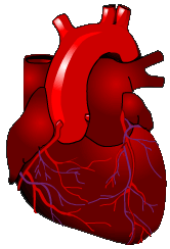


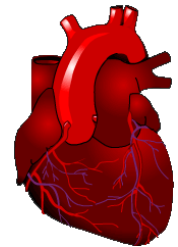


Systematic Anatomy

Splanchnology - Part 3



Urinary system



泌尿系统



Prof.& Ph.D 张红旗

复旦大学基础医学院解剖与组织胚胎学系

复旦大学枫林校区

Into Chinese:

1. Nasal concha
2. Sphenoidal sinus
3. Pharyngeal recess
4. Cardiac notch
5. Cupula of pleura

Into English:

1. 喉
2. 甲状软骨
3. 肺段
4. 主支气管
5. 纵隔

Into Chinese:

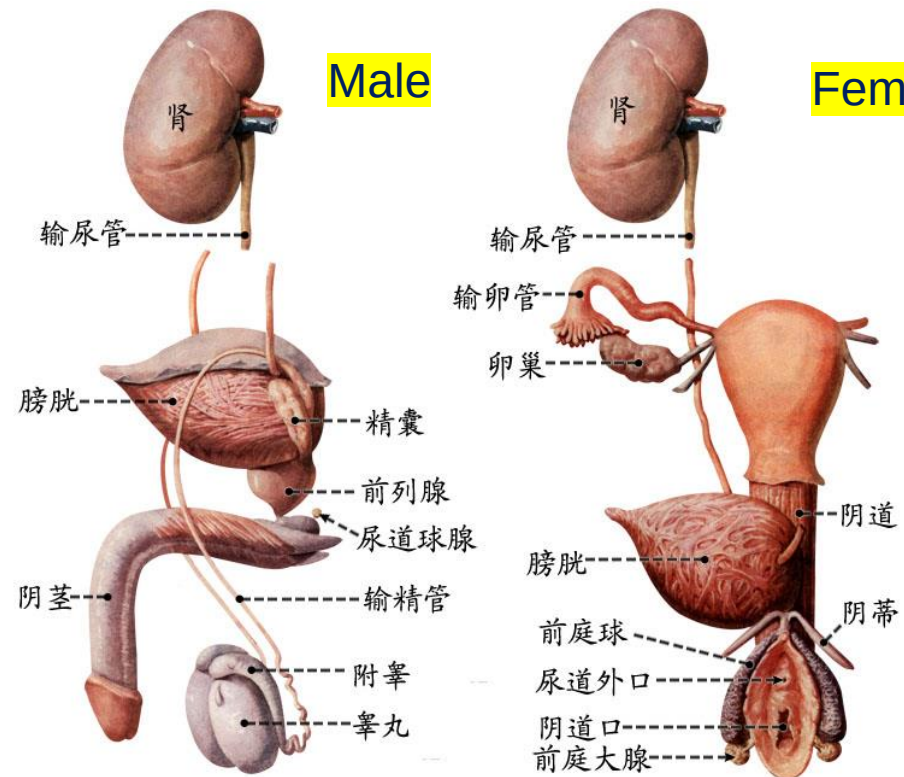
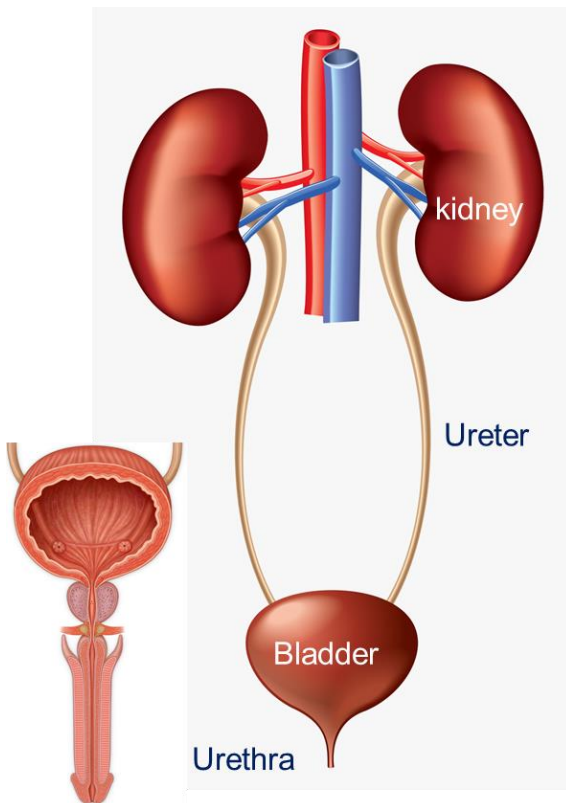
1. Nasal concha-鼻甲
2. Sphenoidal sinus-蝶窦
3. Pharyngeal recess-咽隐窝
4. Cardiac notch-心切迹
5. Cupula of pleura-胸膜顶

Into English:

1. 喉-larynx
2. 甲状软骨-thyroid cartilage
3. 肺段-pulmonary segment
4. 主支气管-principal bronchus
5. 纵隔-mediastinum

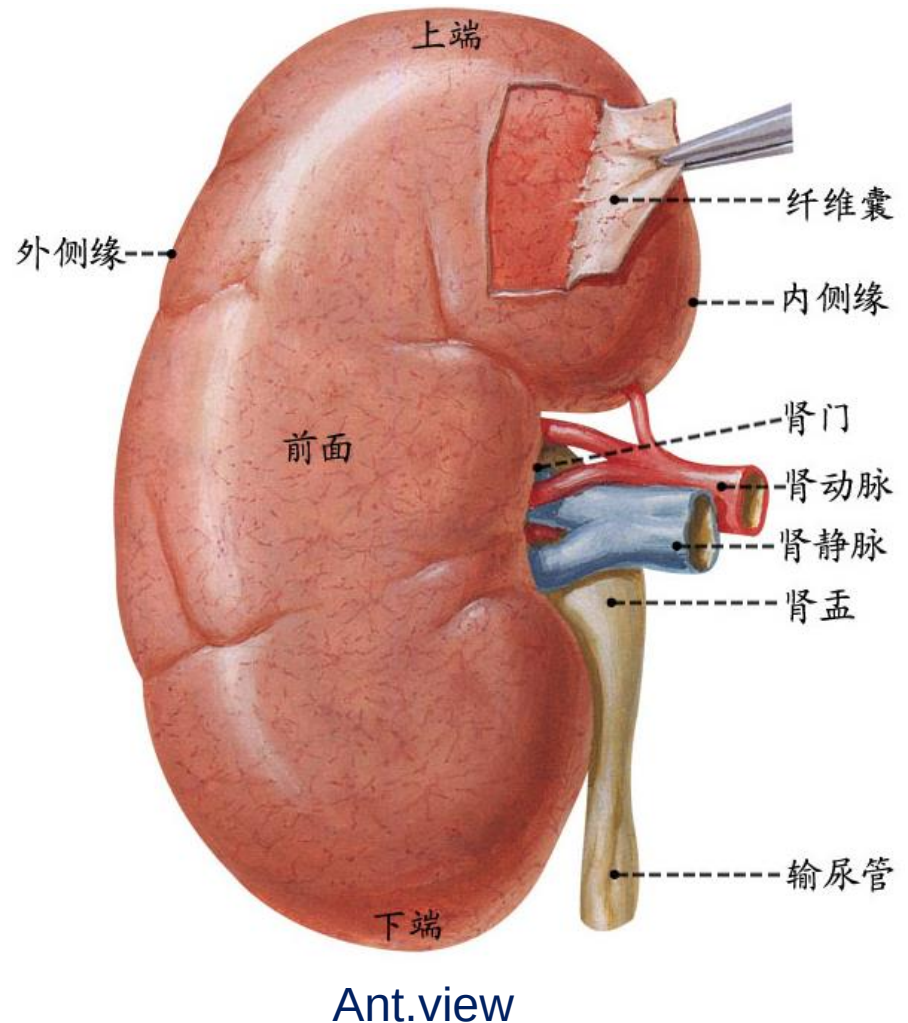
Composition of urinary system

- ◆ **Kidney 肾脏**—Form urine
- ◆ **Ureter 输尿管**—Conduct urine from kidneys to bladder
- ◆ **Bladder 膀胱**—Receives and stores urine
- ◆ **Urethra 尿道**—Conducts urine from bladder to exterior of body
- ◆ **Major function** Produce urine. Homeostatic functions, such as regulation of electrolytes, acid-base balance & blood pressure.



