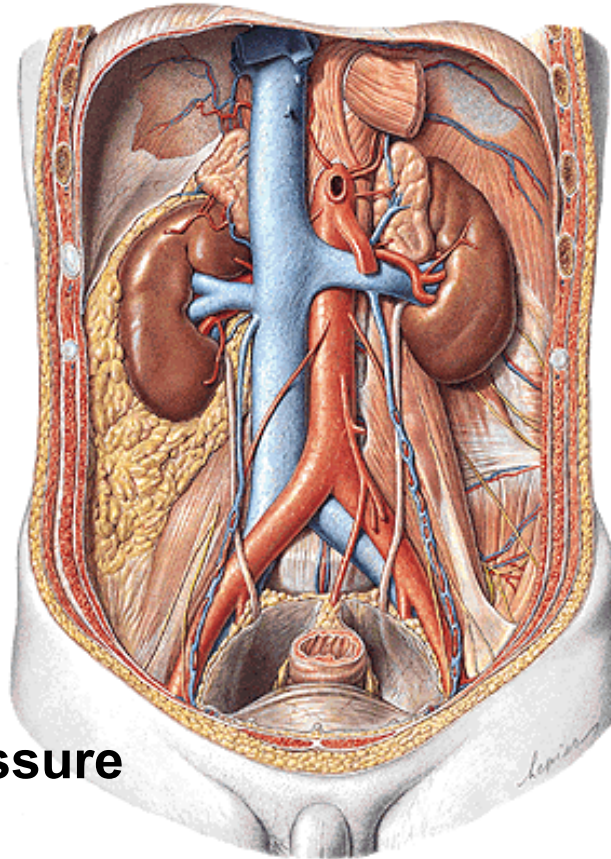


URINARY SYSTEM

FUNCTIONS

- **Removal of waste product from the body**
- **Regulation of electrolyte balance**
- **Regulation of acid-base homeostasis (blood pH)**
- **Controlling blood volume and maintaining blood pressure**



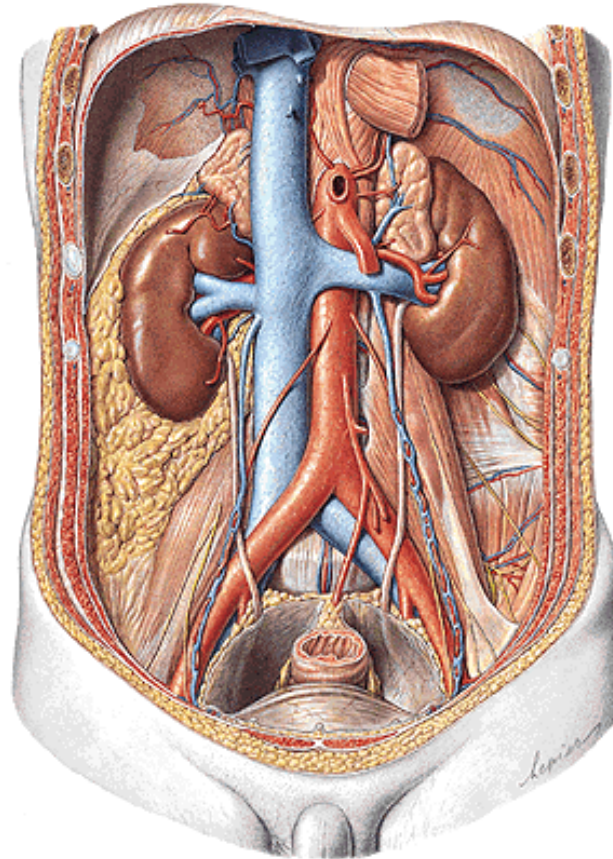
PARTS

Kidney (ren)

Efferent urinary tract:
renal calices
renal pelvis
ureter
urinary bladder
urethra

FUNCTIONS

- **Removal of waste product from the body**
- **Regulation of electrolyte balance**
- **Regulation of acid-base homeostasis (blood pH)**
- **Controlling blood volume and maintaining blood pressure**



PARTS

Kidney (ren)

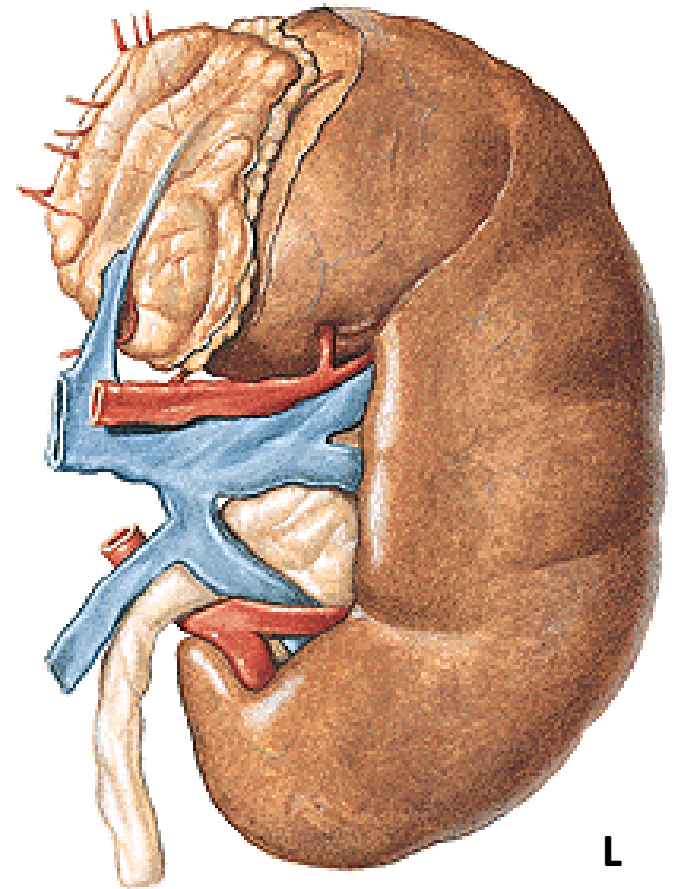
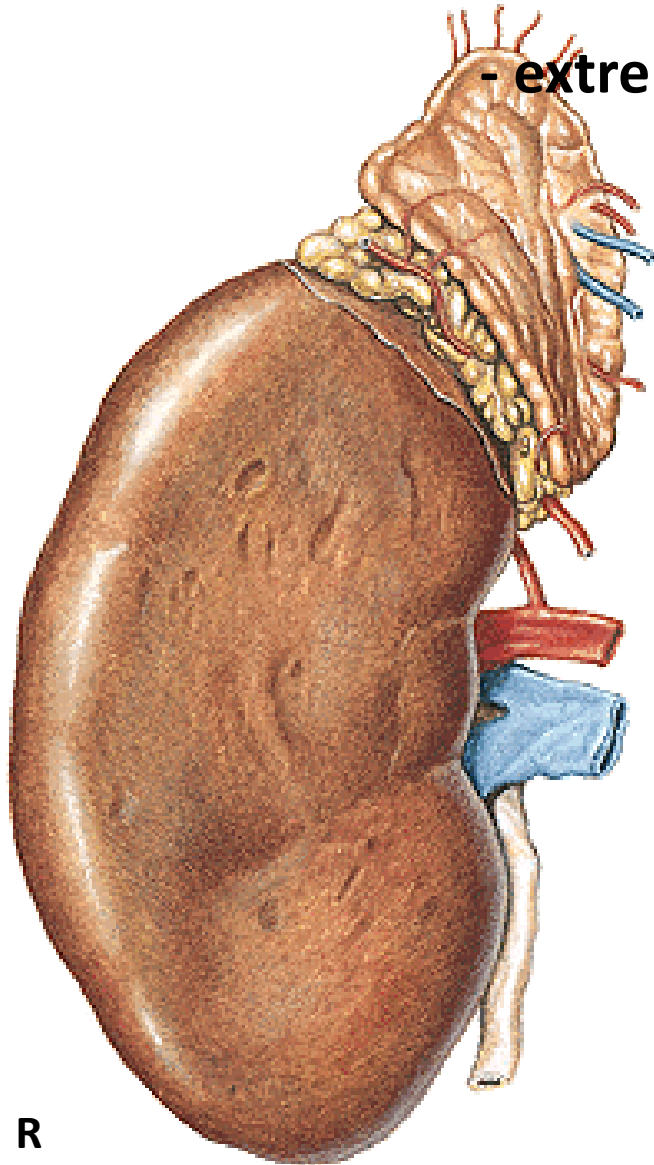
Efferent urinary tract:
renal calices
renal pelvis
ureter
urinary bladder
urethra

REN, NEPHROS - facies anterior et posterior

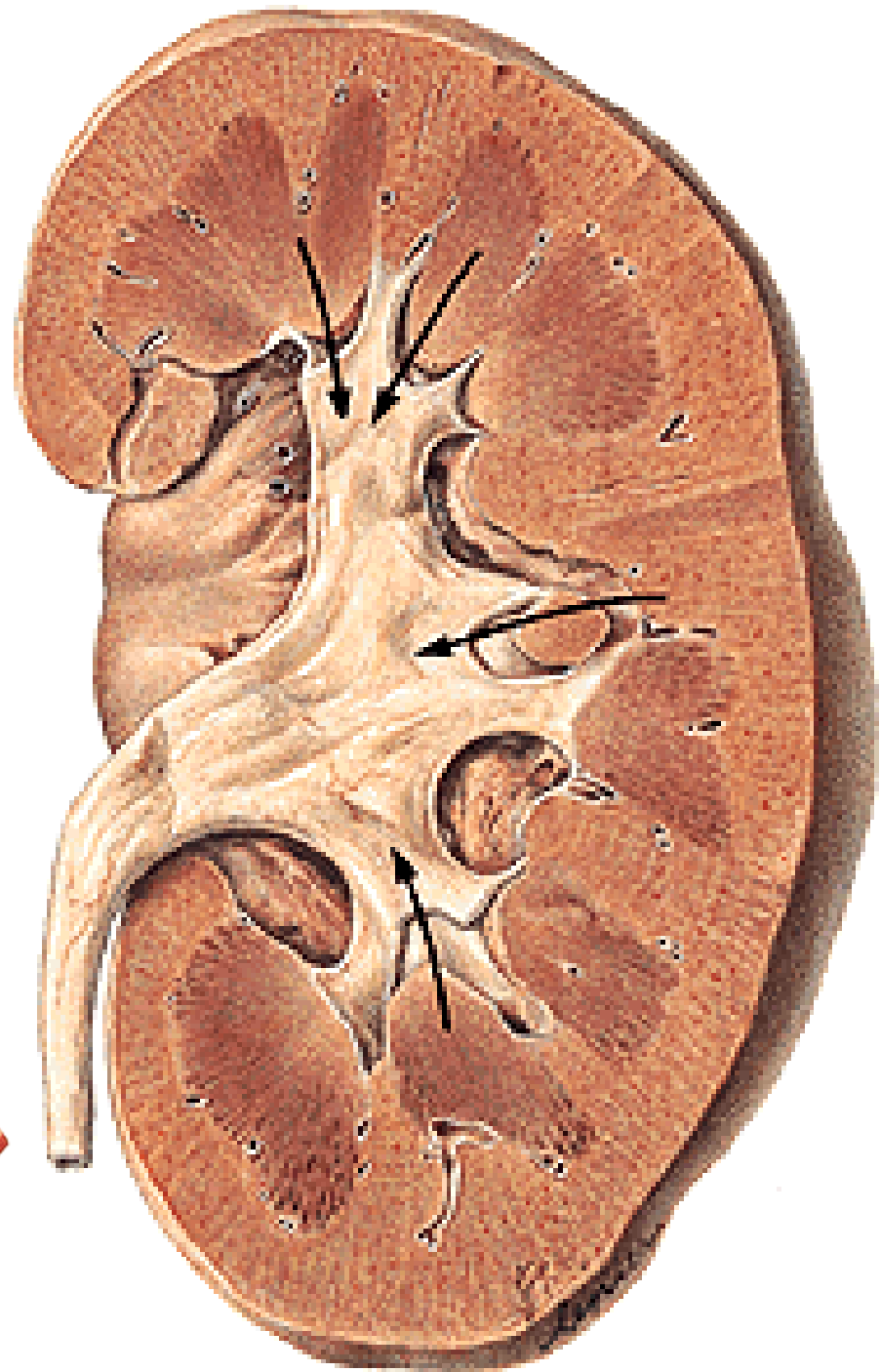
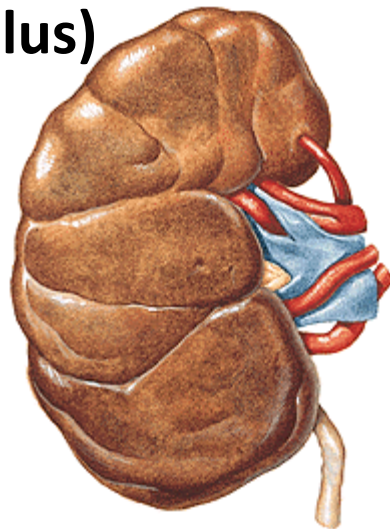
- margo lateralis et medialis - hilum renale

- sinus renalis

- extremitas superior et inferior



Capsula fibrosa
Sinus renalis
Cortex renalis
Medulla renalis
– 6-20 pyramides renales
Columnae renales
Pars radiata corticis
Papilla renalis
Ductus papillares
Foramina papillaria
Area cribrosa
Lobus renalis (Renculus)
Renculi-marking
(renculization)



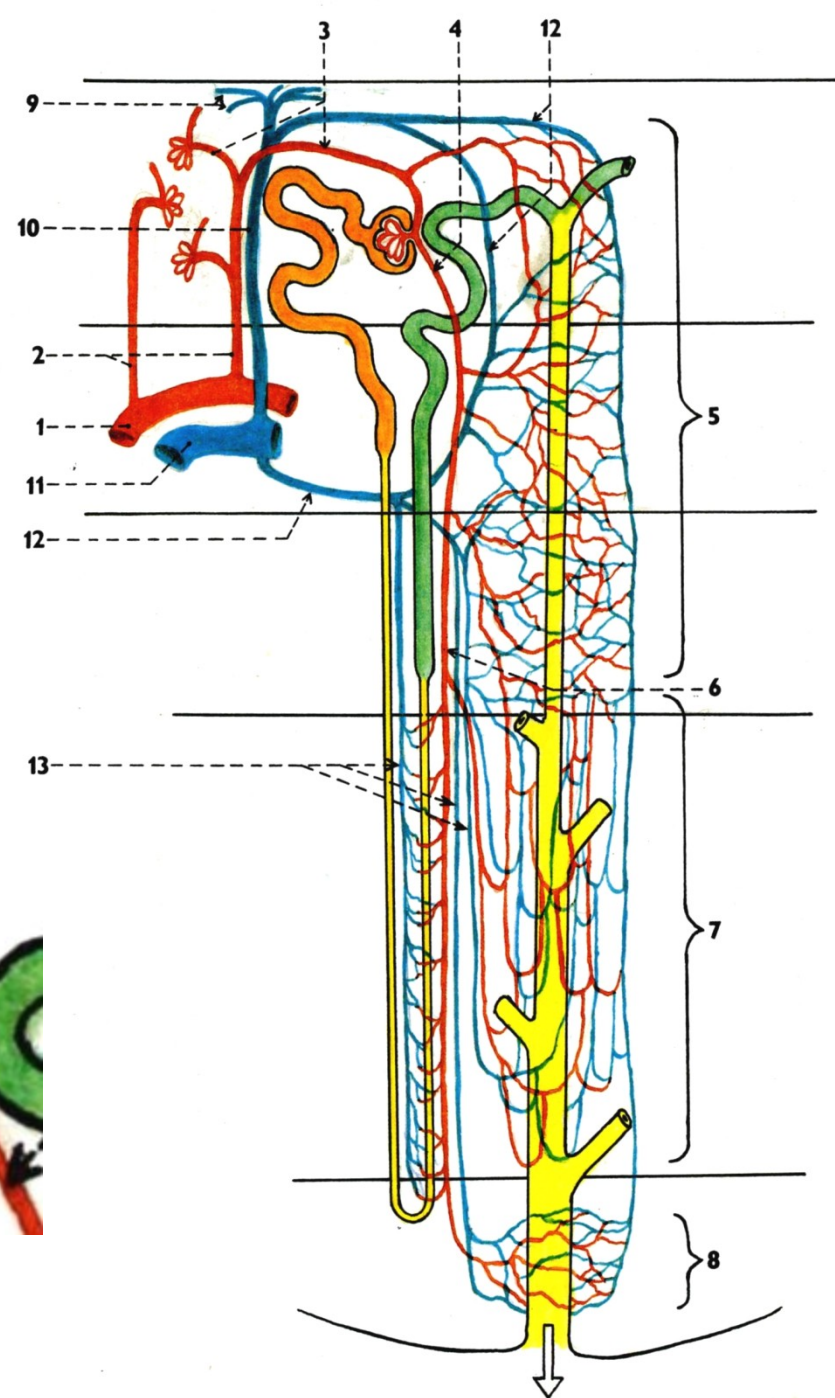
NEPHRON

- Corpusculum renale (Malpighi)
 - Glomerulum
 - Capsula glomeruli (Bowman)
- Tubulus proximalis
- Henle's loop
- Tubulus distalis

