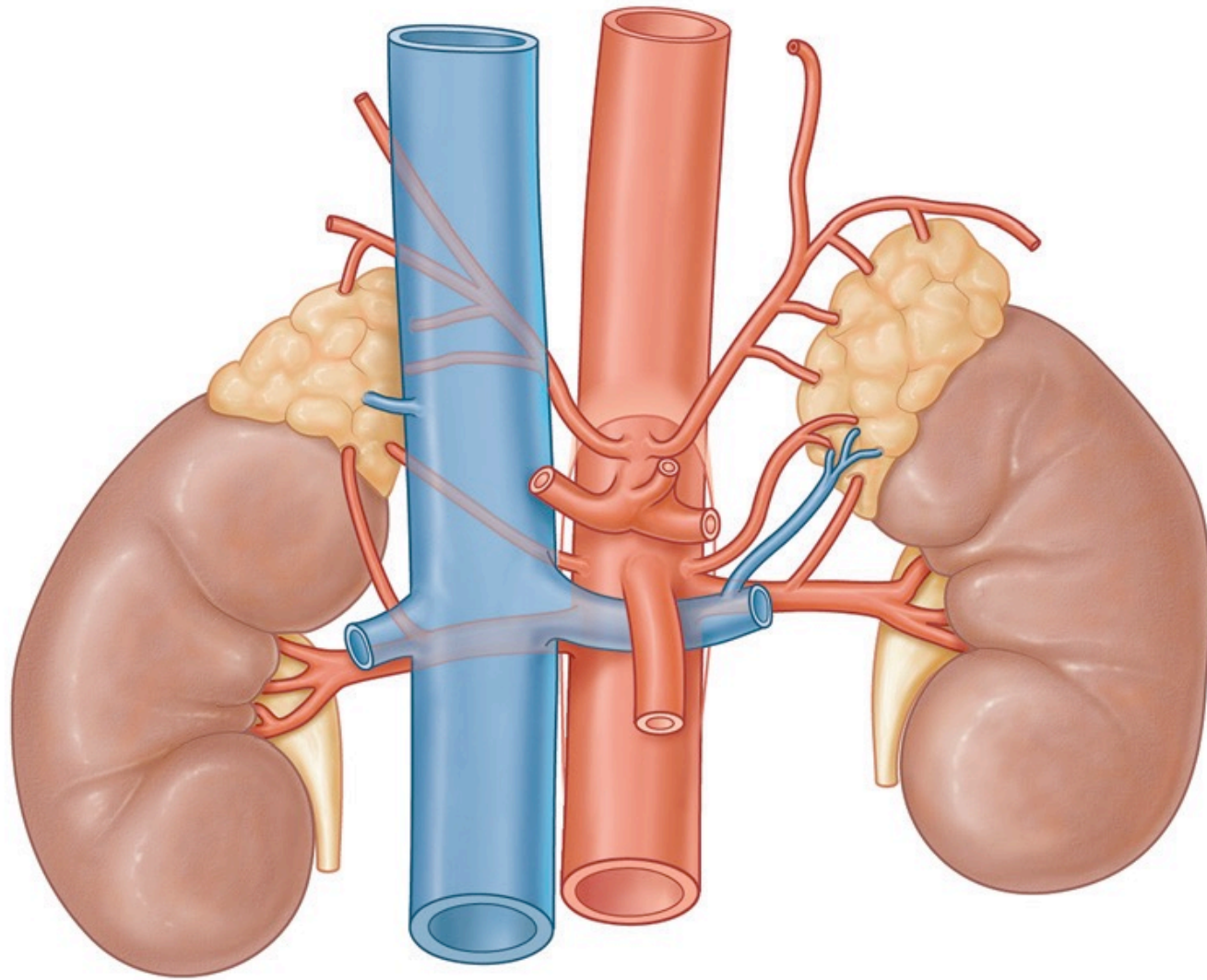
💧 *adrenalin, noradrenalin*

💧 *epinephrine, norepinephrine*

💧 *Sympathetic paraganglion*



GLL. SUPRARENALES / ADRENALES



- ♦ **Aa. suprarenales superiores**
 - ♦ A. phrenica inferior
- ♦ **A. suprarenalis media**
- ♦ **A. suprarenalis inferior**
 - ♦ A. renalis.
- ♦ **V. suprarenalis dx.**
 - ♦ V. cava inferior
- ♦ **V. suprarenalis sin.**
 - ♦ V. renalis sin.

VASA SUPRARENALIA

ABDOMEN 4

Prof. MUDr. Jiří Ferda, Ph.D.