Appearance of the kidney 肾脏的外形

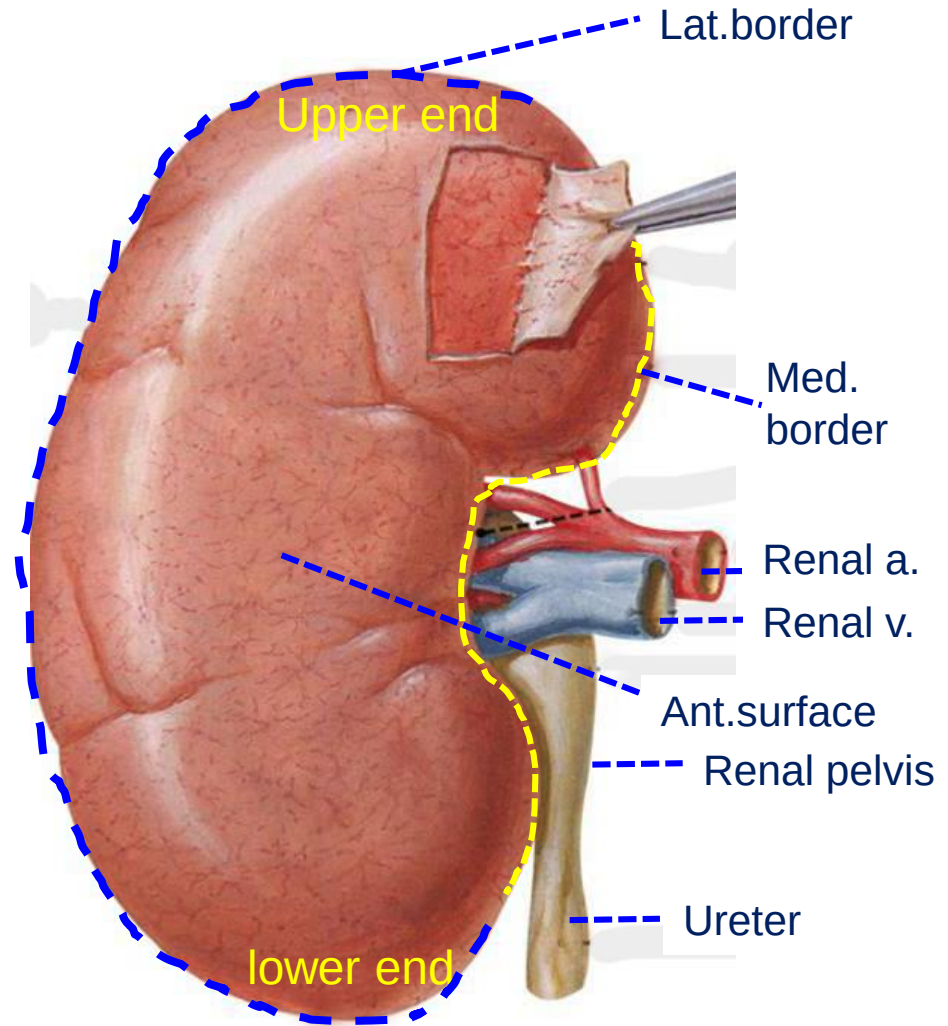
- ◆ Pea shaped 蚕豆形
- ◆ Two surfaces 前后两面
- ◆ Two extremities 上下两端
- ◆ Two borders 内外两缘
- ◆ One hilum 肾门
- ◆ One pedicle 肾蒂



Appearance of the kidney 肾脏的外形

General features

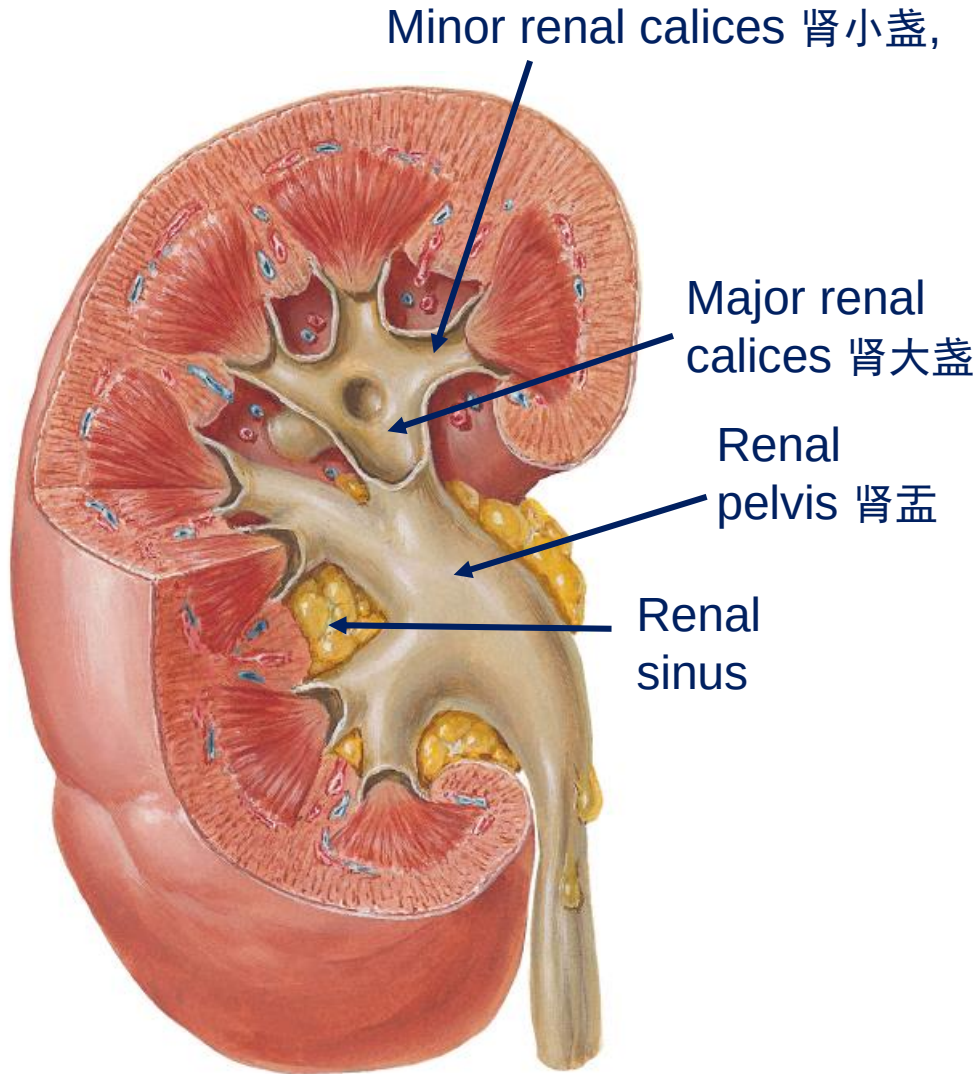
- ◆ **Shape:** Bean-shaped, Reddish-brown organ
- ◆ **2 surfaces**
 - Ant. surface—convex 隆凸
 - Post. surface—flat 平坦
- ◆ **2 borders**
 - Lat. border—convex 隆凸
 - Med. border—concave 凹陷
- ◆ **Renal hilum** 肾门
- ◆ **Renal pedicle**, renal v., a., renal pelvis, lymphatic vessels and nerves



Ant. to post.—V. A. P.