Tubulus colligens
Ductus papillaris
Foramen papillare

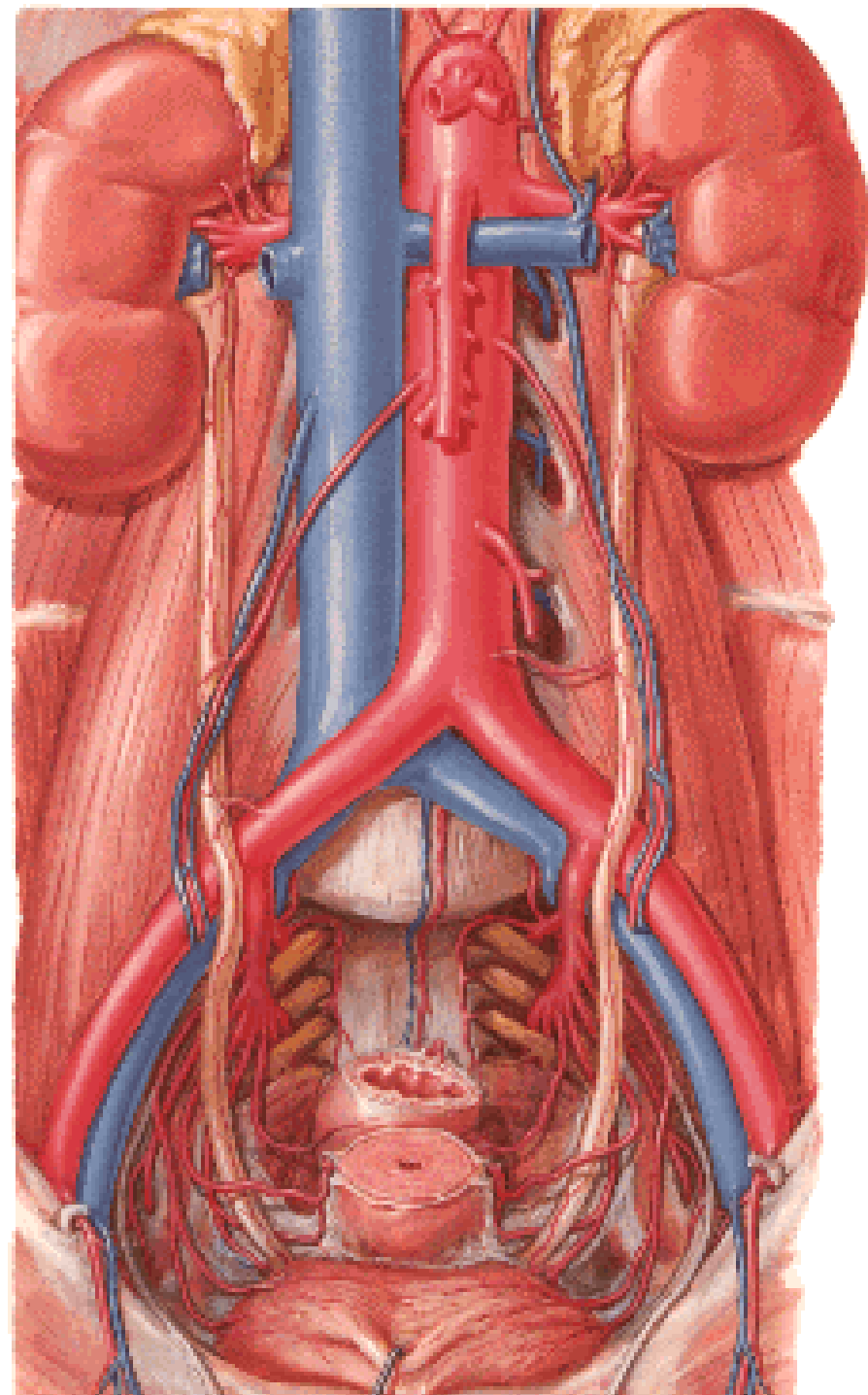


200 μm



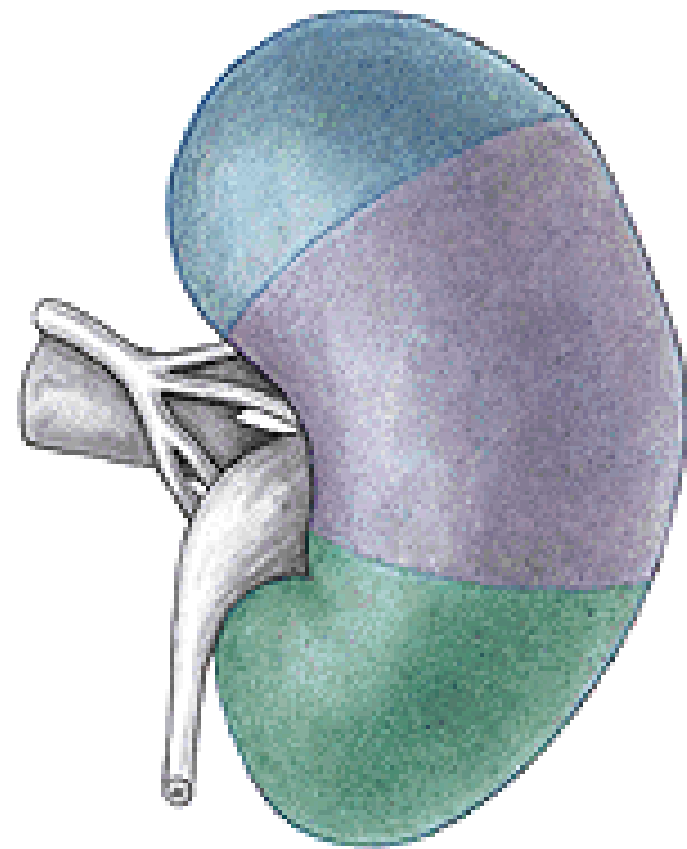
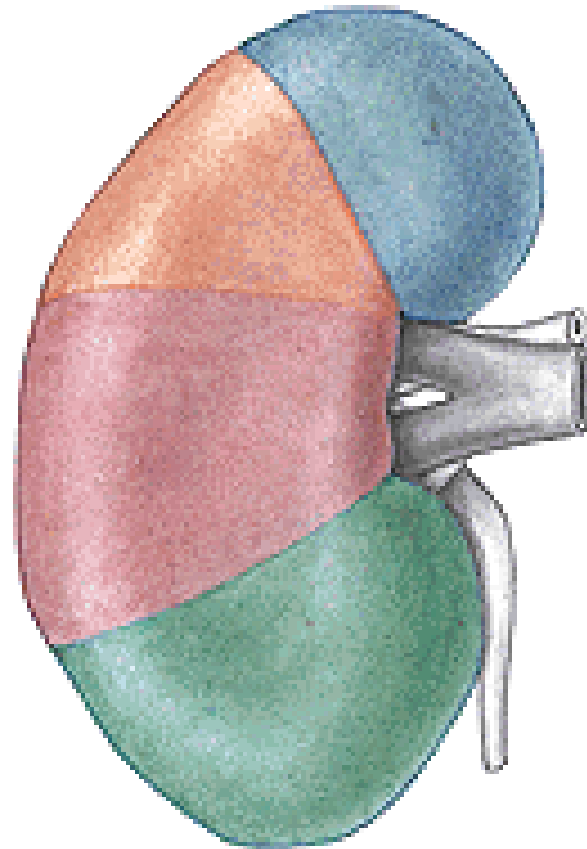
A. renalis

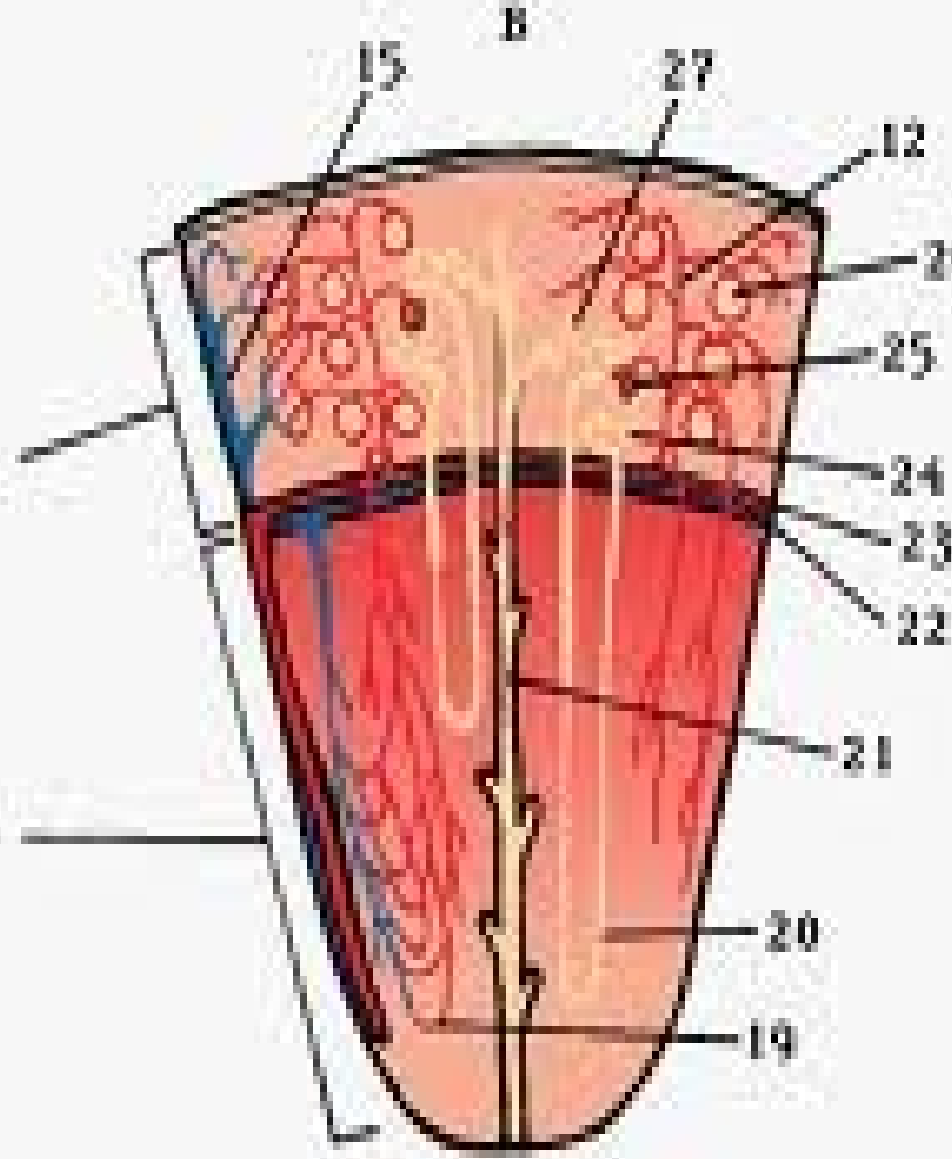
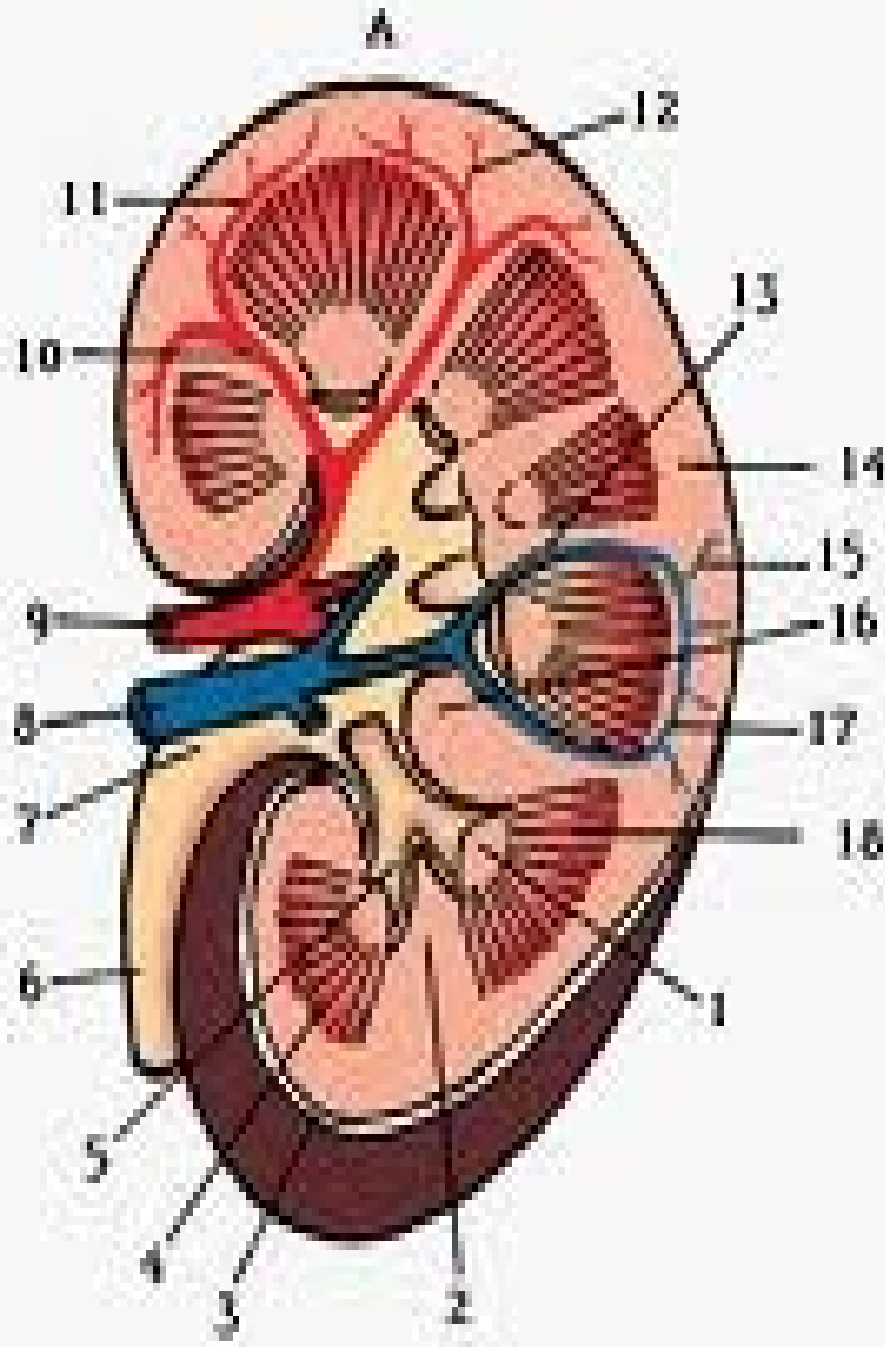
- r. anterior – 4 rr. praepelvici
- r. posterior – r. retropelvicus
- aa. lobares – aa. interlobares



Segmenta renalia – s. superius

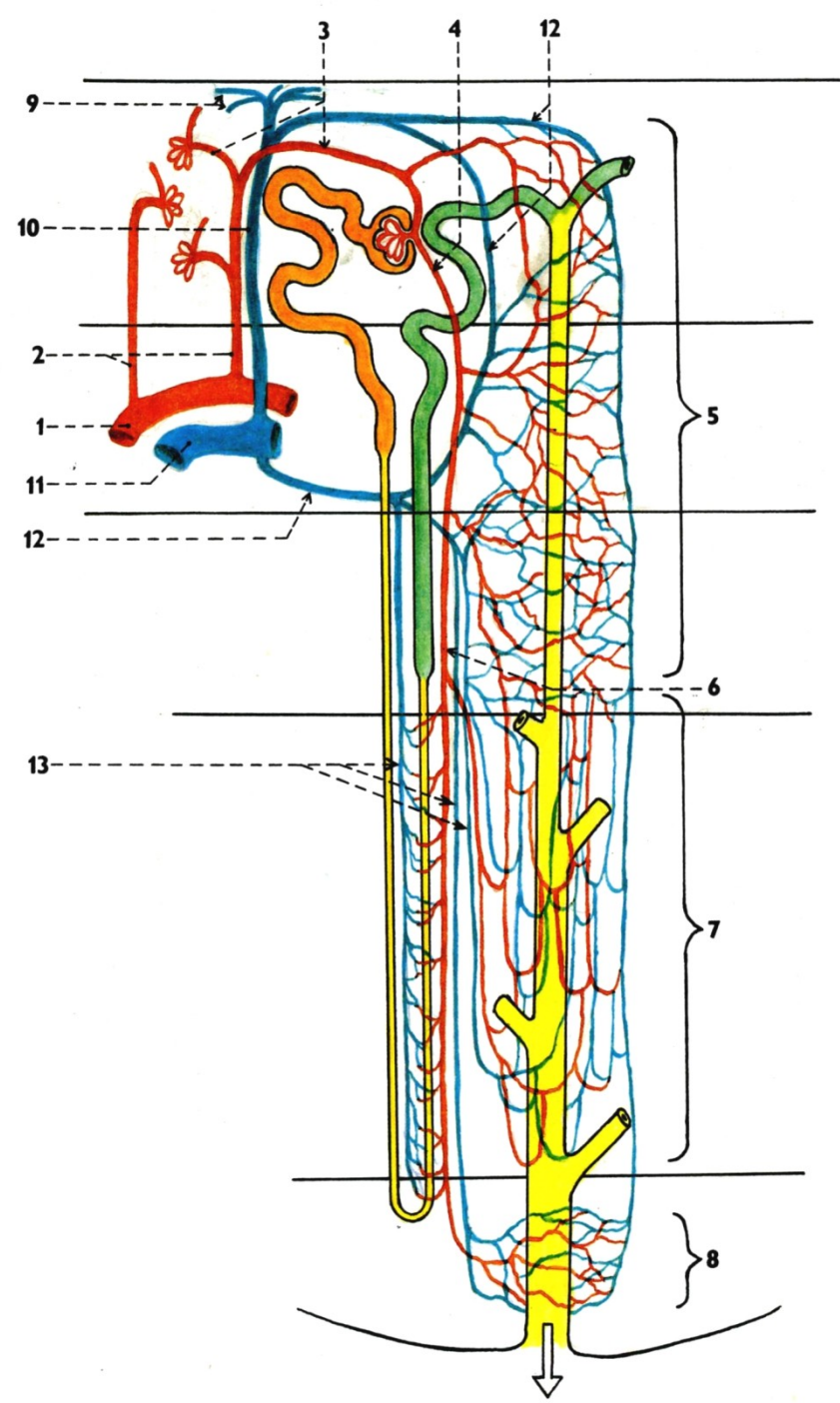
- s. anterius superius
- s. anterius inferius
- s. inferius
- s. posterius



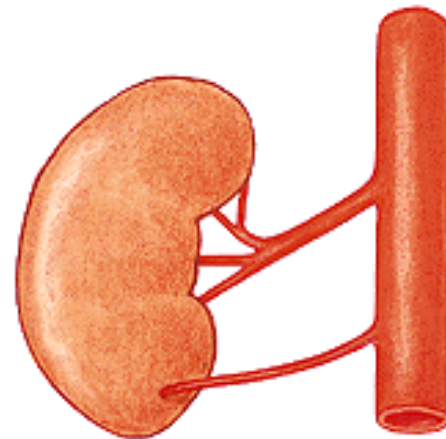
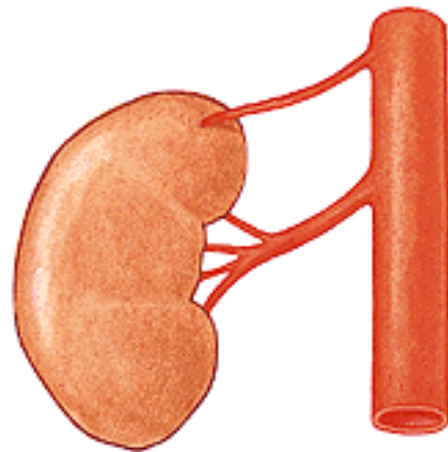
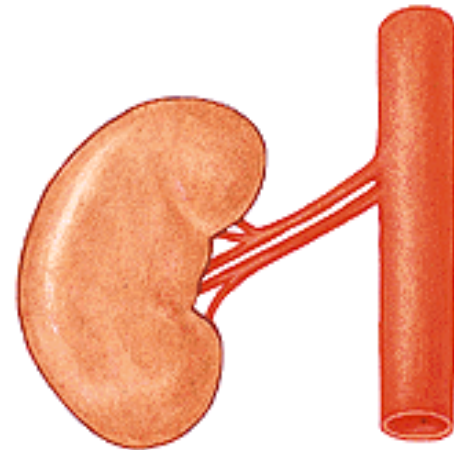
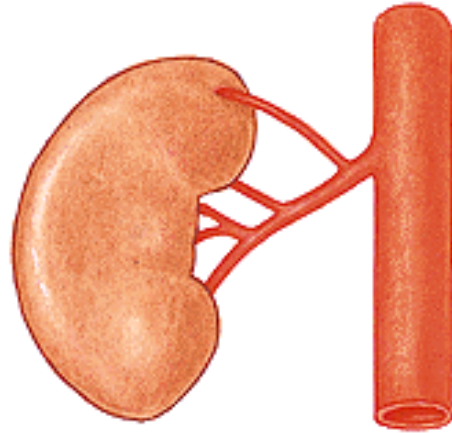


Aa. interlobares:

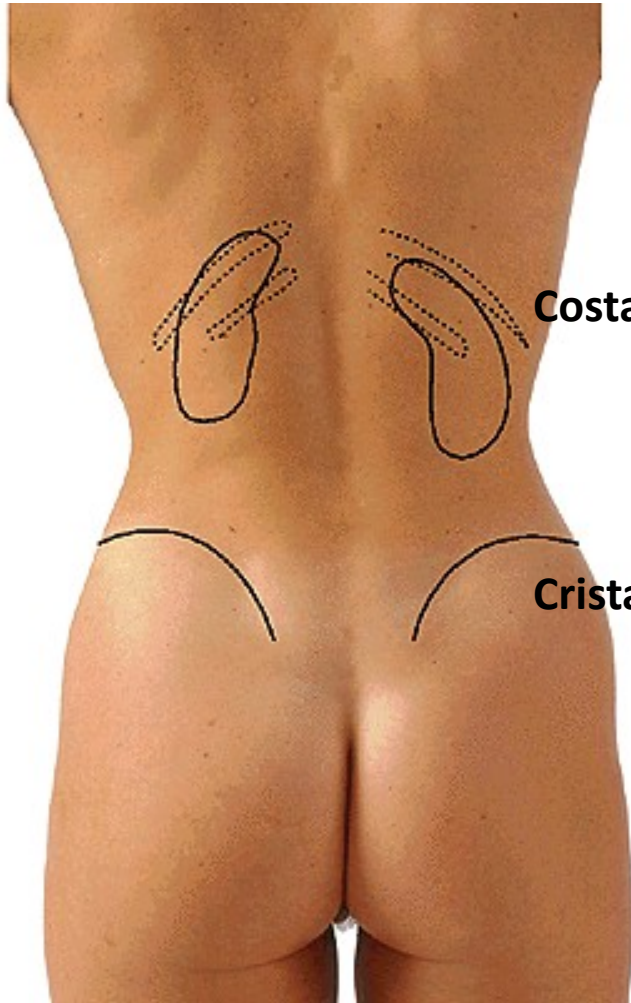
- 1. A. arcuata**
- 2. A. interlobularis**
- 3. Vas afferens**
- 4. Vas efferens**
- 5. Peritubular capillary plexus**
- 6. Arteriola recta**
- 7. Capillary plexus in the medulla**
- 8. Capillary plexus around papillary duct**
- 9. Venulae stellatae**
- 10. V. interlobularis**
- 11. V. arcuata**
- 12. Vein from the peritubular plexus**
- 13. Venulae rectae**



Aa. renales accessoriae

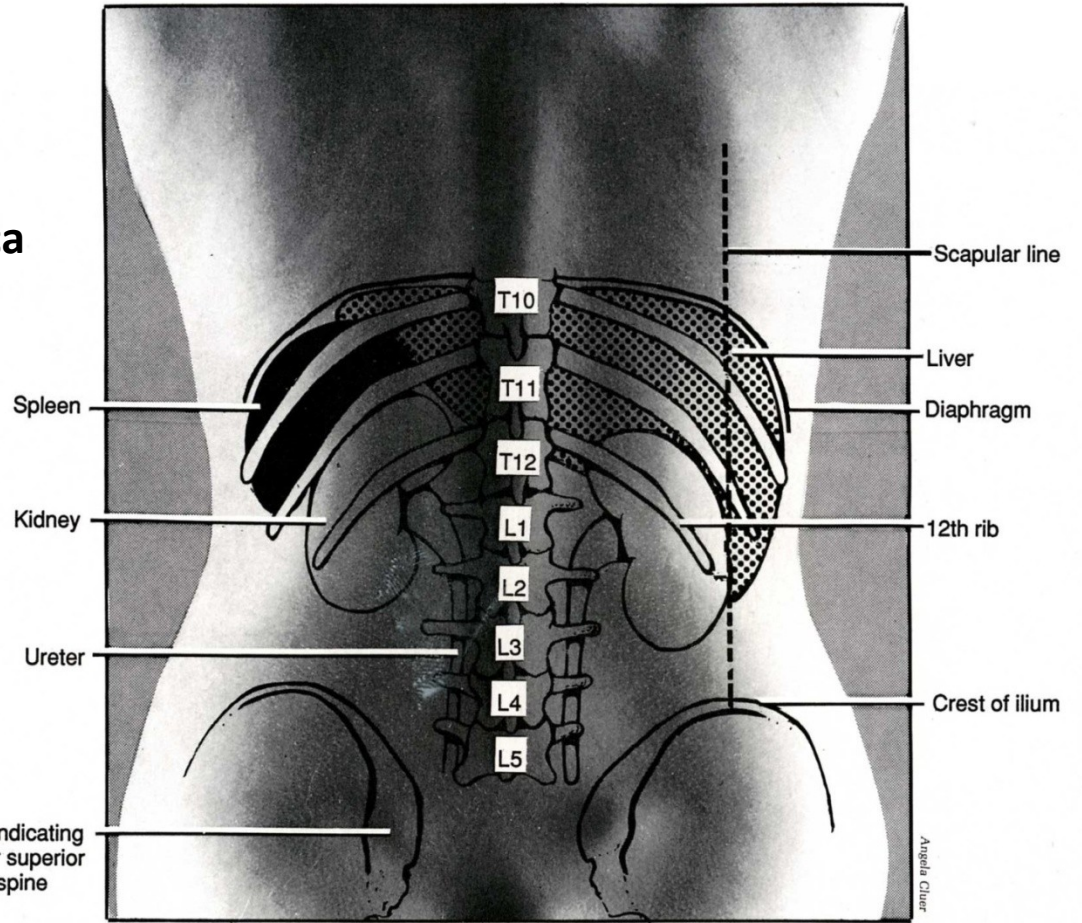


Skeletotomy



Costae - XI - XII

Crista iliaca



Scapular line

Liver

Diaphragm

12th rib

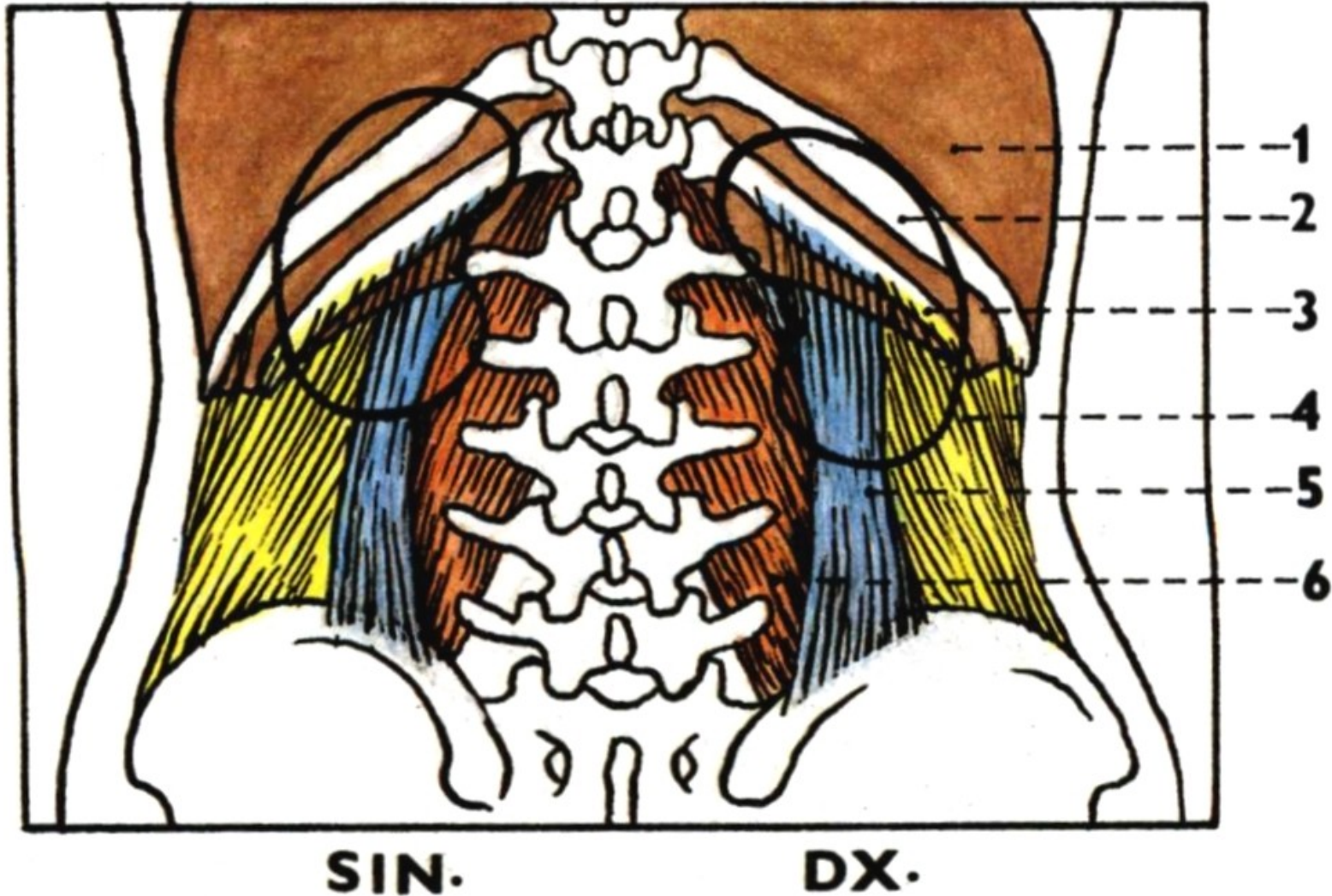
Crest of ilium

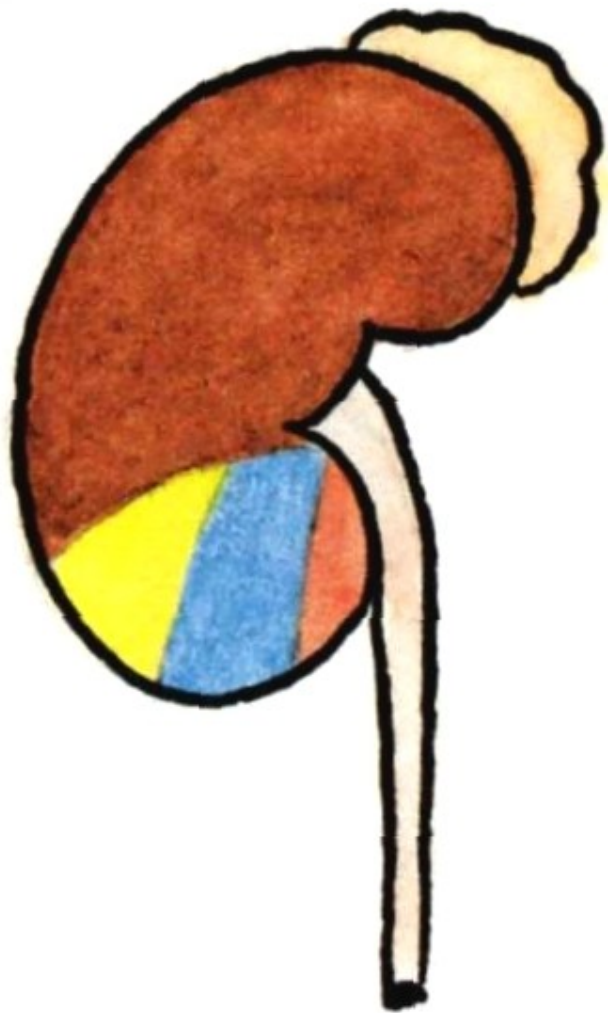
Dimple indicating posterior superior iliac spine

Angela Glaser

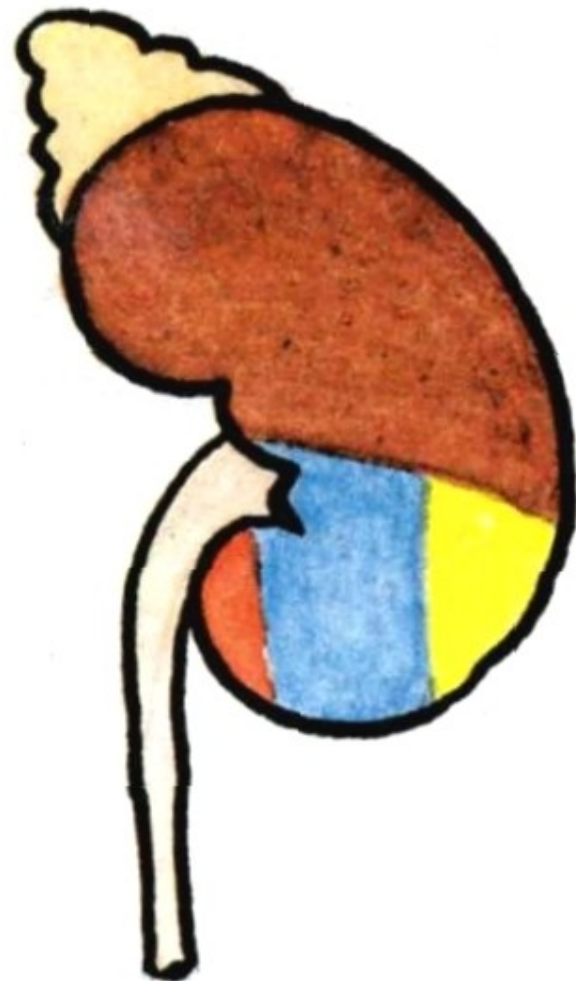
1. Diaphragma
2. 11th rib
3. 12th rib

4. M. transversus abdominis
5. M. quadratus lumborum
6. M. psoas major



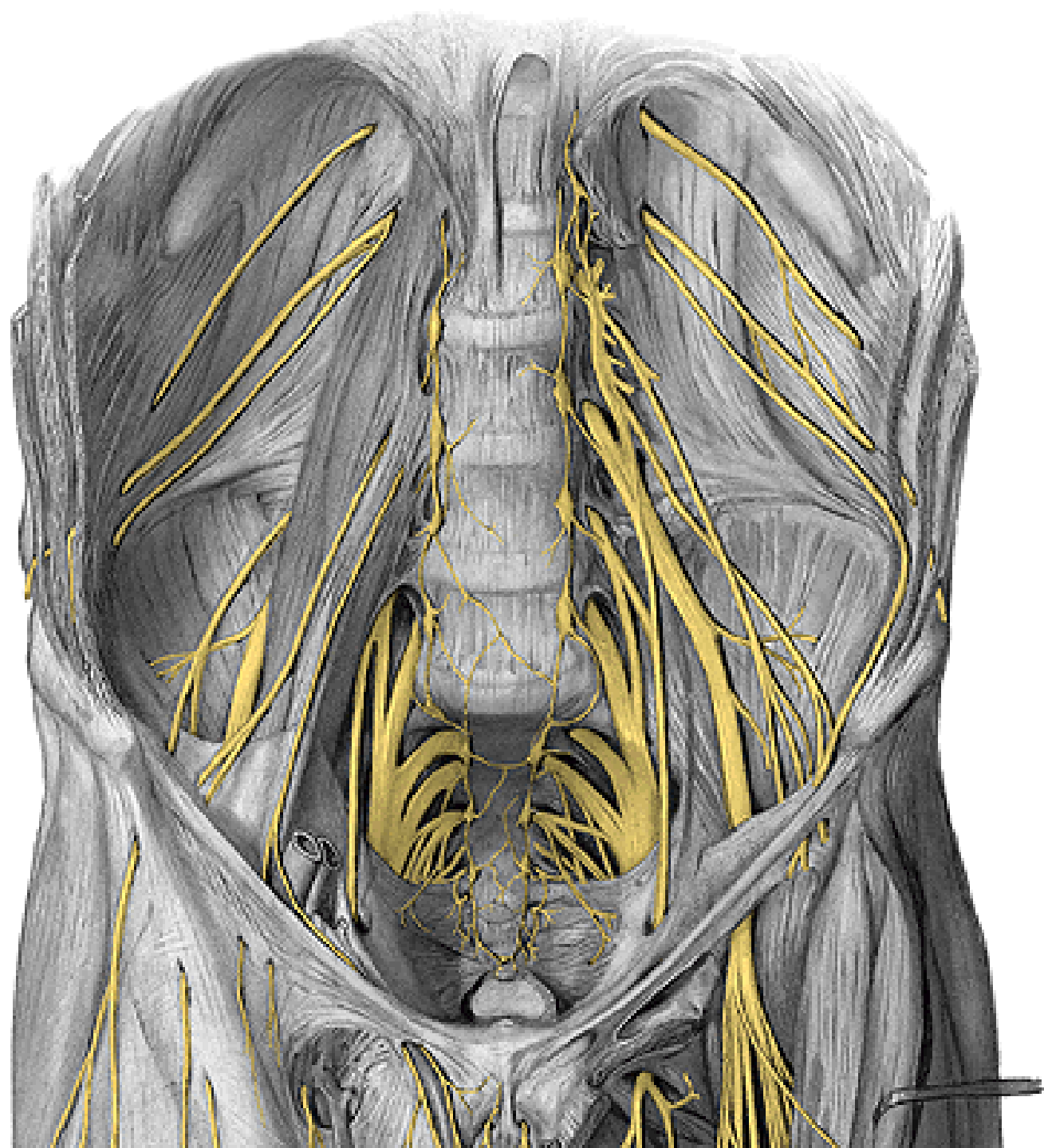


SIN.