Sup. to inf.—A. V. P.

The shape of the kidney



Renal sinus 肾窦

◆ The renal hilum extends into a large cavity within the kidney

◆ Content:

Renal blood vessels 肾血管

Minor renal calices 肾小盏

Major renal calices 肾大盏

Renal pelvis 肾盂

Adipose tissue 脂肪组织

The structures shown on coronal section of kidney

Renal cortex 皮质

Renal columns 肾柱

Renal medulla 髓质

Renal pyramids 锥体 15~20

Renal papilla 肾乳头

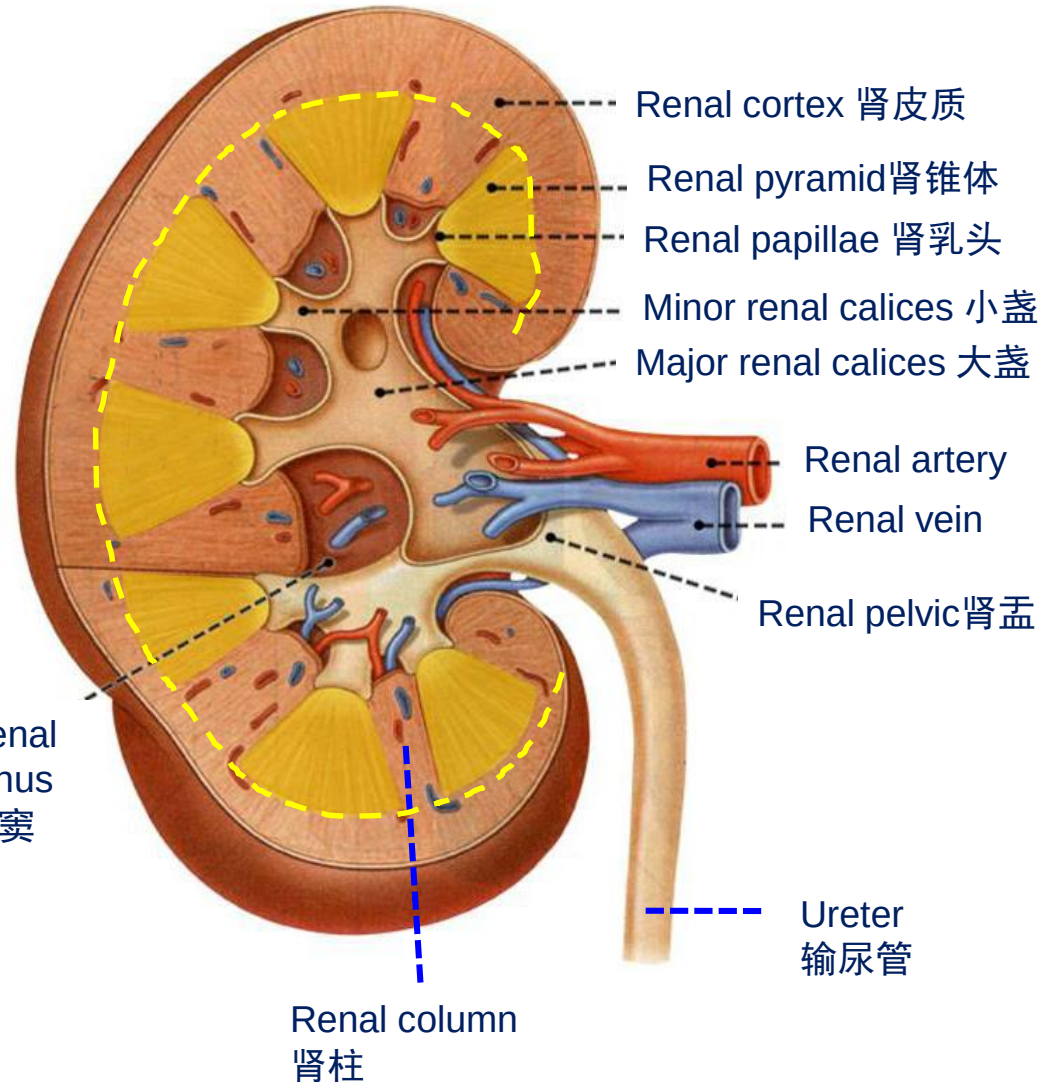
Papillary foramina 乳头孔

Minor renal calices 肾小盏 7-8

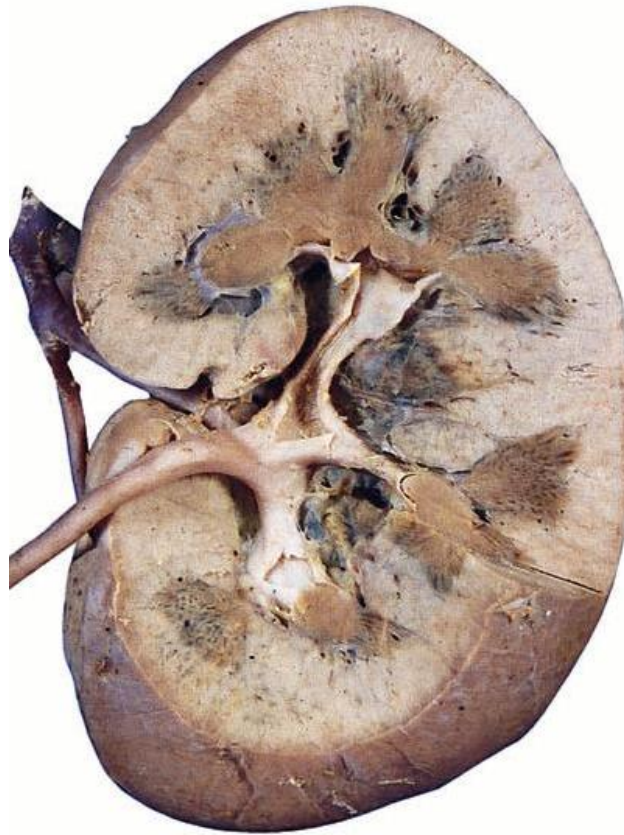
Major renal calices 肾大盏 2-3

Renal pelvis 肾盂

Renal Sinus
肾窦



Appearance & internal structure of kidney



Coronal section

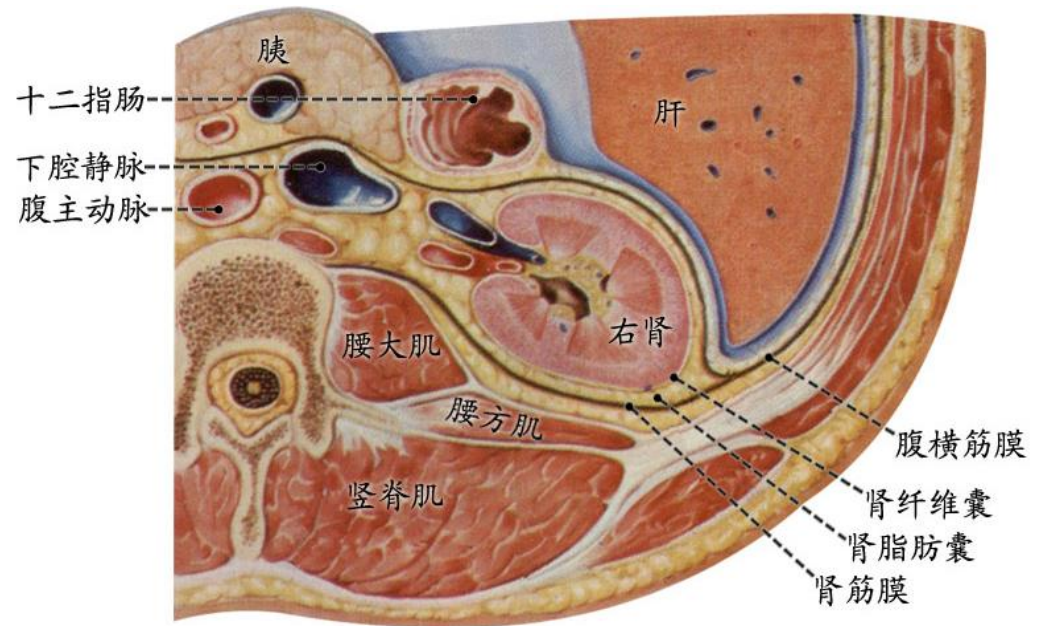
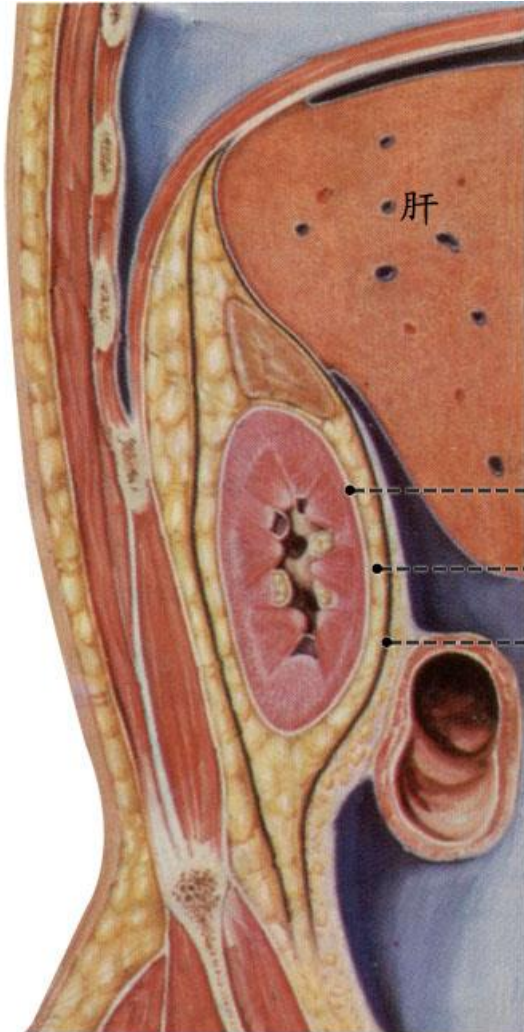