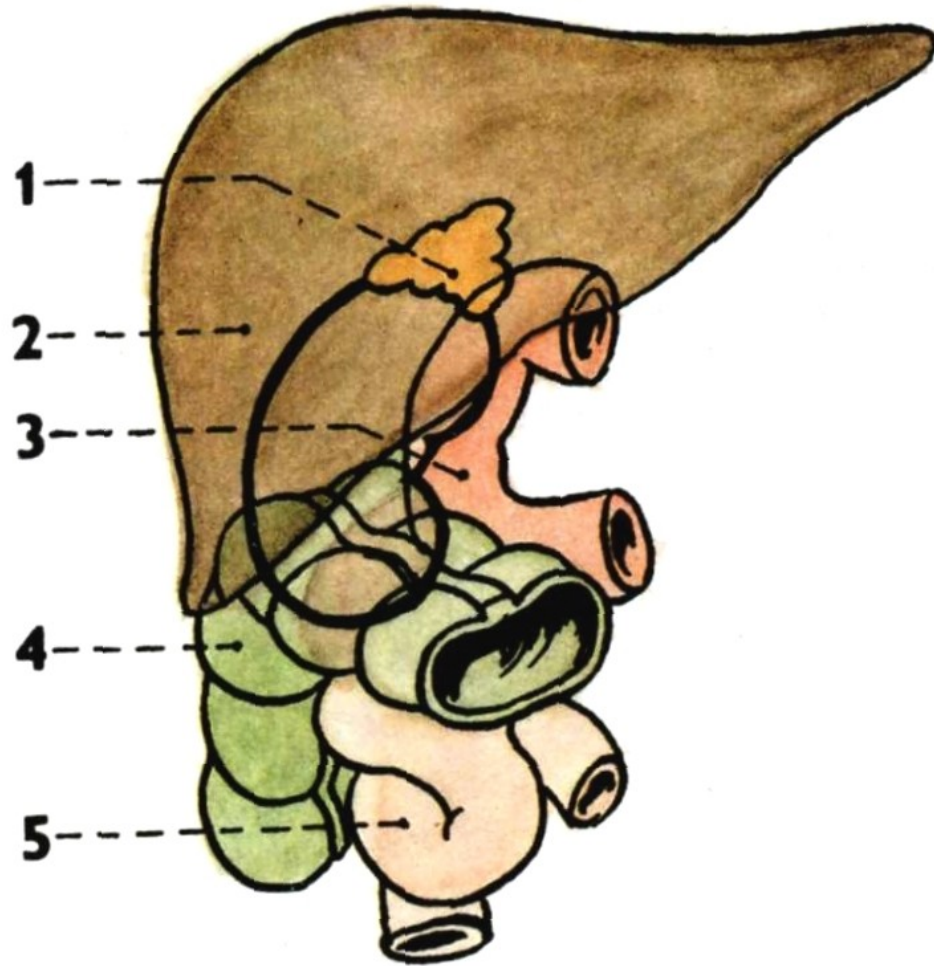


DX.

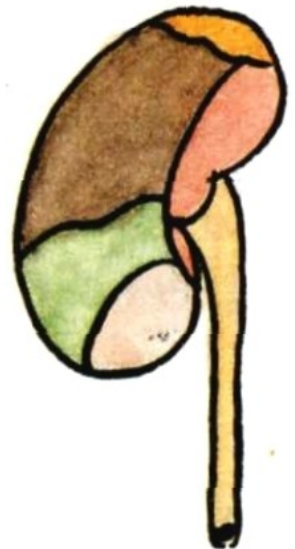
N. subcostalis
N. iliohypogastricus
N. ilioinguinalis



1. Gl. suprarenalis dx.
2. Liver
3. Duodenum
4. Flexura coli dx.
5. Jejunum

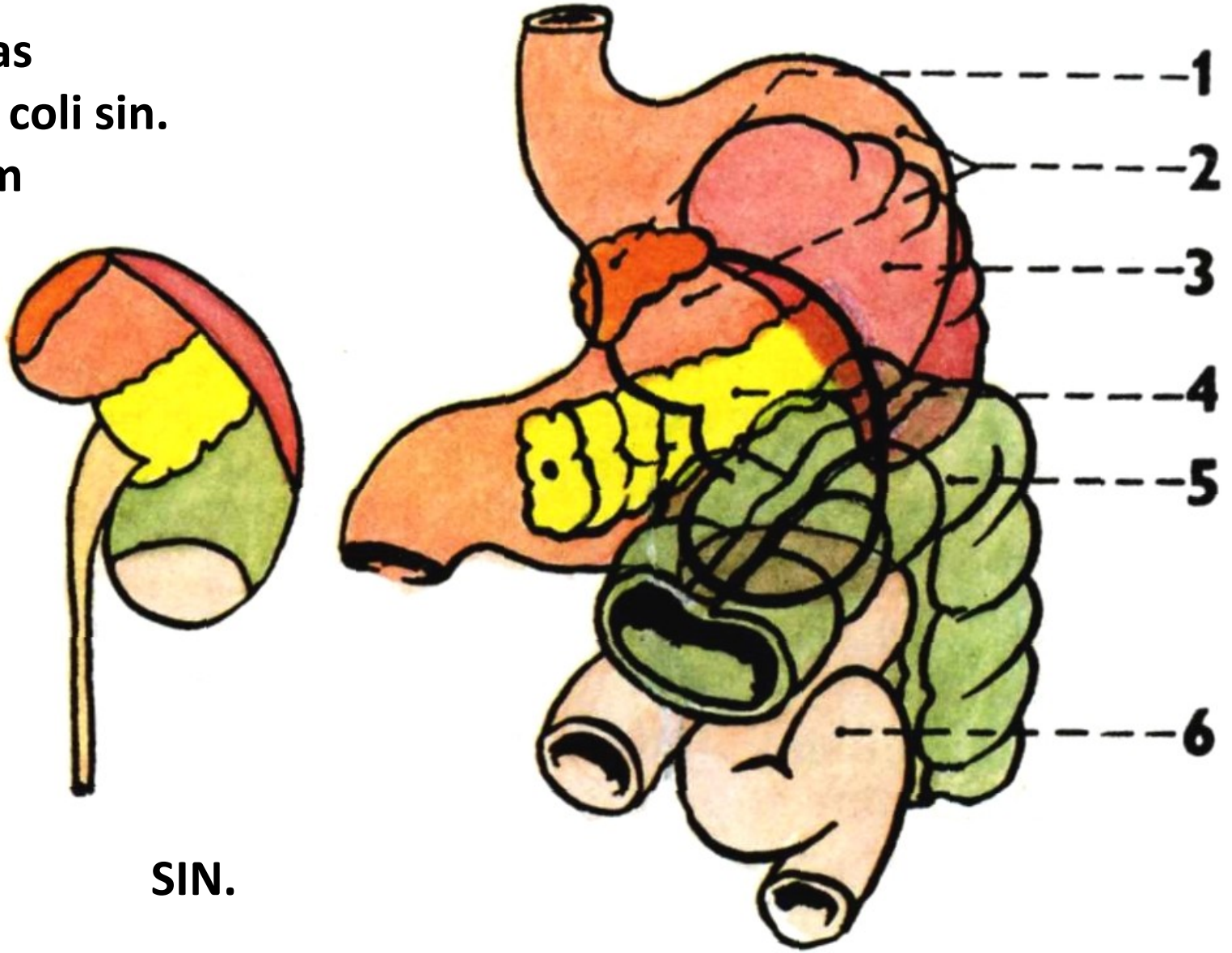


DX.



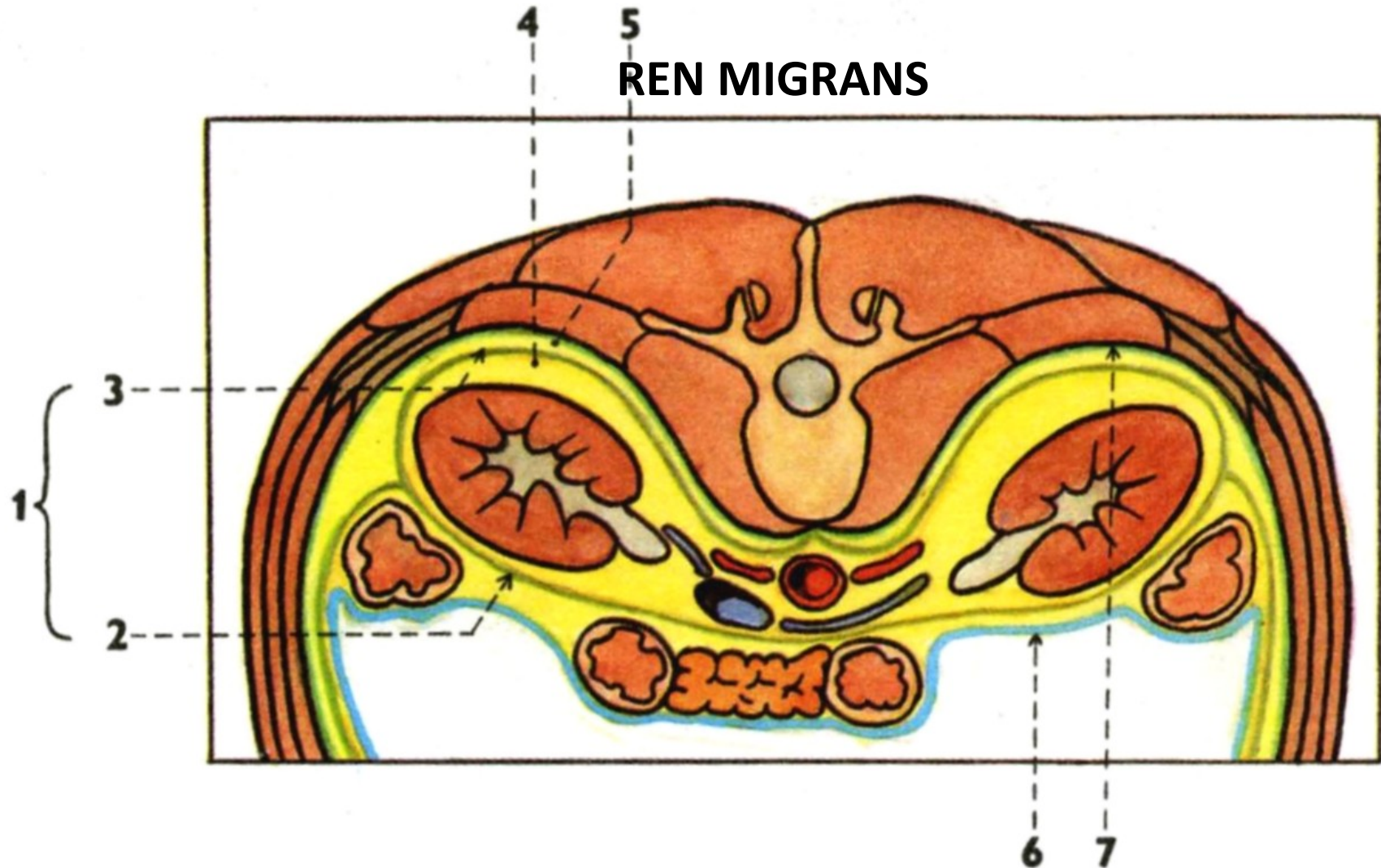
DX.

1. Gl. suprarenalis sin.
2. Stomach
3. Spleen
4. Pancreas
5. Flexura coli sin.
6. Jejunum

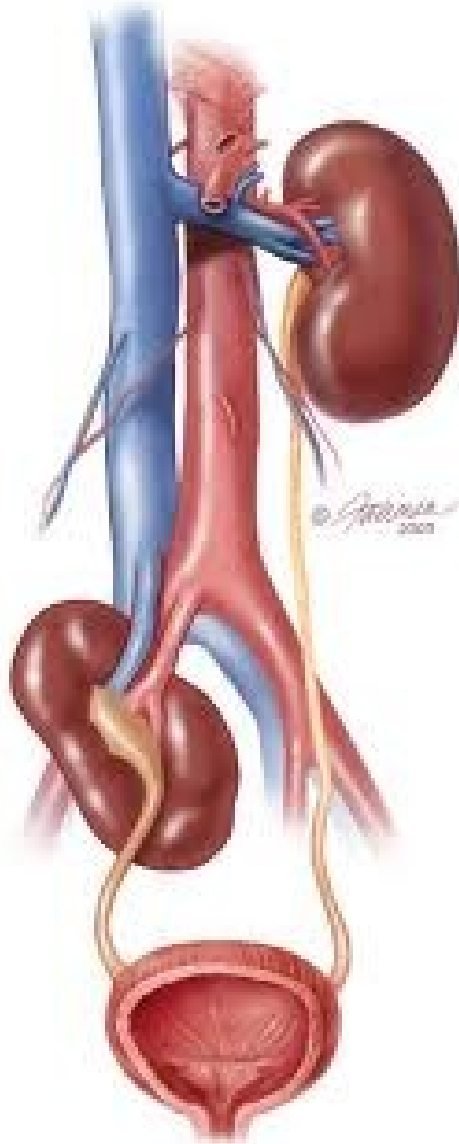


SIN.

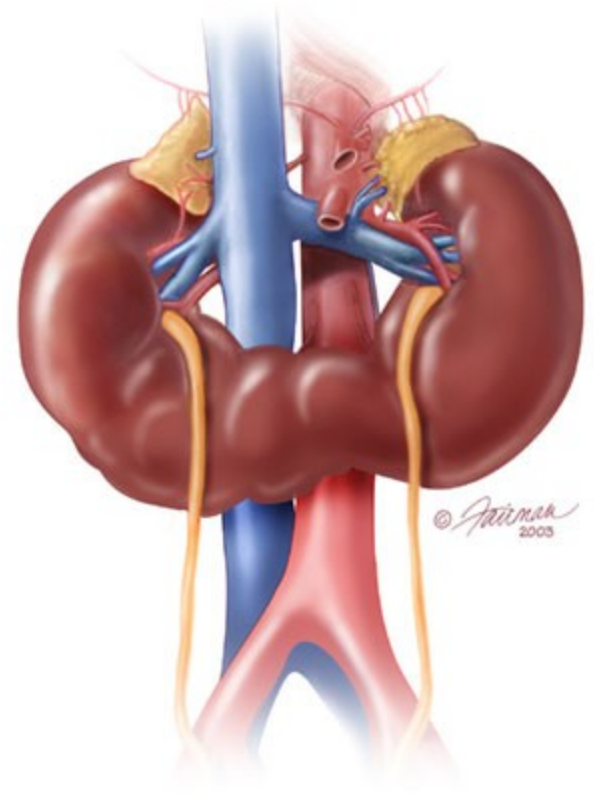
1. Fascia renalis
2. Lamina praerenalis
3. Lamina retrorenalis
4. Capsula adiposa
5. Corpus adiposum pararenale
6. Peritoneum
7. Fascia transversalis



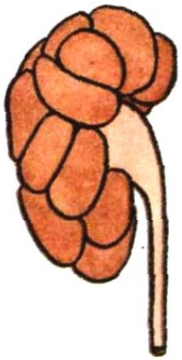
Ectopic kidney x ren migrans



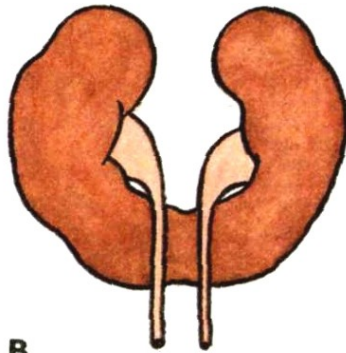
Horseshoe kidney



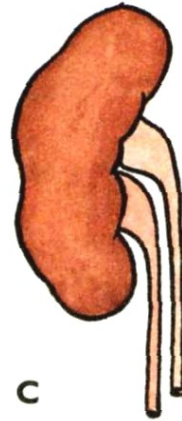
- **ren culi marking**
- **ren arcuatus**
- **ren duplex**
- **ren sigmoideus**
- **ren fungiformis**
- **agenesia renis**



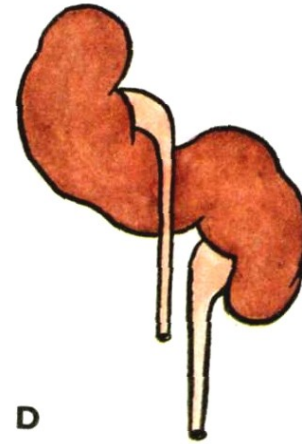
A



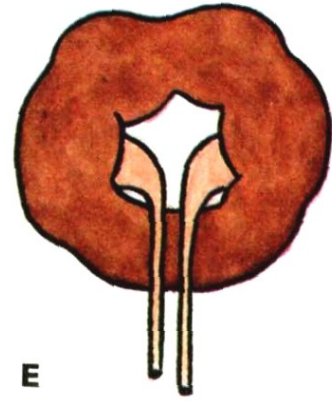
B



C



D

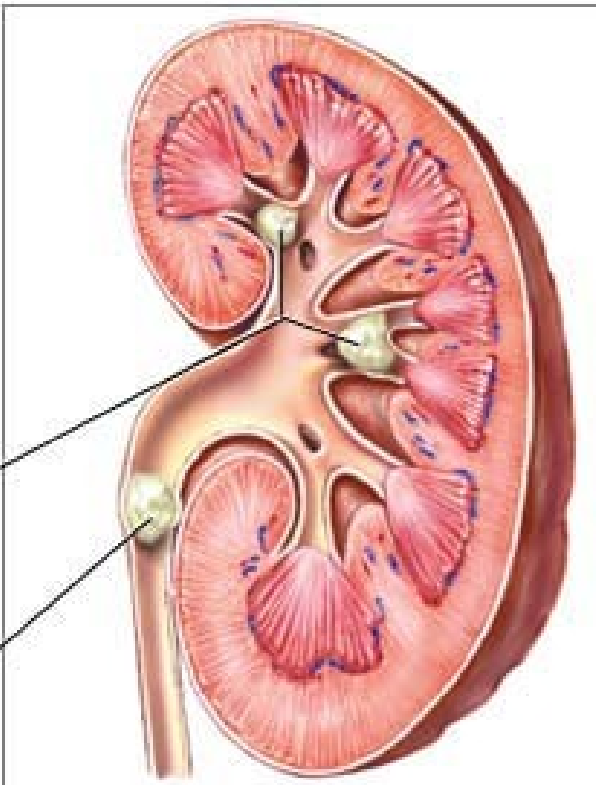
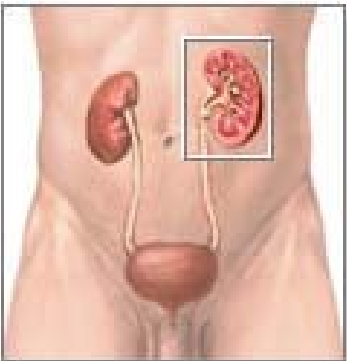


E

Nephrolithiasis

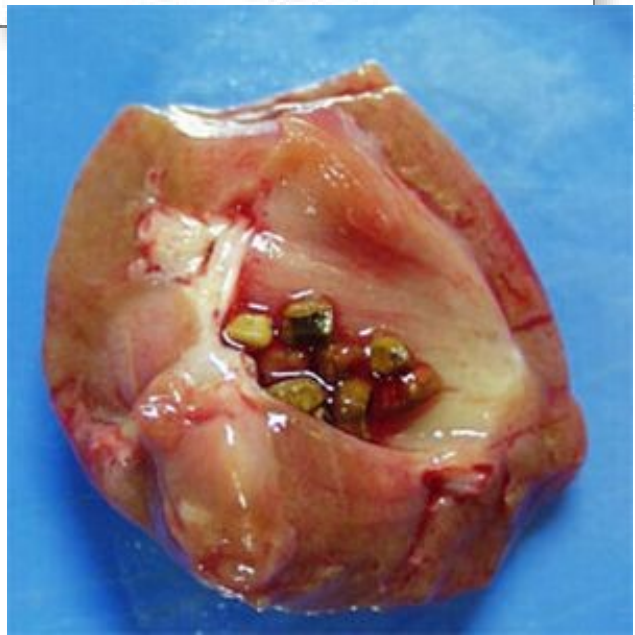
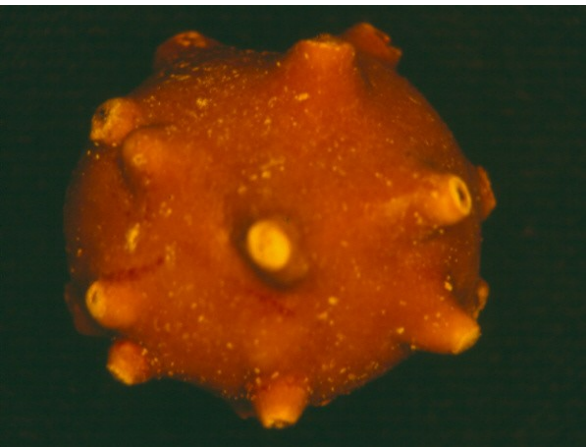
Calcium oxalate crystals – 80%

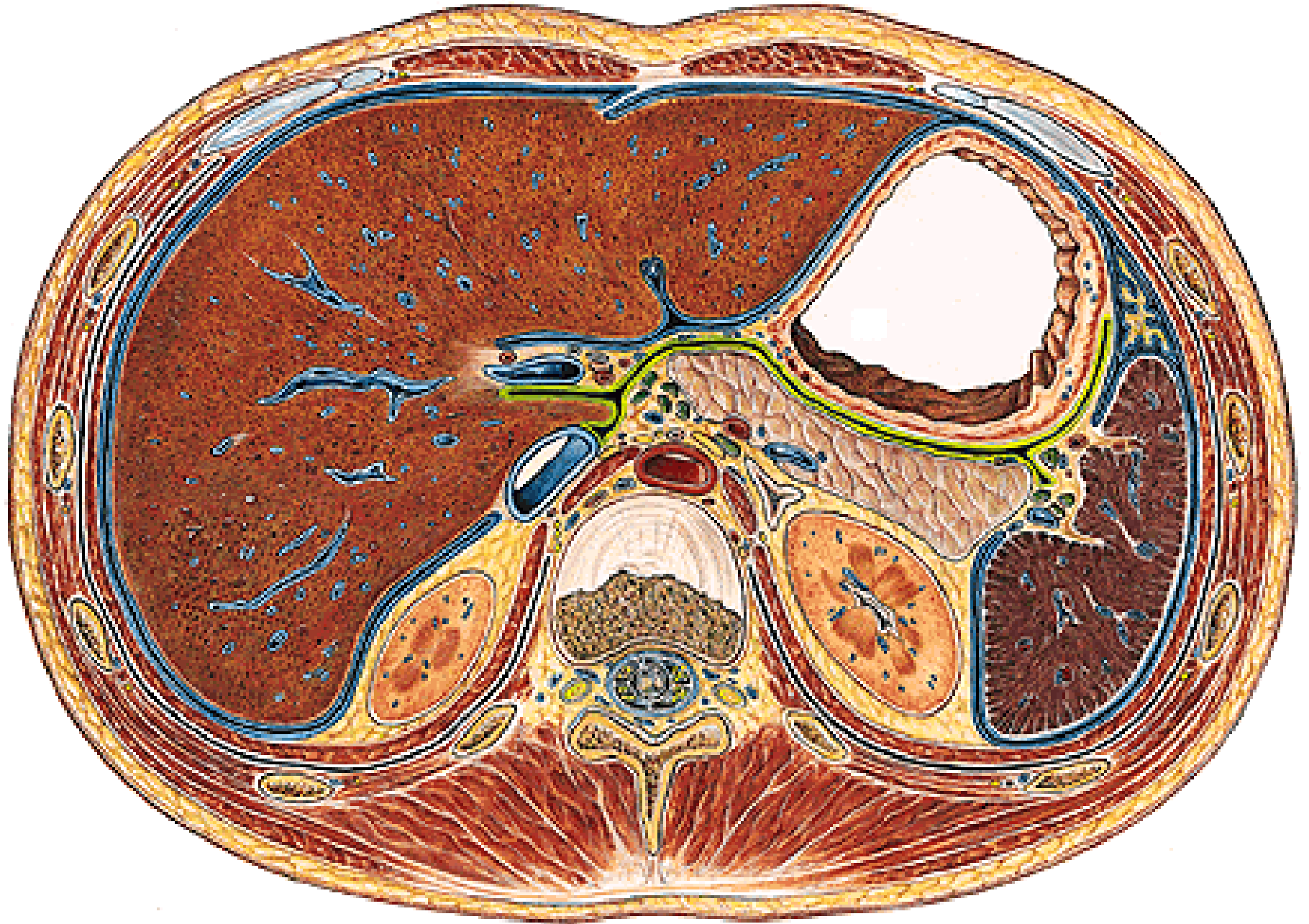
Uric acid – 5 - 10%



Kidney stones in the minor and major calyces of the kidney

Kidney stone in the ureter





Transverse section through the intervertebral disc between T12 and L1



Cross-sectional image through the L1 obtained with CT

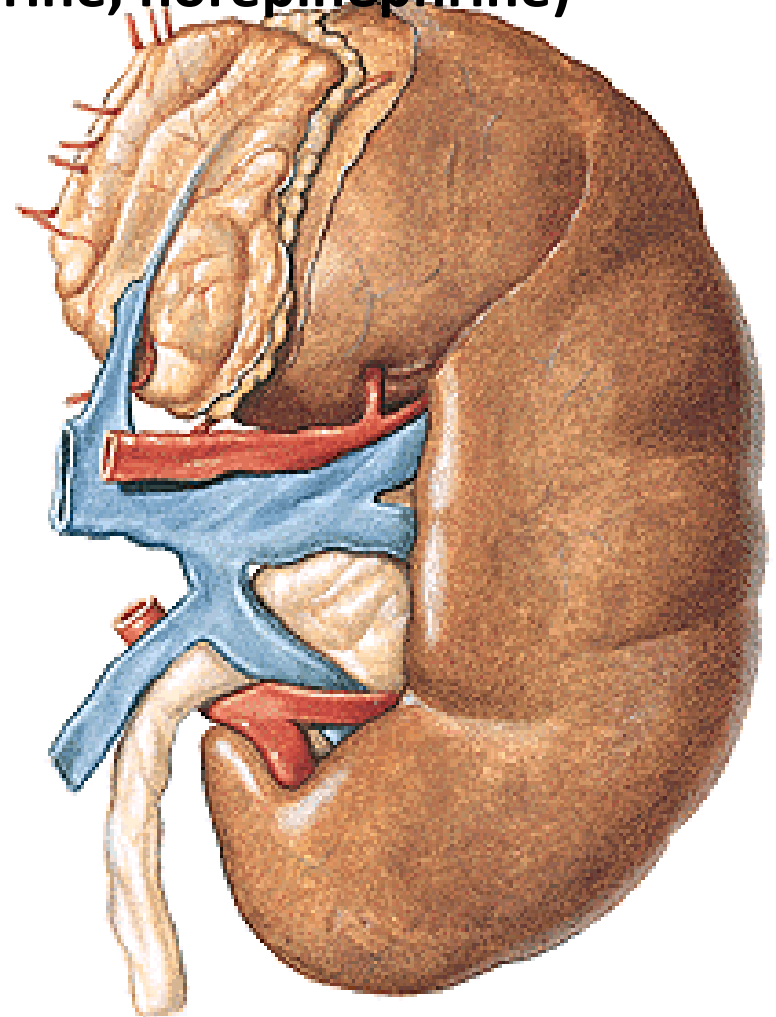
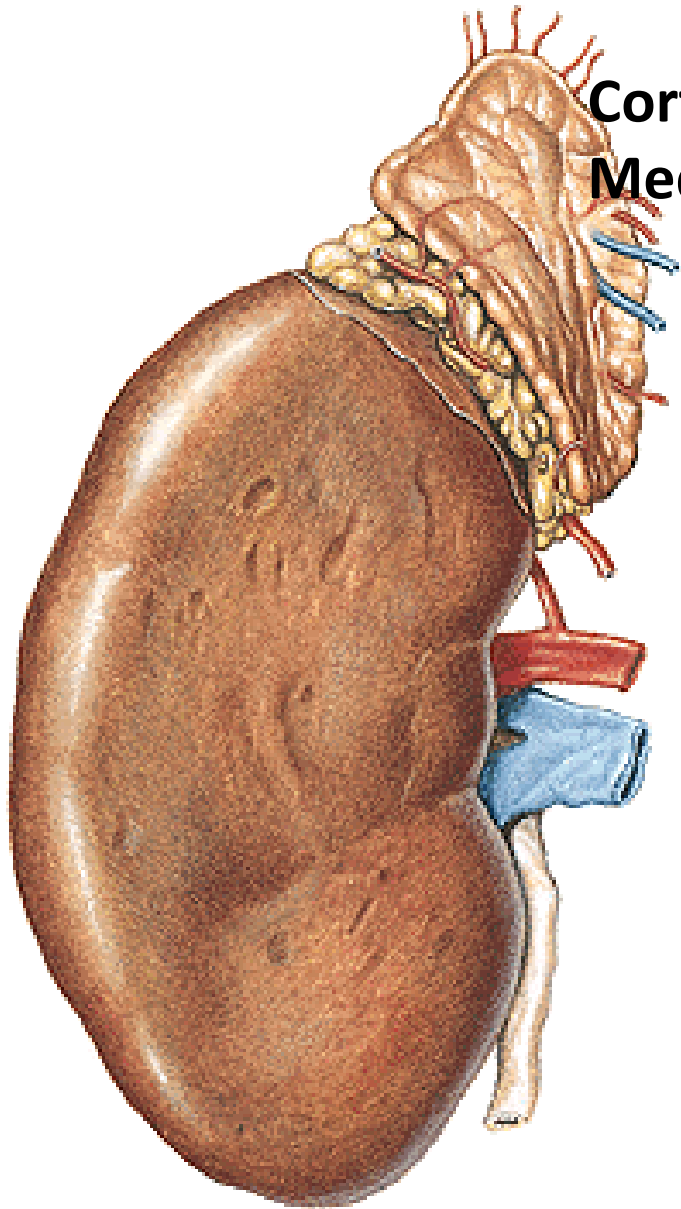
GLANDULA SUPRARENALIS – facies anterior – hilum

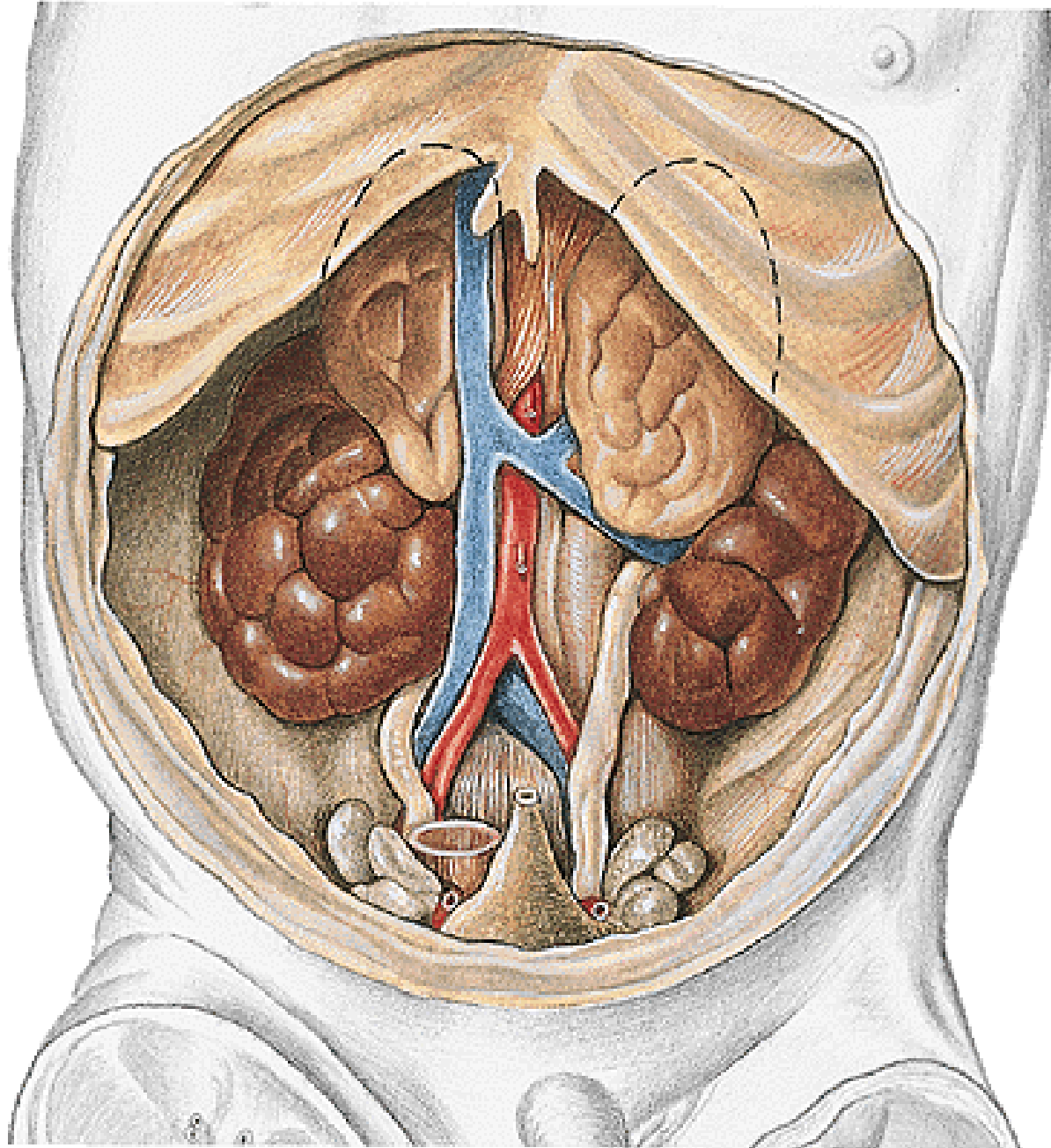
- facies posterior

- facies renalis

Cortex (aldosterone, cortisol)