鲸的肾
Kidney of whale

Covering of the kidney 肾的被膜

从内向外有三层膜

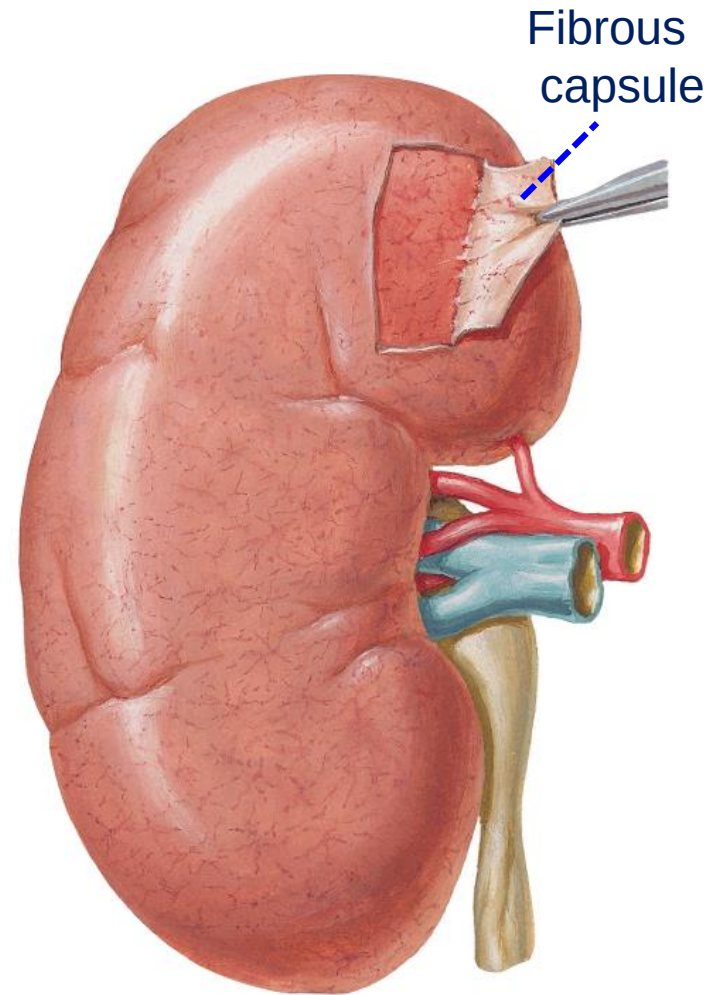
1. Renal fibrous capsule 纤维膜-保护
2. Renal fatty capsule 脂肪囊，缓冲作用
3. Renal fascia 肾筋膜，前方与对侧移行，向下开放。



Covering of the kidney 肾的被膜

From the inside out

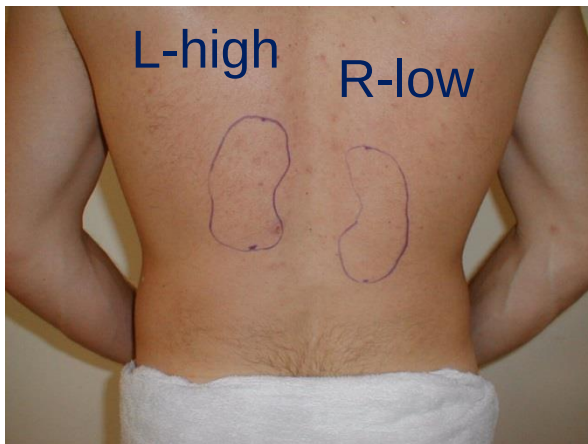
- ◆ **Fibrous capsule** 纤维膜 — a strong fibrous capsule which strips easily from a normal kidney surface but adheres firmly to an organ that has been inflamed
- ◆ **Fatty renal capsule** 脂肪囊 - a thick adipose connective tissue capsule, surrounds the fibrous capsule. It acts as a shock absorber to protect the kidney from jolting and jarring
- ◆ **Renal fascia** 肾筋膜 - on outside, surrounds both the kidney & suprarenal gland, holding these organs in place