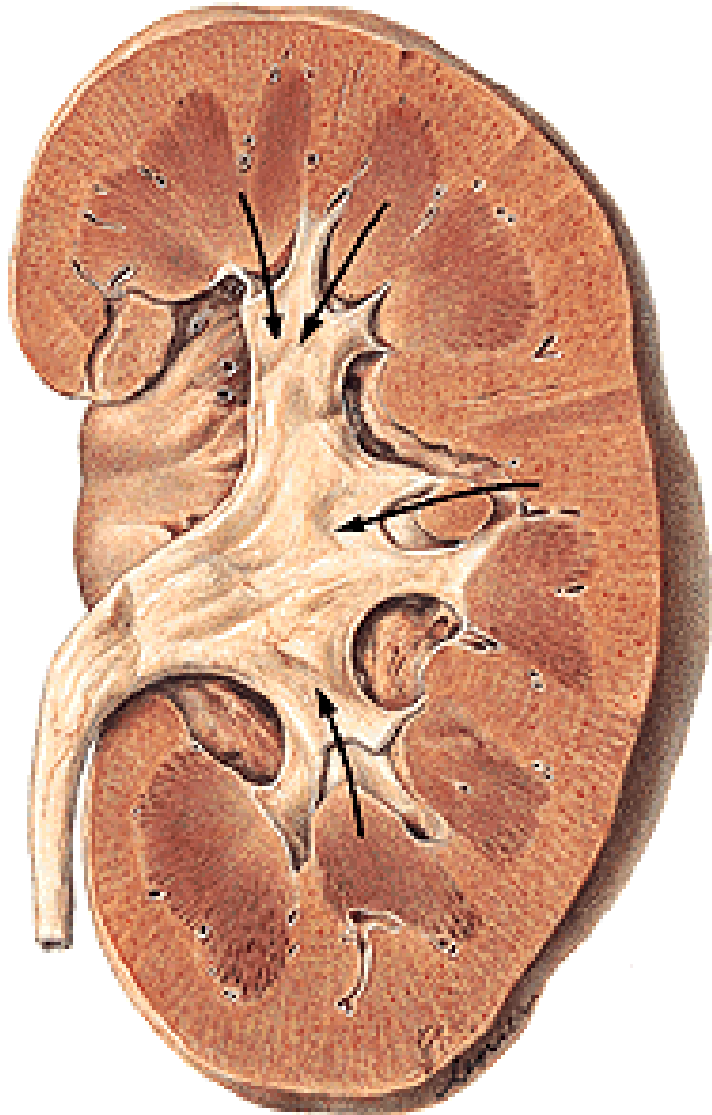
Medulla (epinephrine, norepinephrine)



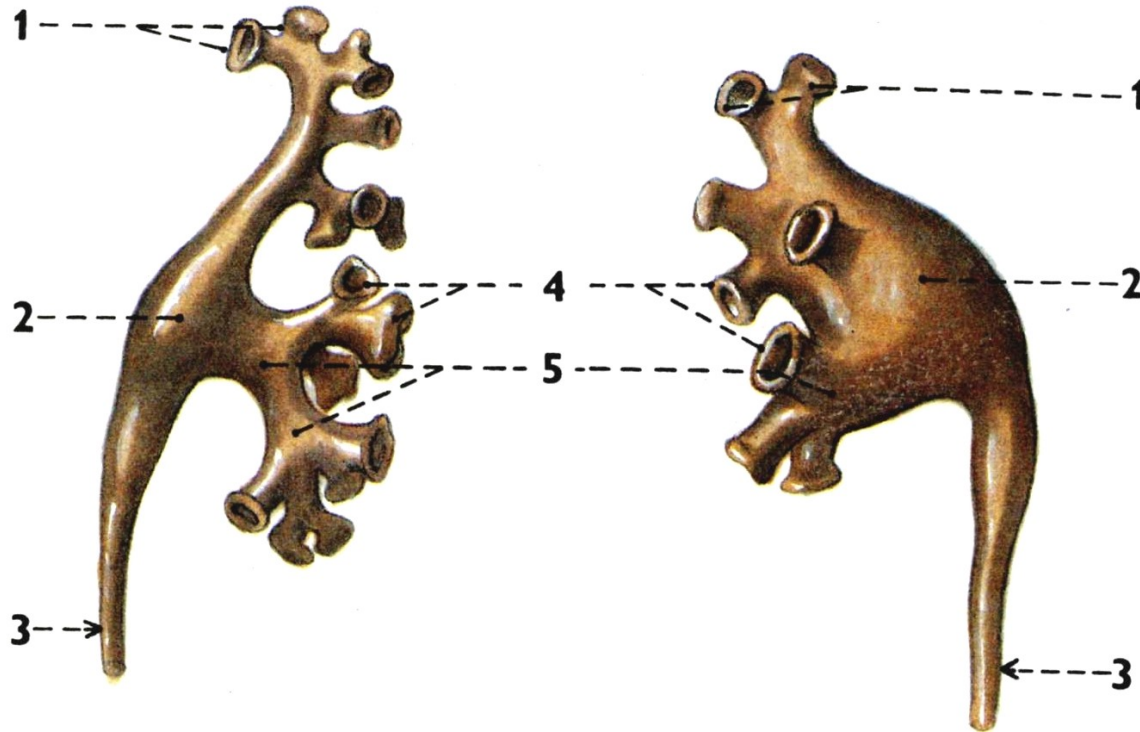


Five-month old fetus

**CALICES RENALES – minores (7-14) et majores (2-4)
PELVIS RENALIS (2-5 , 5-8)**



Various types of pelvis renalis

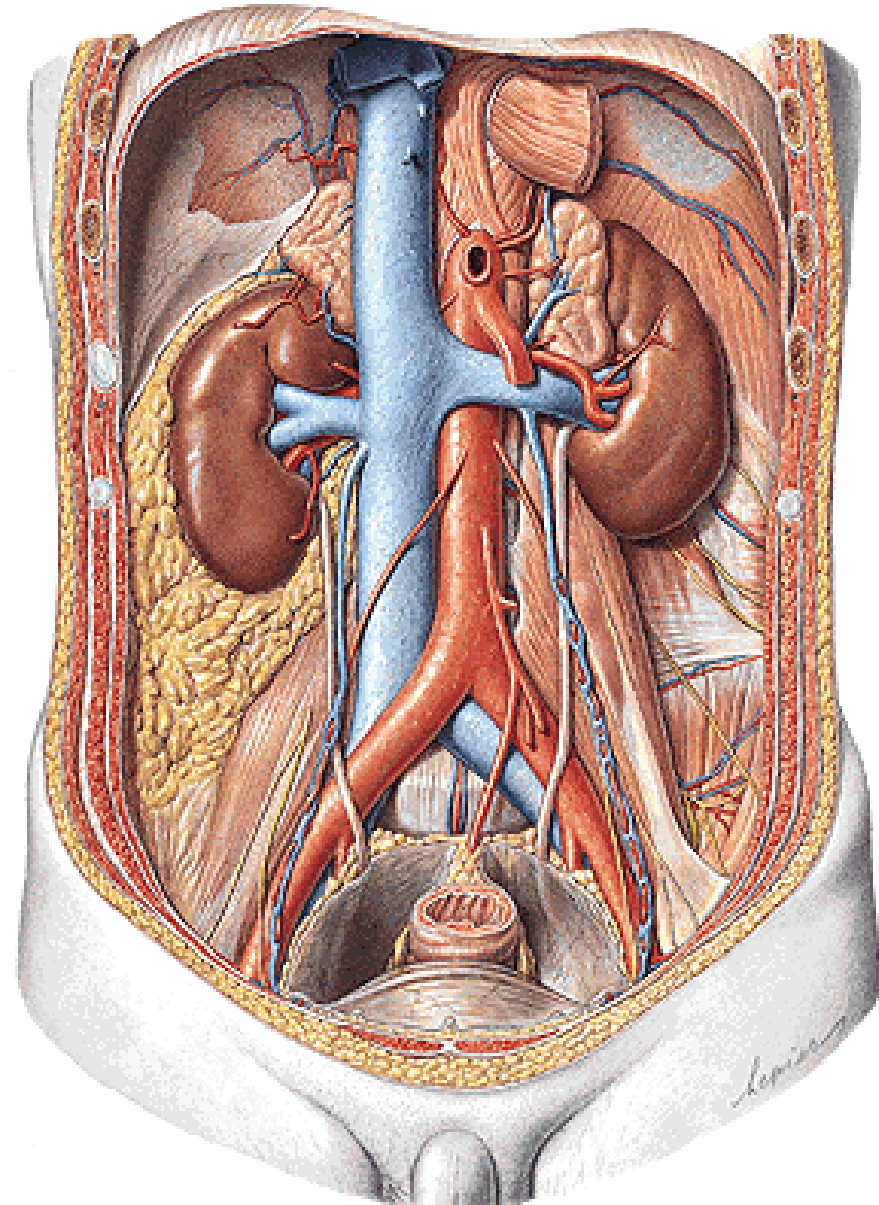
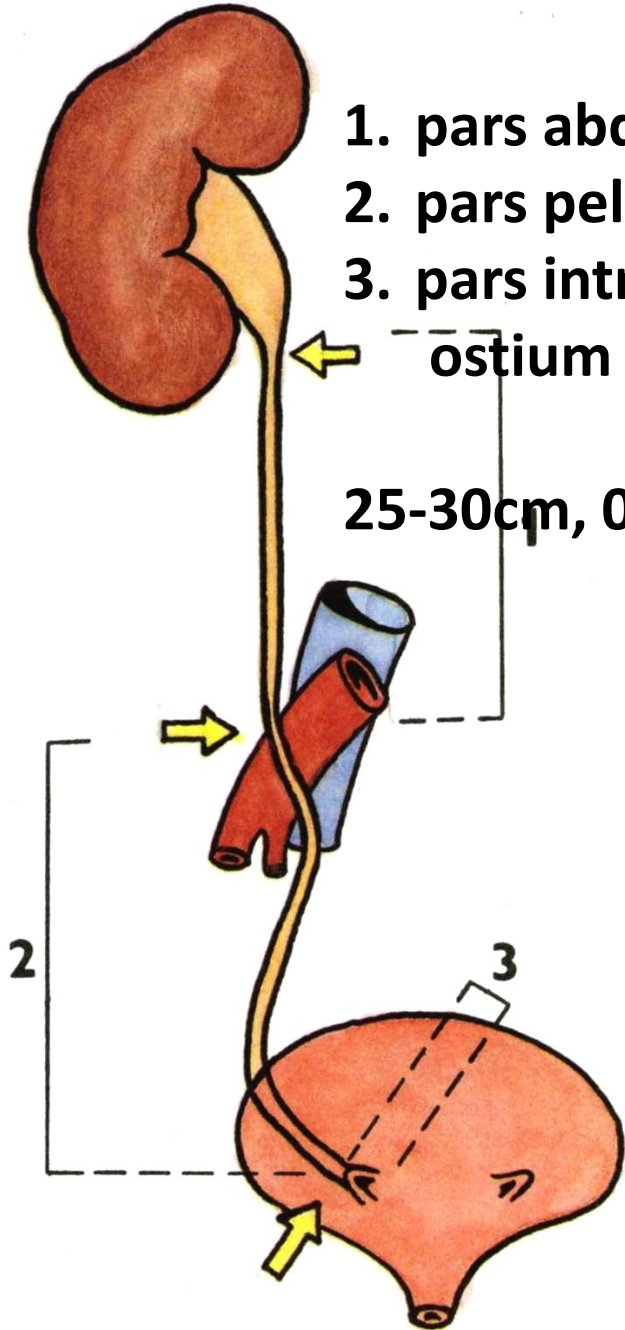


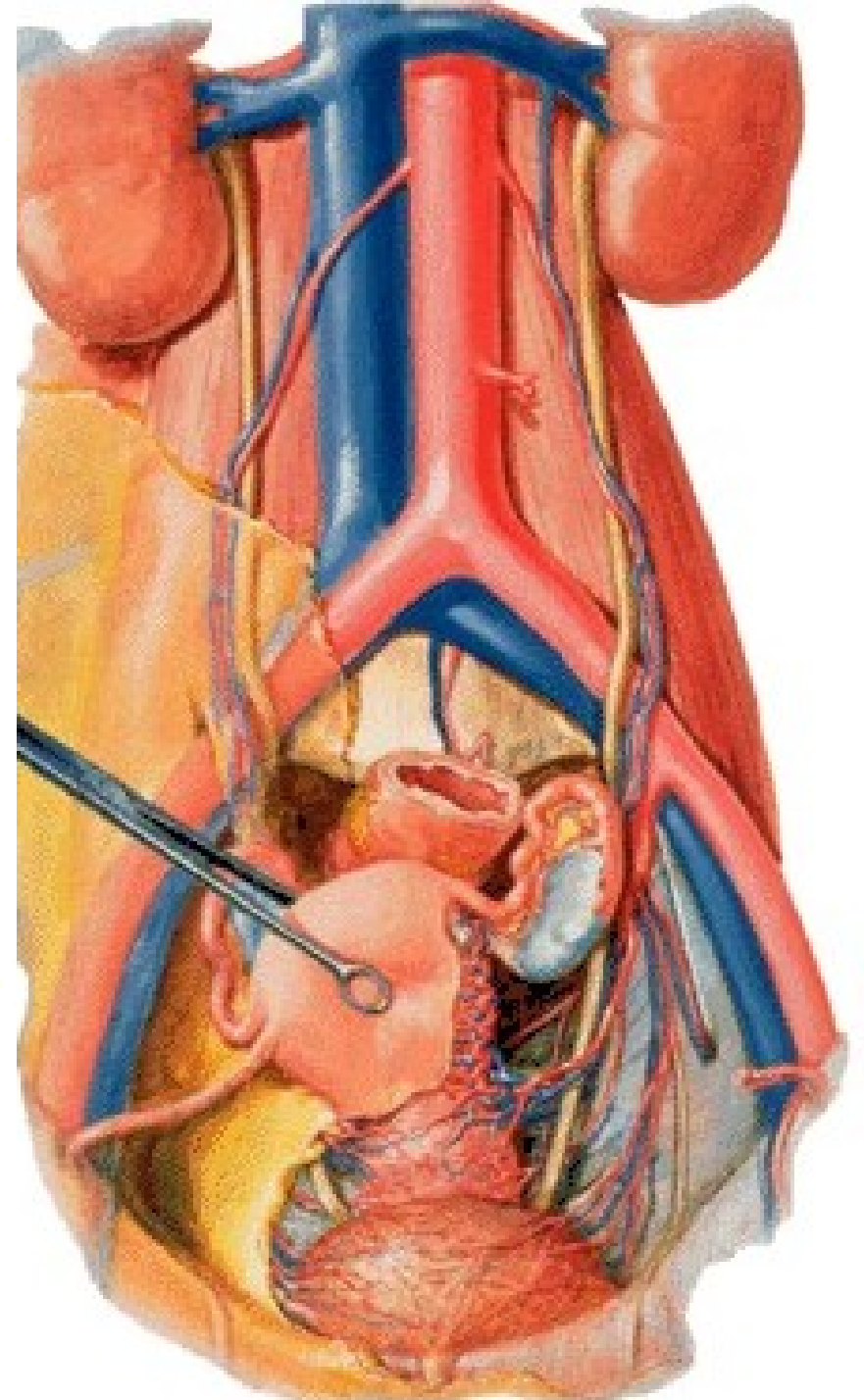
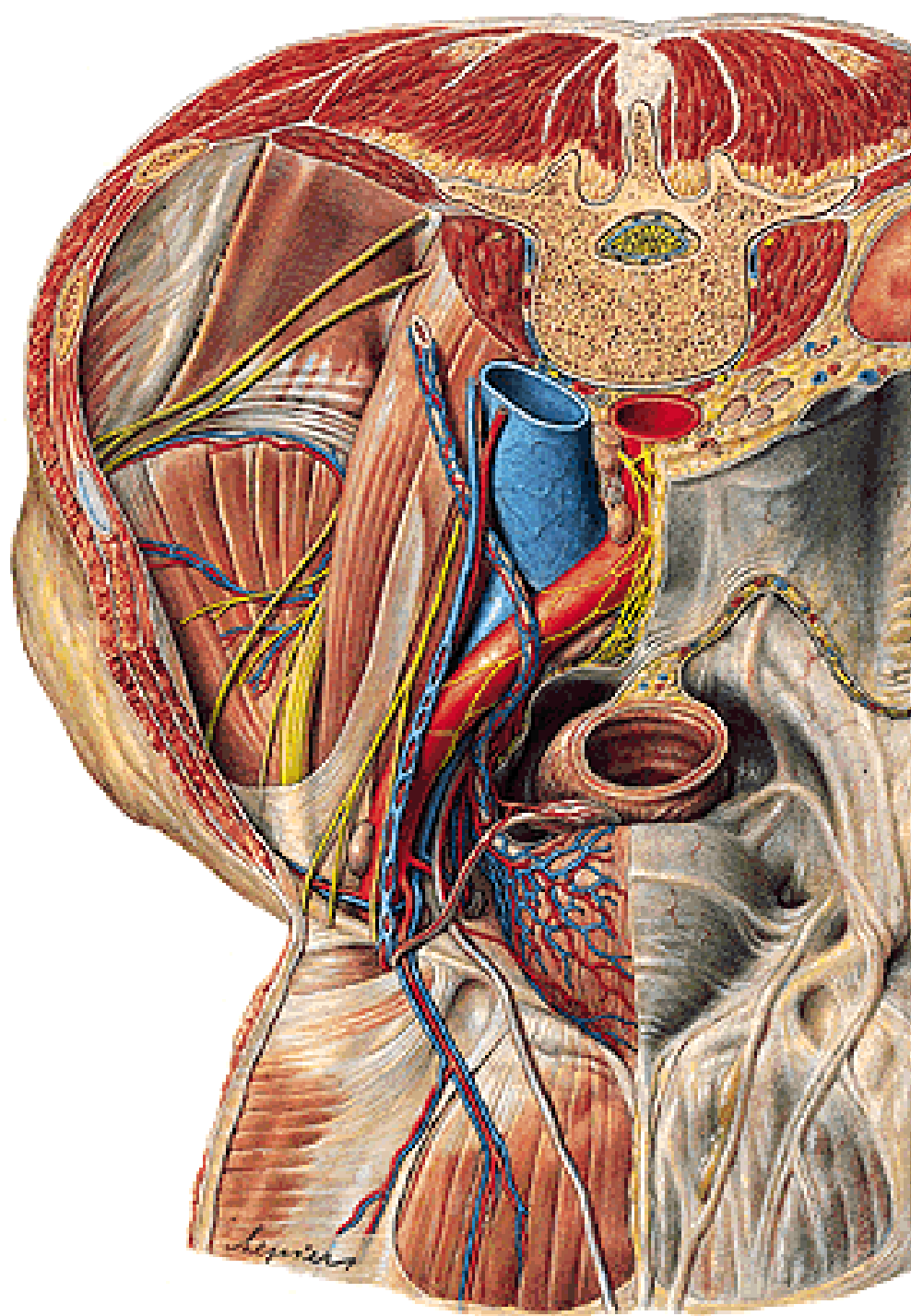
URETER

1. pars abdominalis
2. pars pelvina
3. pars intramuralis

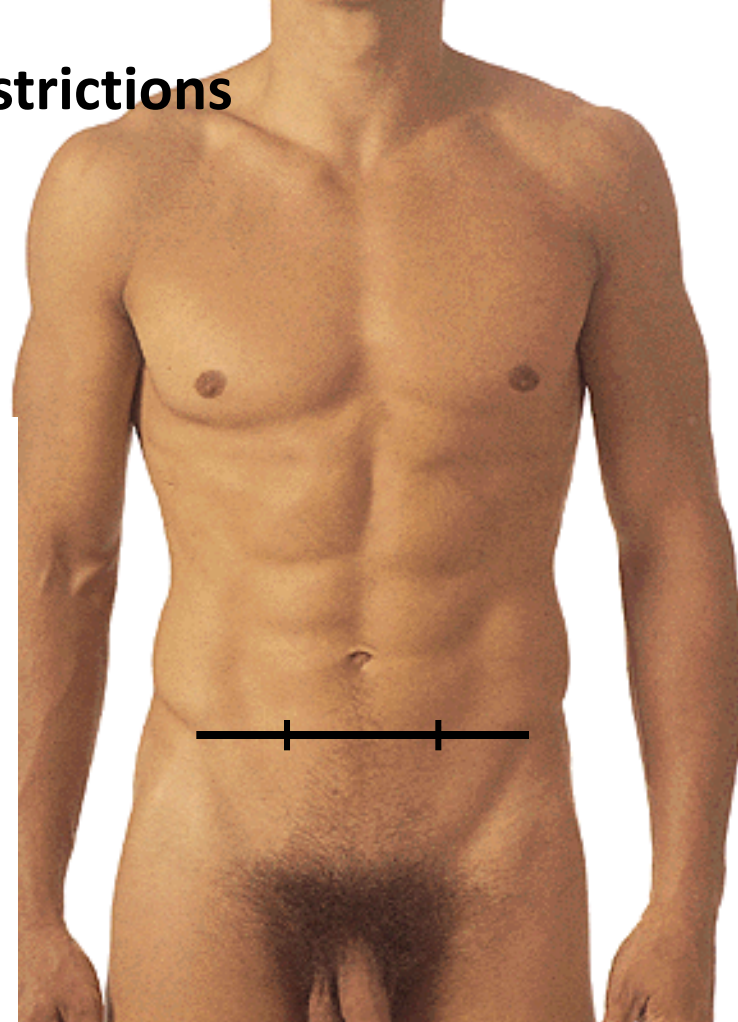
ostium ureteris

25-30cm, 0,5cm

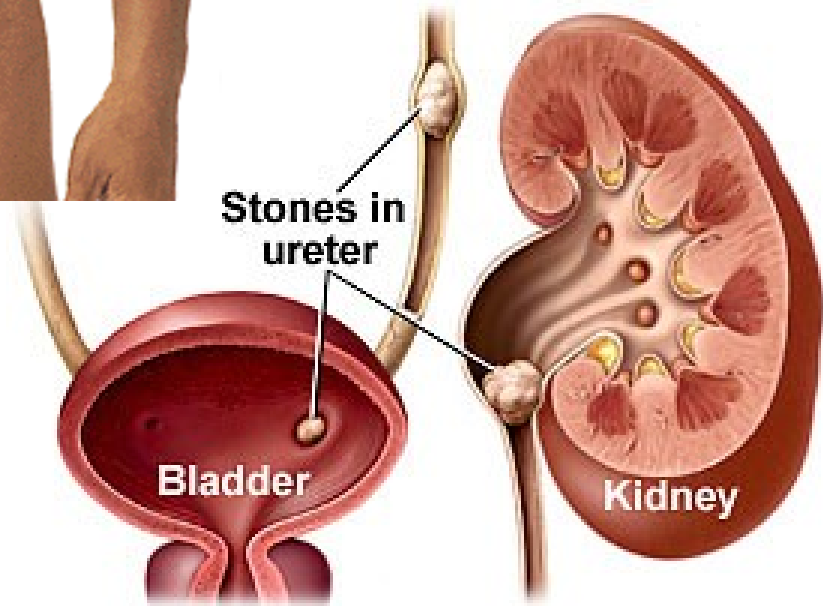
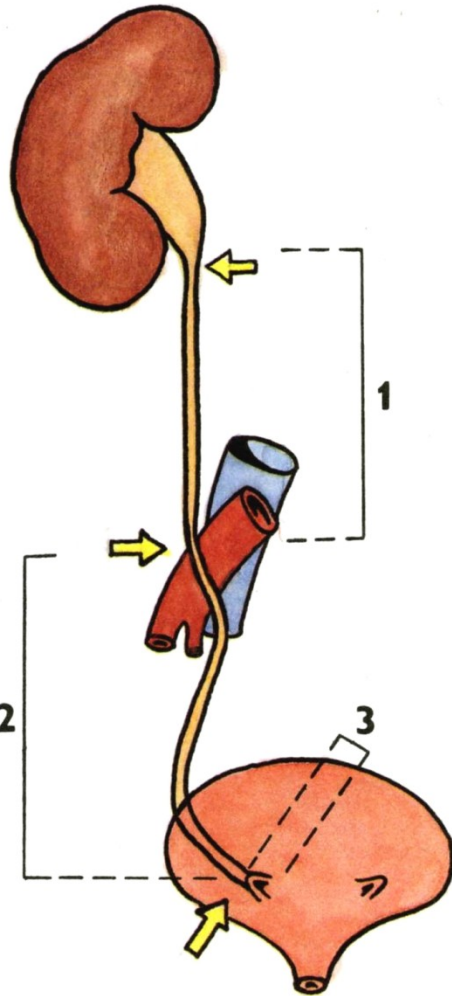




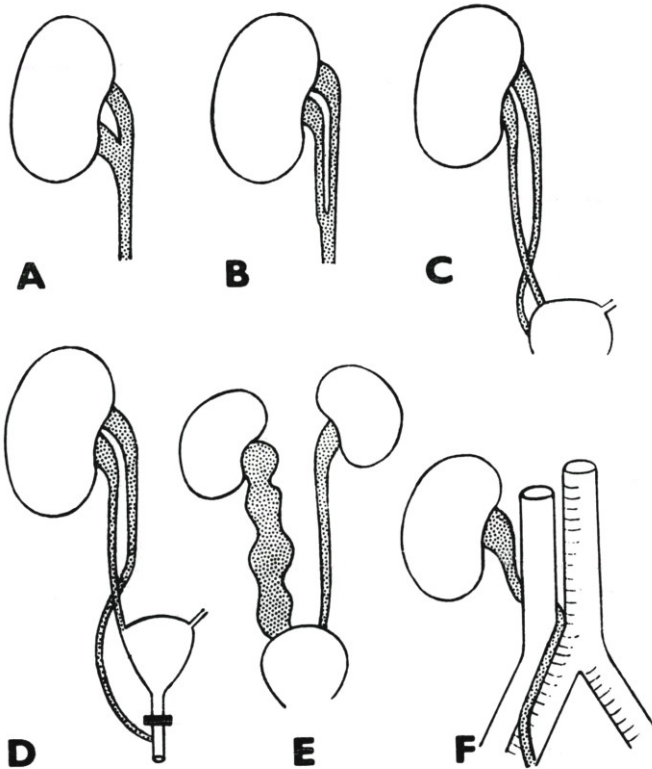
3 physiological constrictions



LANZ



VARIATIONS OF URETER



Pelvis duplex

Ureter fissus

Ureter duplex

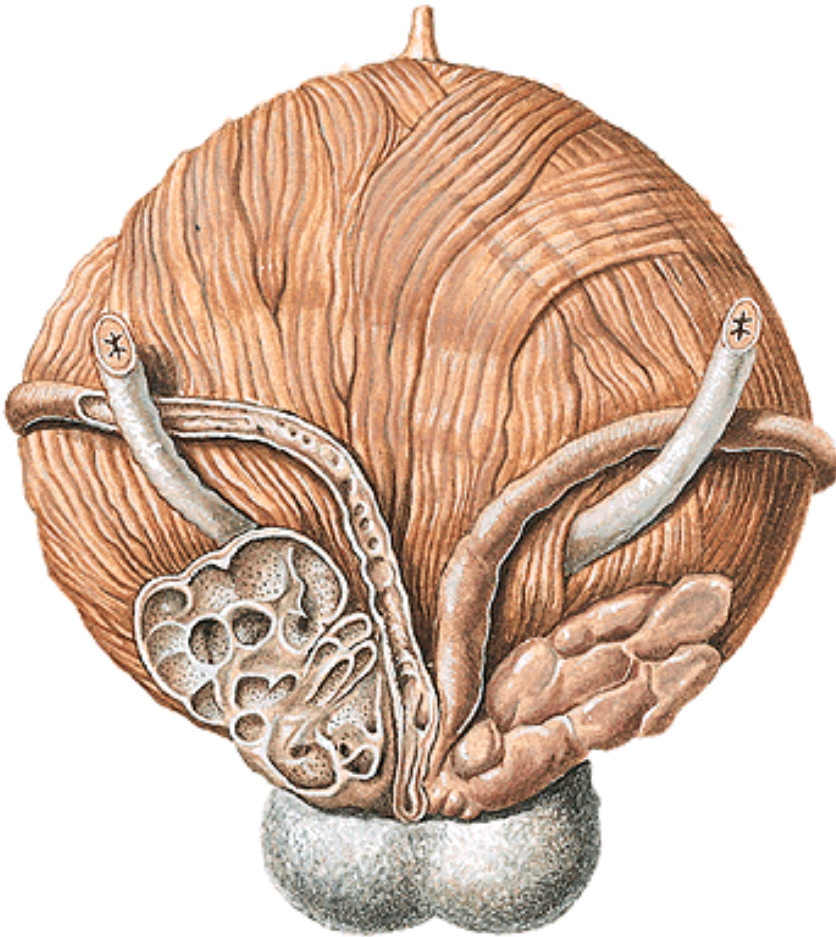
Ectopia ostii ureteris

Megaloureter

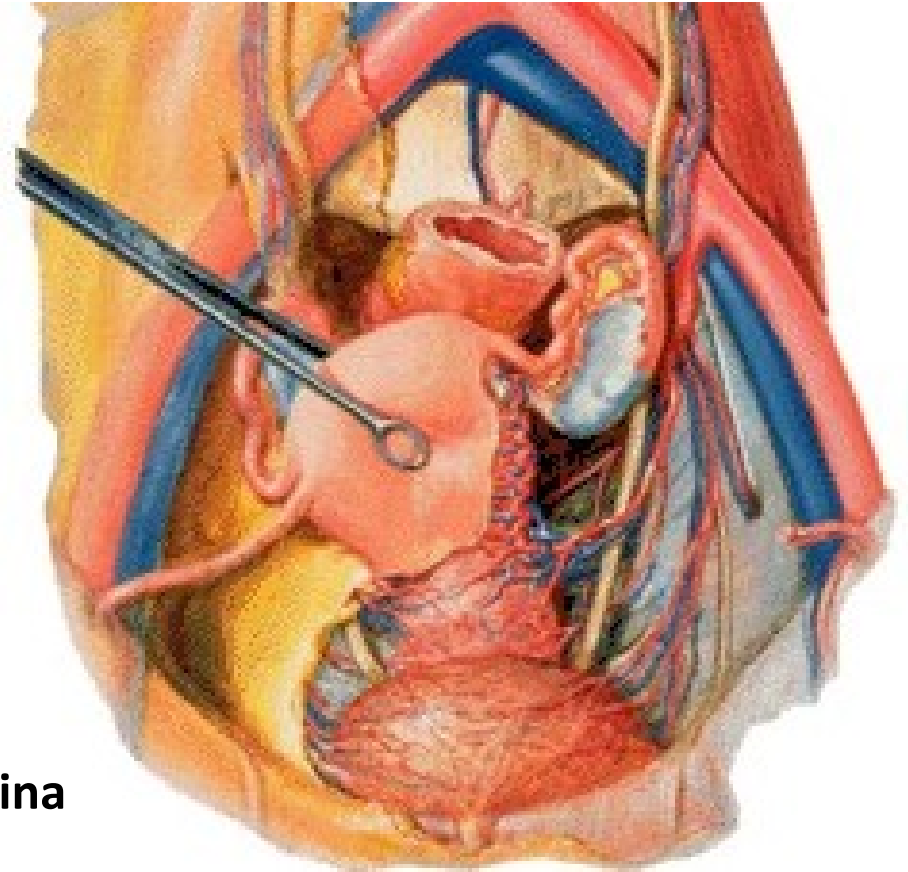
**Retrocaval passage of
ureter**

Male - dorsal aspect of urinary bladder

Ductus deferens



Female – ventral aspect
a. uterina and ureter
2 cm from the cervix of uterus
1,5 cm above the fornix of vagina



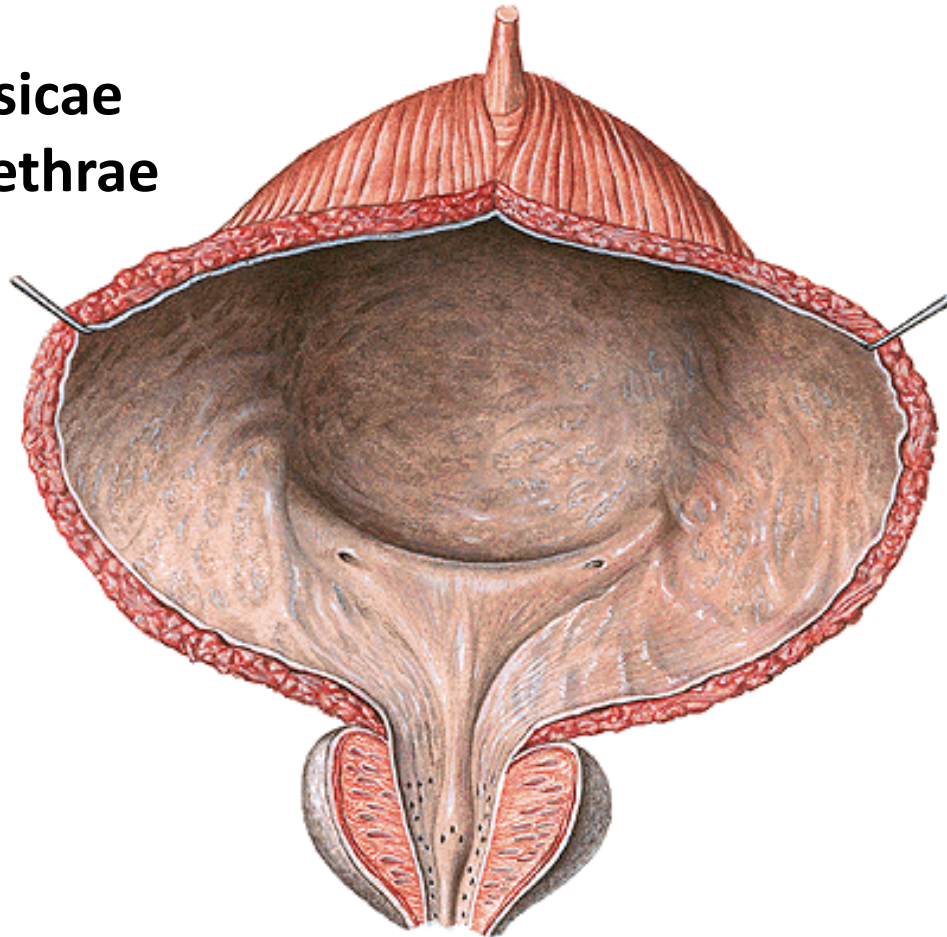
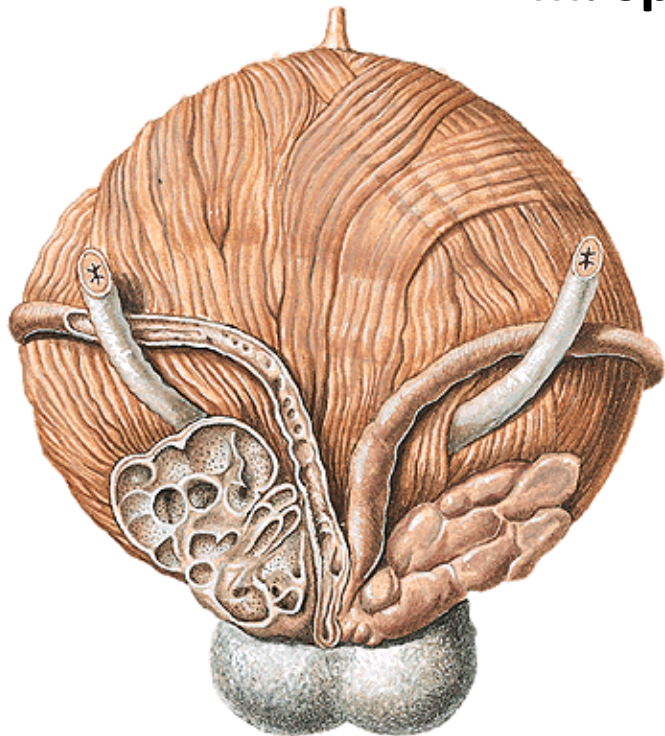
VESICA URINARIA

- fundus vesicae
- corpus vesicae
- apex vesicae
 - lig. umbilicale medianum
- cervix vesicae