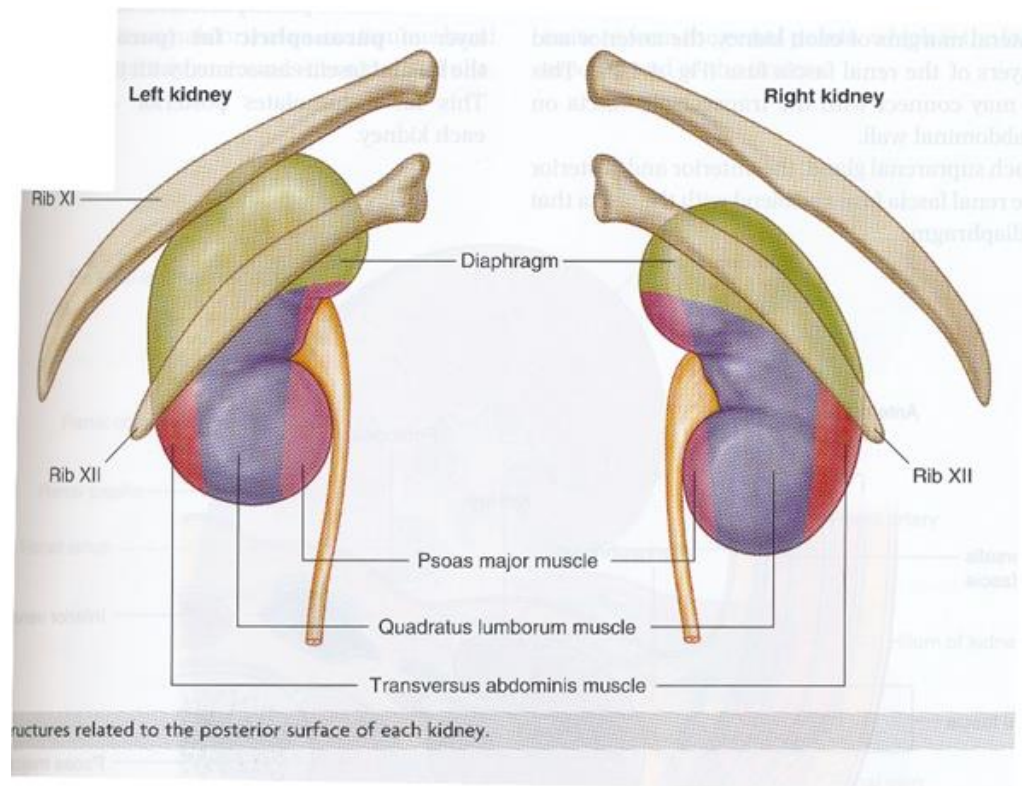
Ant. surface of right kidney

Position of the kidney

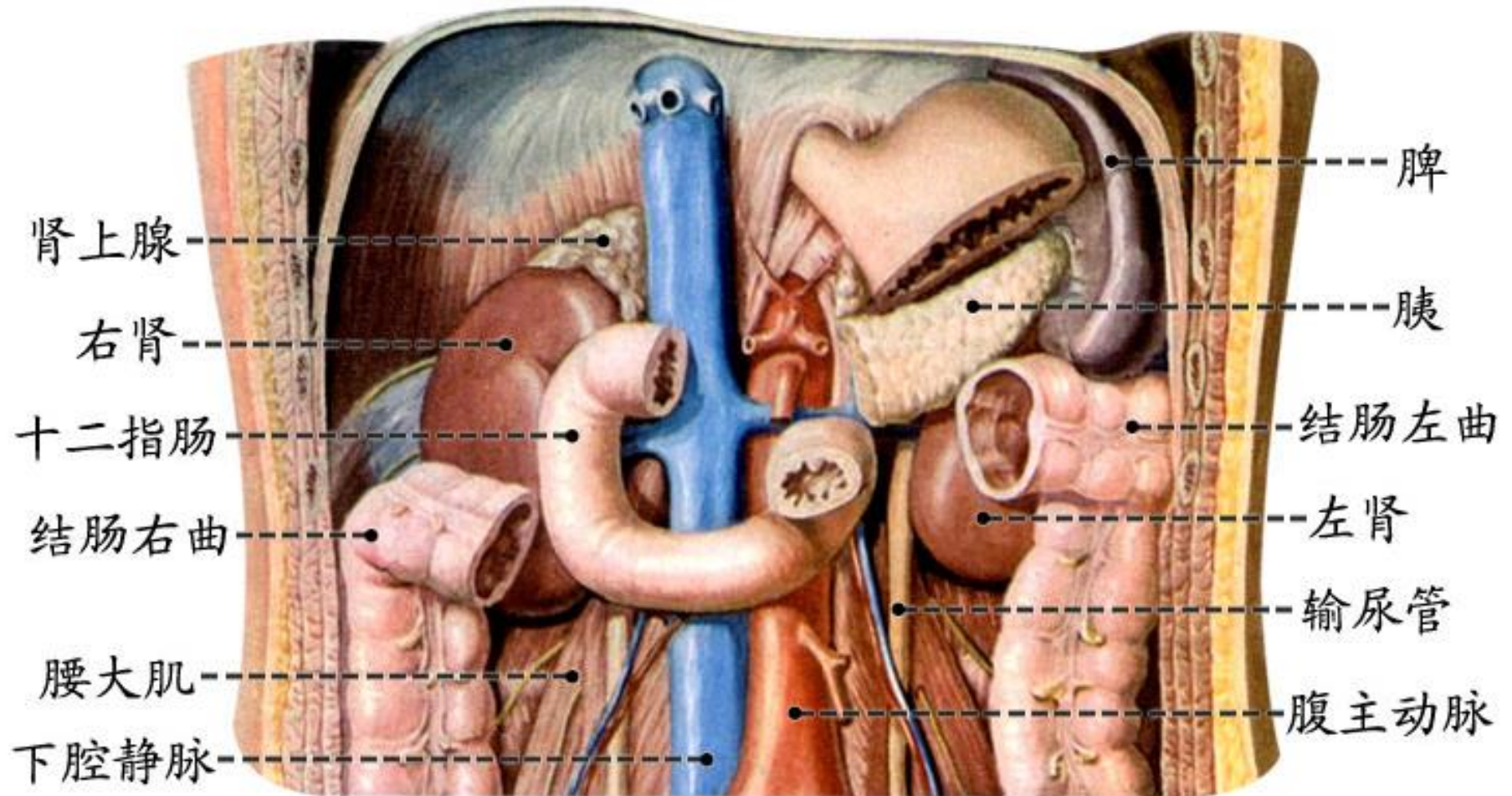
Attached to post. abdominal wall, close to column, extraperitoneal organ, left kidney higher than R kidney, 12nd rib pass upper part of L. kidney and mid. part of R. kidney, both kidneys looks “八” shaped.