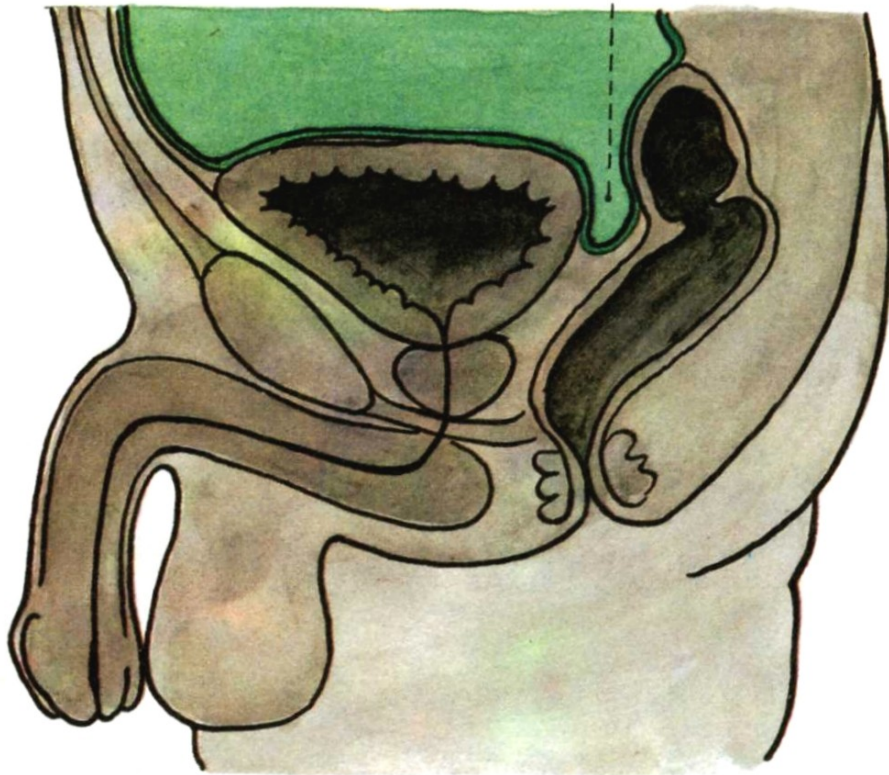
Trigonum vesicae – ostia ureterum

- ostium urethrae internum
- plica interureterica
- fossa retrotrigonalis
- bundles of Bell
- uvula vesicae
- m. detrusor
- m. sphincter vesicae
- m. sphincter urethrae



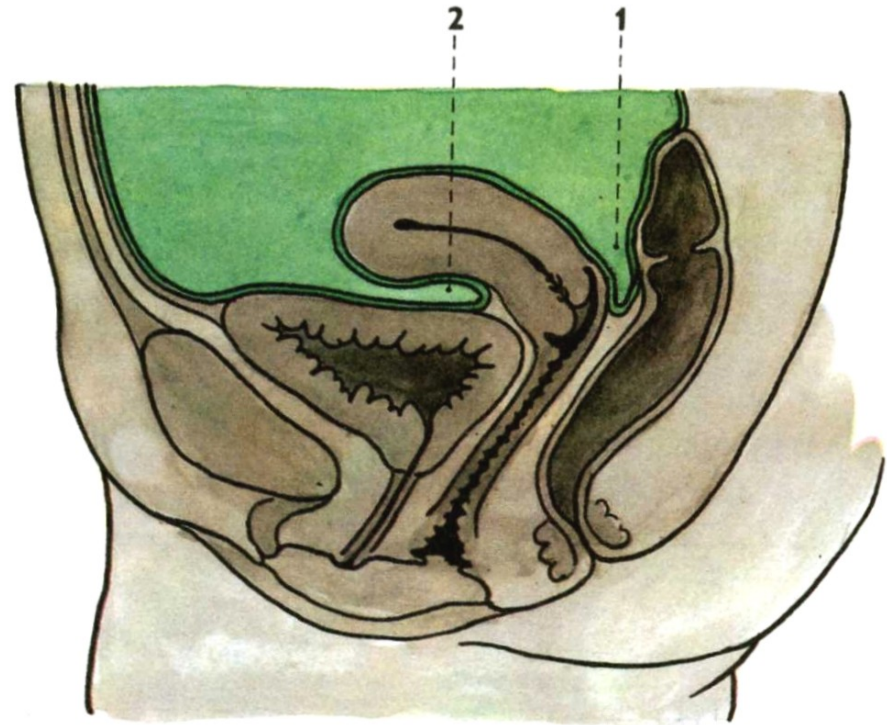
Median section through the male pelvis

1. Excavatio rectovesicalis



Median section through the female pelvis

1. Excavatio rectouterina
2. Excavatio vesicouterina



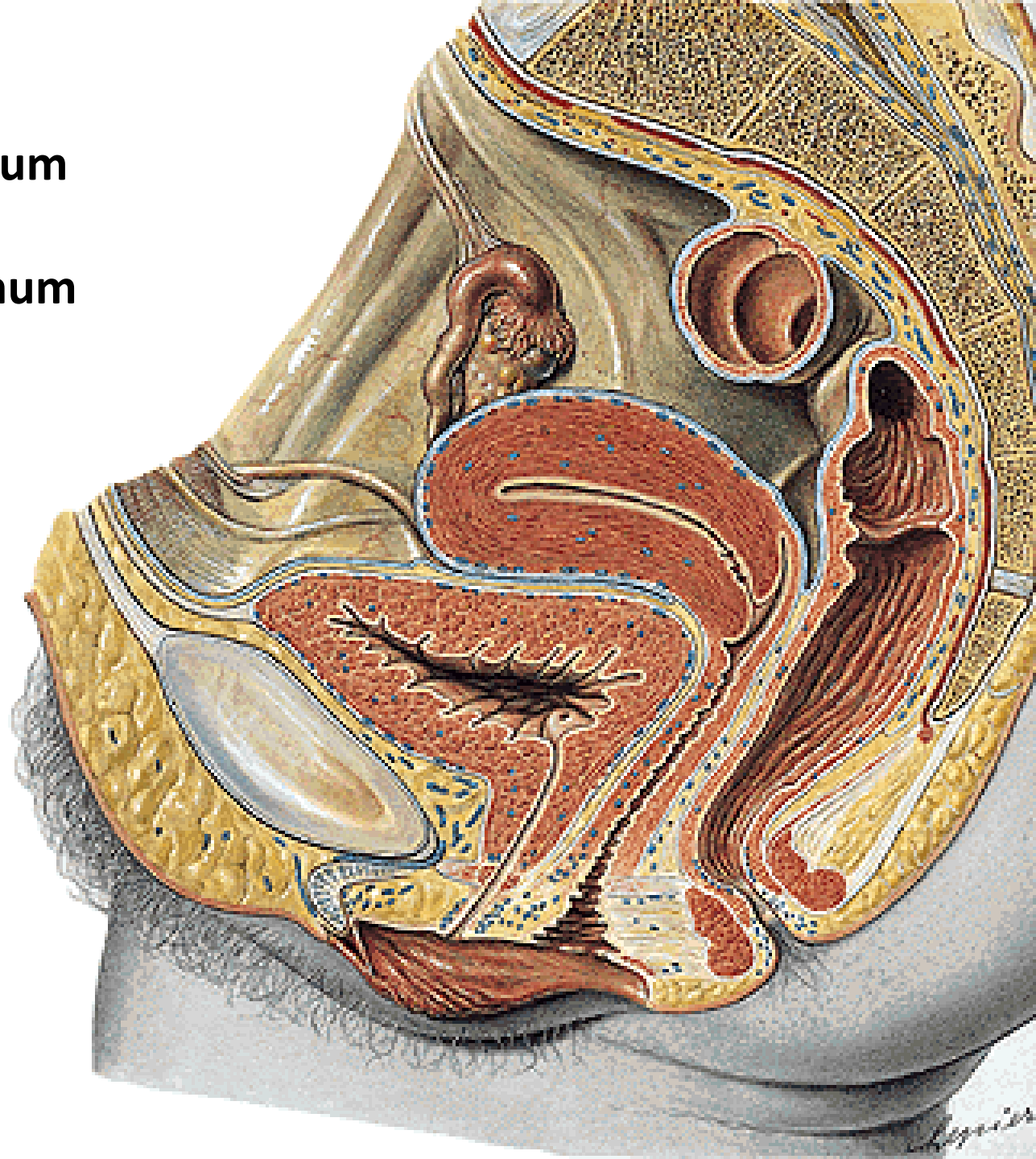
**Paracystium – lig. pubo prostaticum (pubovesicale),
lig. sacroprostaticum (sacrovesicale)**

URETHRA FEMININA

Ostium urethrae internum

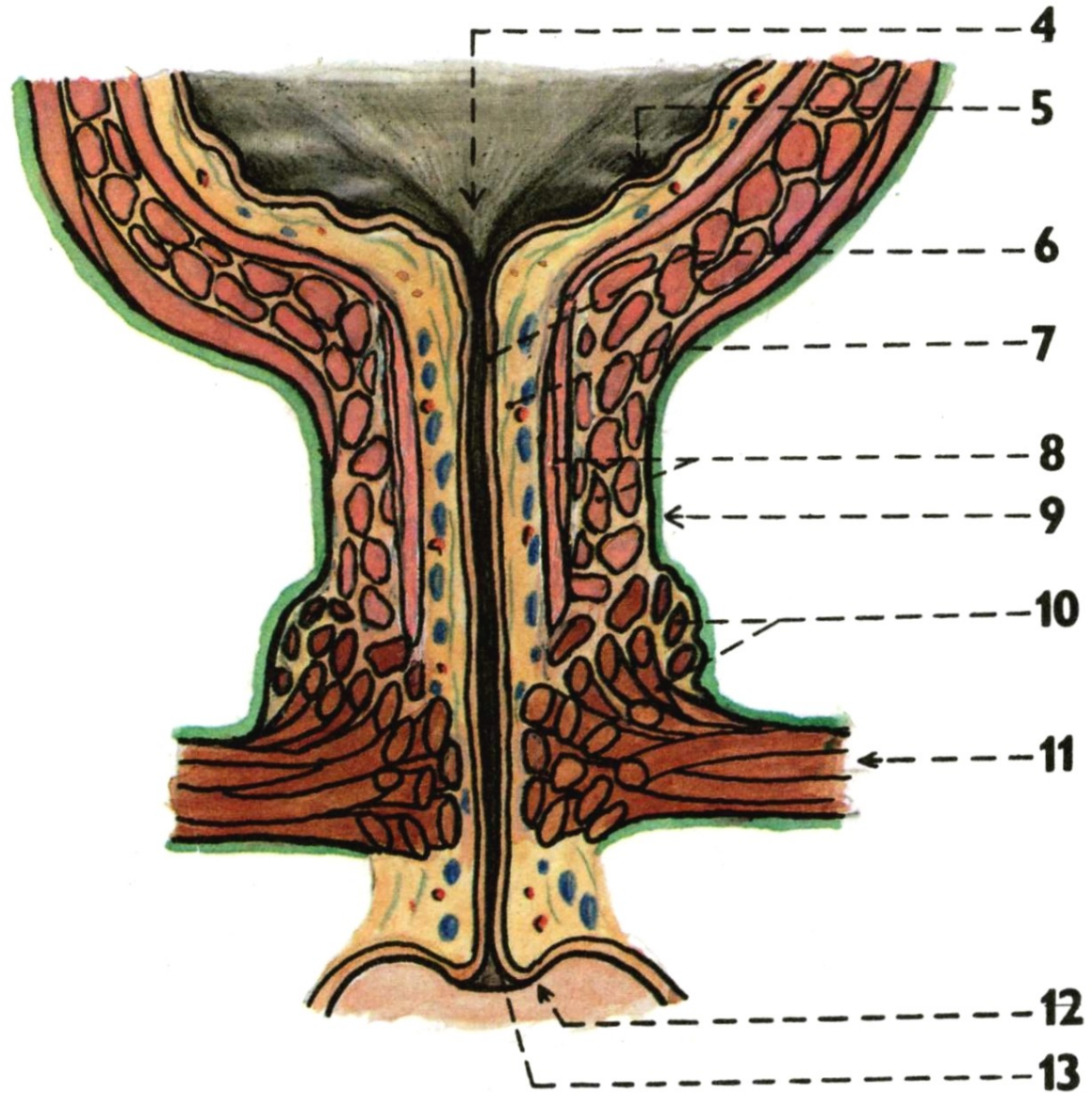
M. sphincter urethrae

Ostium urethrae externum



URETHRA FEMININA

- Crista urethralis
- Lacunae urethrales
- Glandulae urethrales
- Ductus paraurethrales



IVU

urography



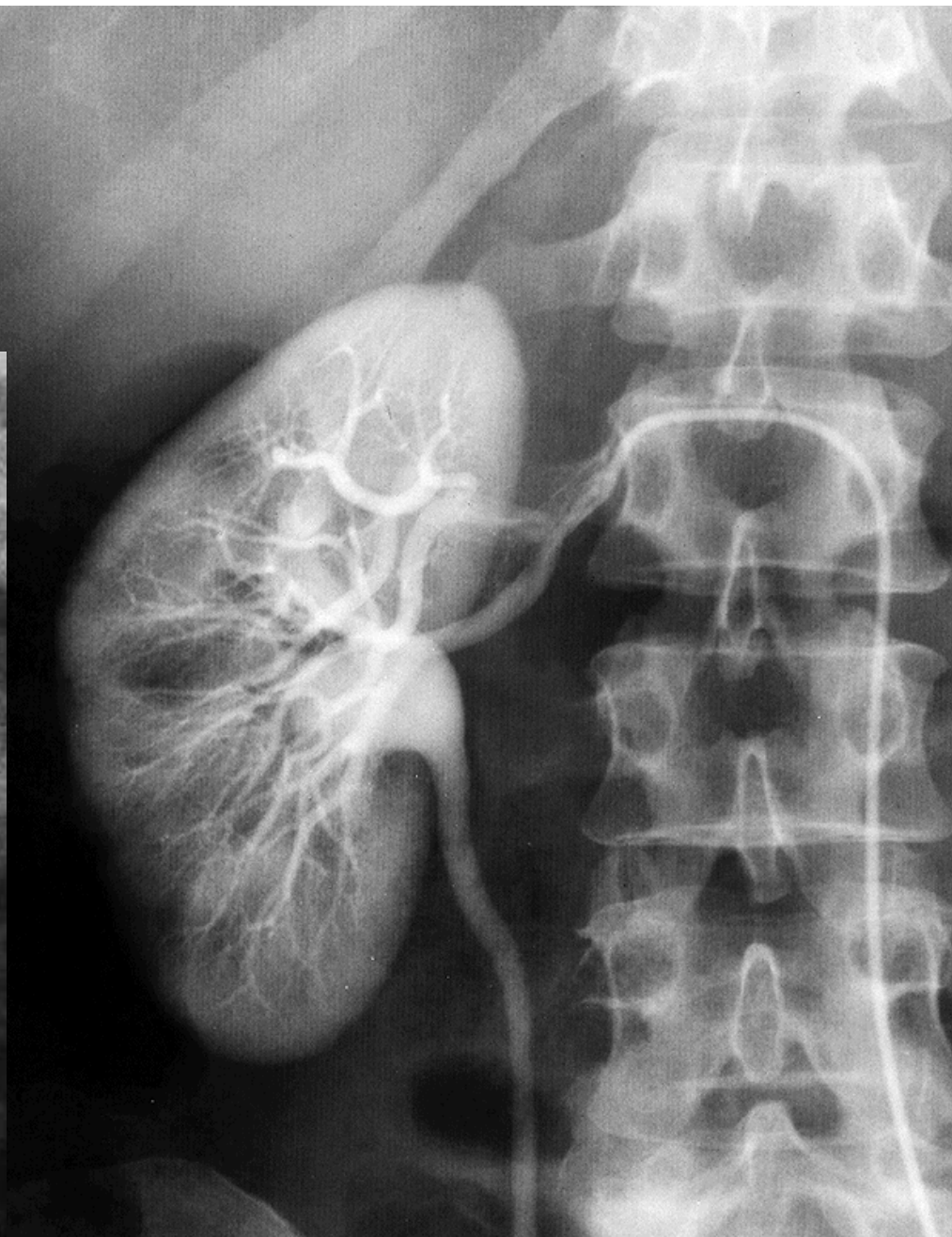
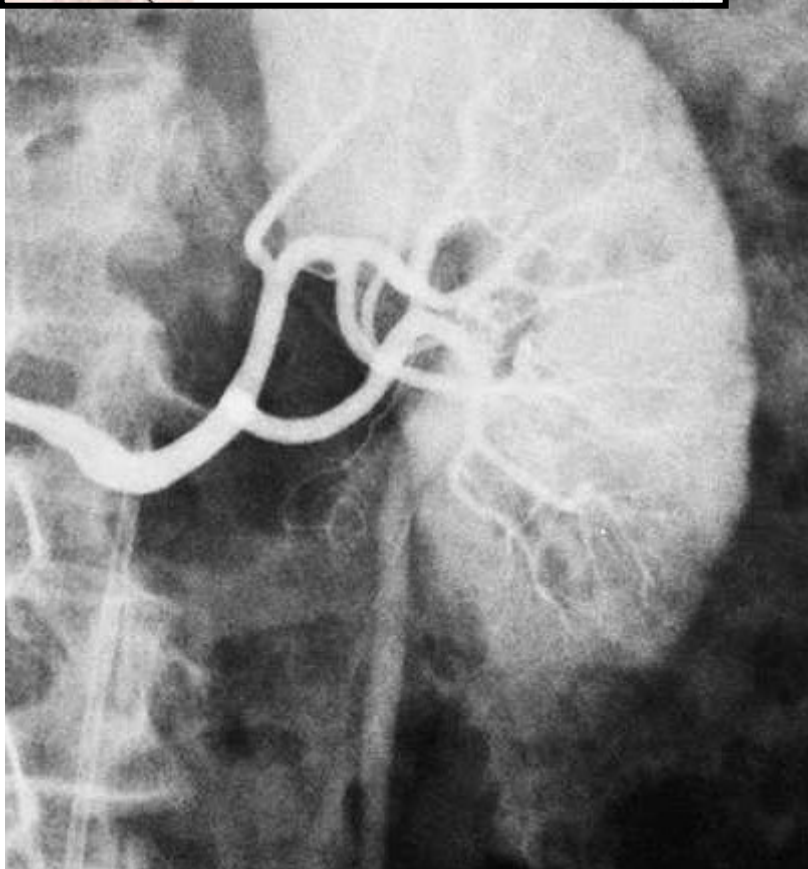
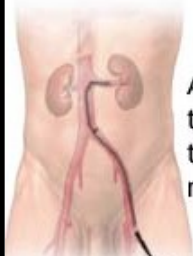
Retrograde pyelography



Renal artery



A catheter is inserted into the artery and threaded through until it is placed in the renal (kidney) artery. The contrast medium is then injected into the artery



Retrocaval ureter



Illustrations were copied from:

**Atlas der Anatomie des Menschen/Sobotta.
Putz,R., und Pabst,R. 20. Auflage. München:
Urban & Schwarzenberg, 1993)**

**Netter: Interactive Atlas of Human Anatomy.
Windows Version 2.0**

**Čihák R: Anatomie 2 (Splanchnologia). Avicenum,
zdravotnické nakladatelství, Praha, 1988.**