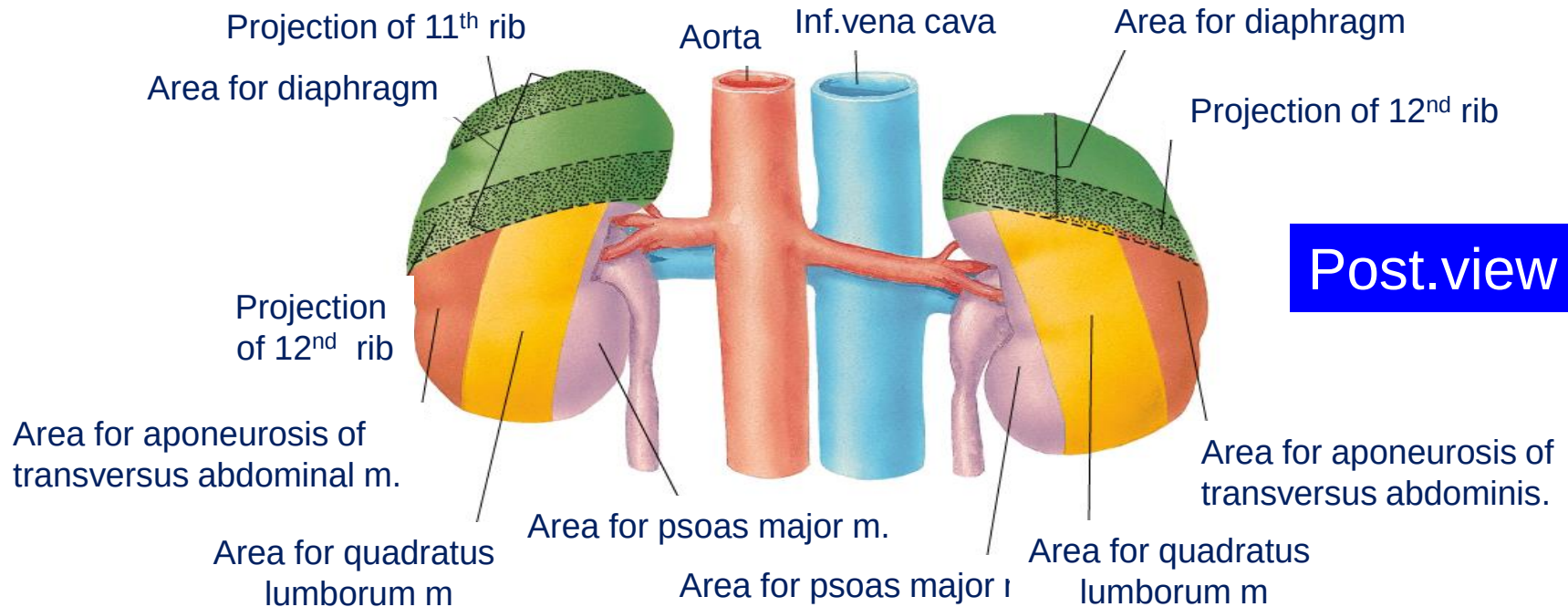
Surface anatomy



Neighbouring of the kidney (ant.view)

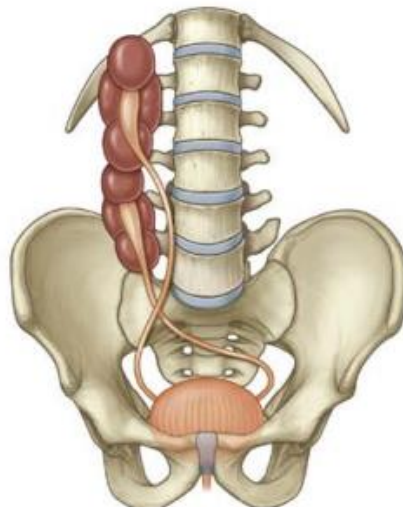


Position of the kidney

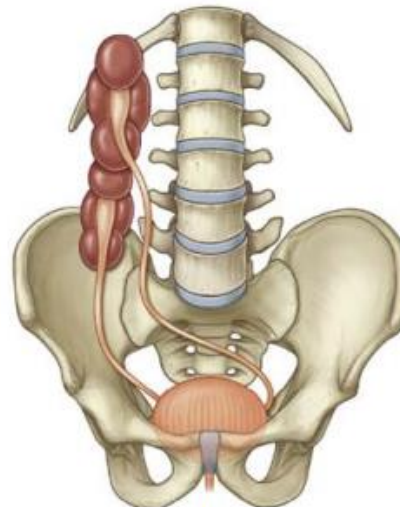


Post.view

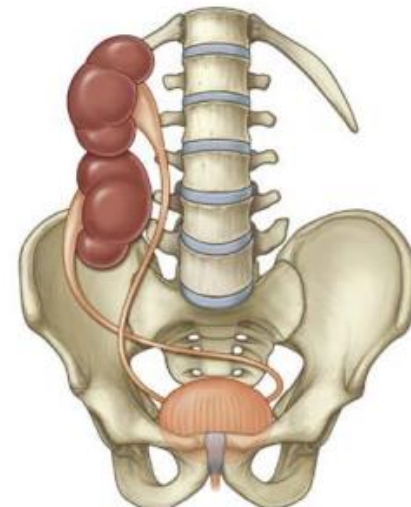
Fused ectopic kidneys - 融合异位肾



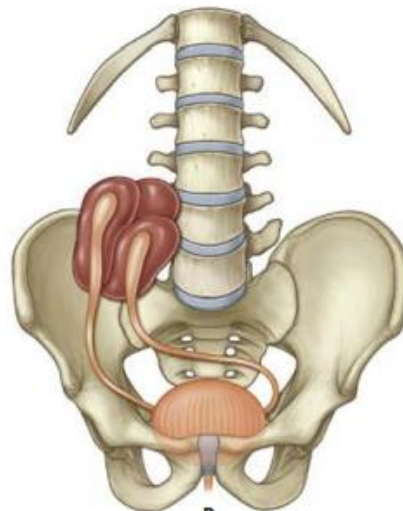
A
Unilateral fused kidney
(inferior ectopia)



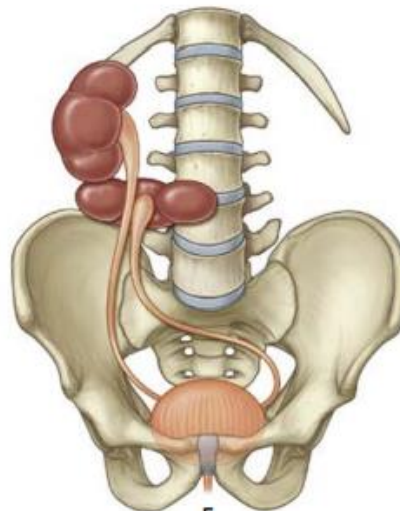
B
Unilateral fused kidney
(superior ectopia)



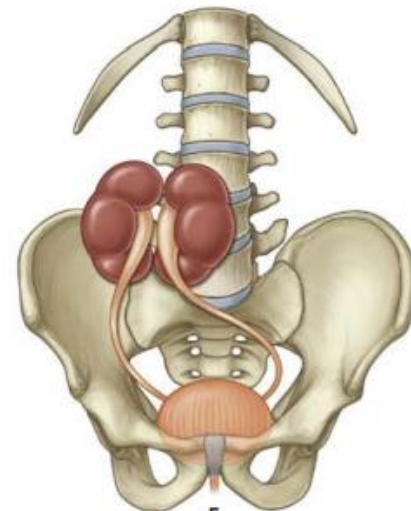
C
Sigmoid or S-shaped kidney



D
Lump kidney



E
L-shaped kidney



F
Disc kidney

Relations of kidneys

◆ Superiorly

Suprarenal gland 肾上腺

◆ Posteriorly

◆ Three muscles

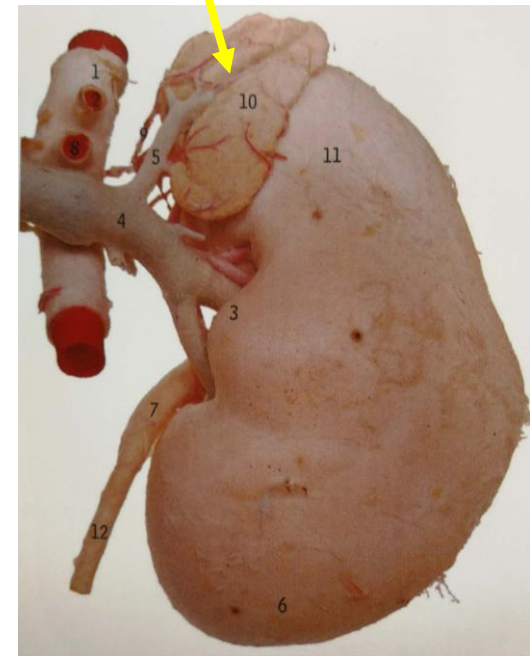
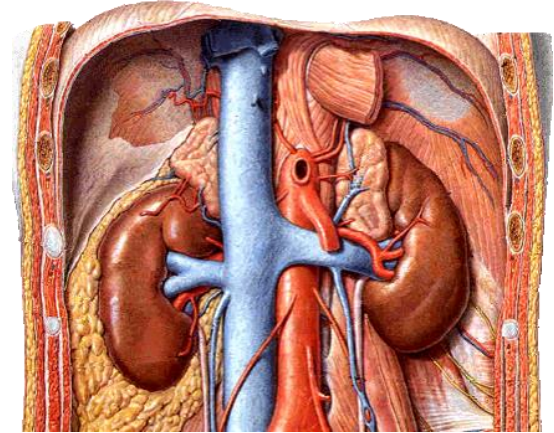
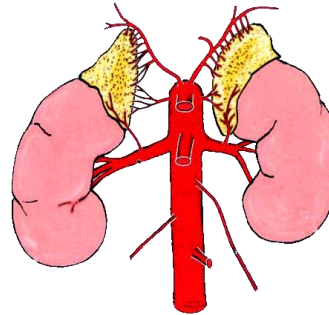
- Diaphragm 膈
- Psoas major 腰大肌
- Quadratus lumborum 腰方肌

◆ Three nerves

- Subcostal n. 肋下神经
- Iliohypogastric n. 髂腹下神经
- Ilioinguinal n. 髂腹股沟神经

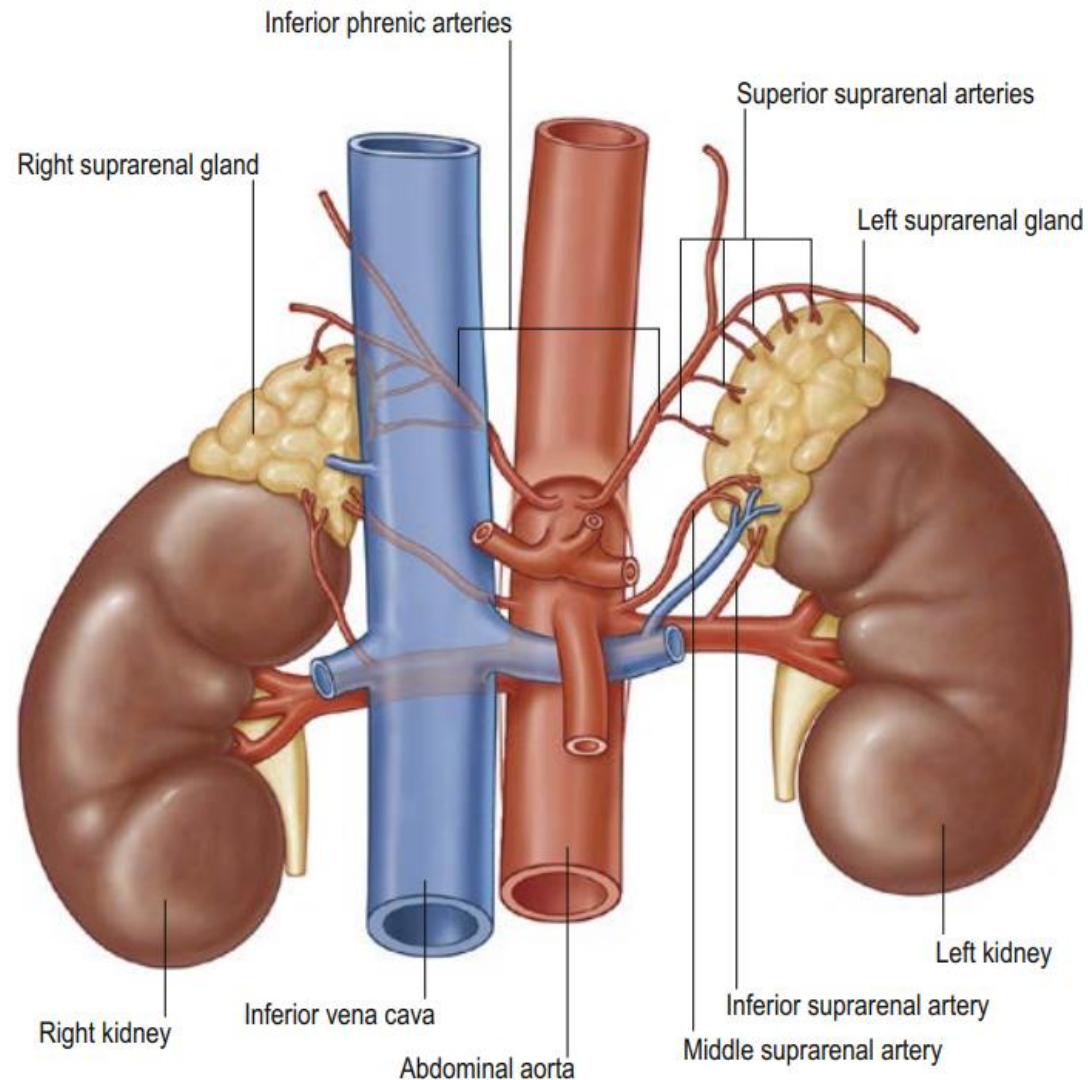
◆ Medial

- L.kidney—abdominal aorta 腹主动脉
- R.kidney—inf. vena cava 下腔静脉



Kidneys, suprarenal gland and blood supply

肾，肾上腺及其血液供应

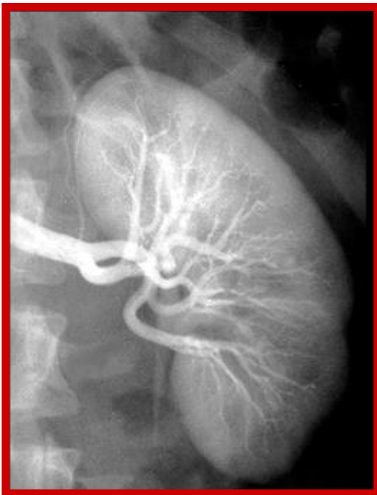


Kidney stone 肾结石

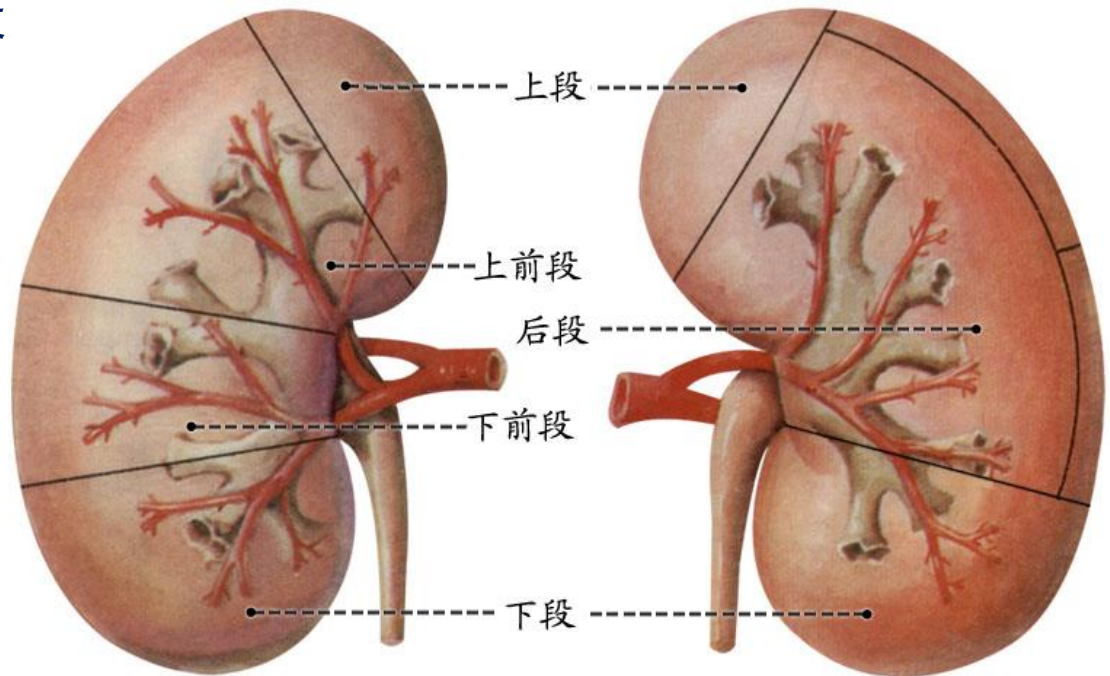


Vascular renal segments 肾 段

- ◆ The kidney is divided into five vascular segments and each is supplied by a branch of the renal artery; between the segments there is no anastomosis.
- ◆ The segments are
 1. Sup. segment 上段
 2. Ant.sup.segment 前上段
 3. Ant.inf.segment 前下段
 4. Inf. segment 下段
 5. Post.segment 后段



肾动脉造影



Ant.view

Post.view

Vascular renal segments 肾 段

A

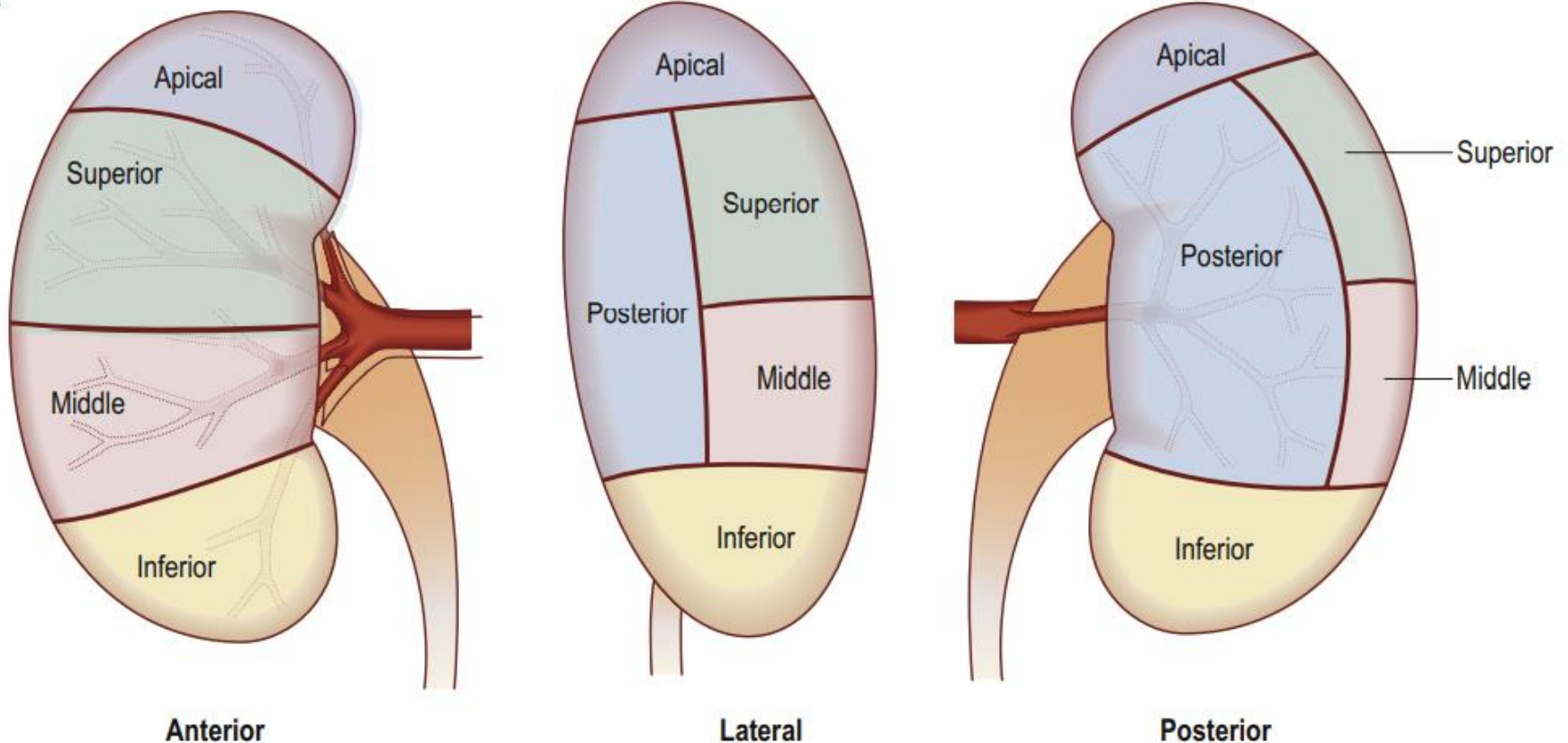
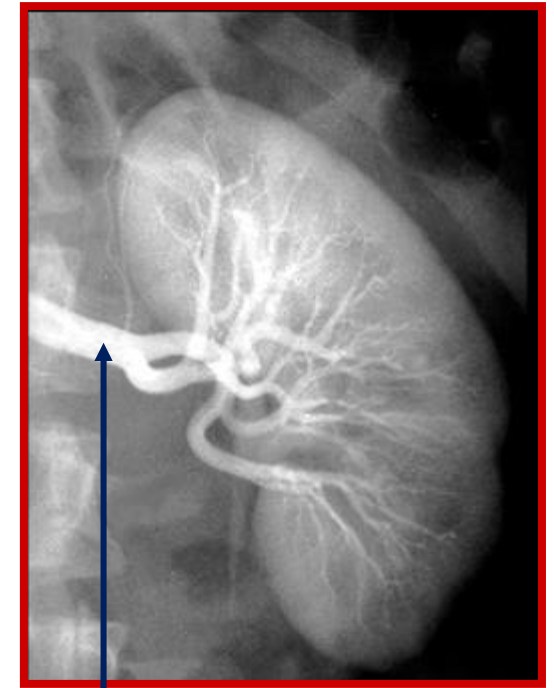
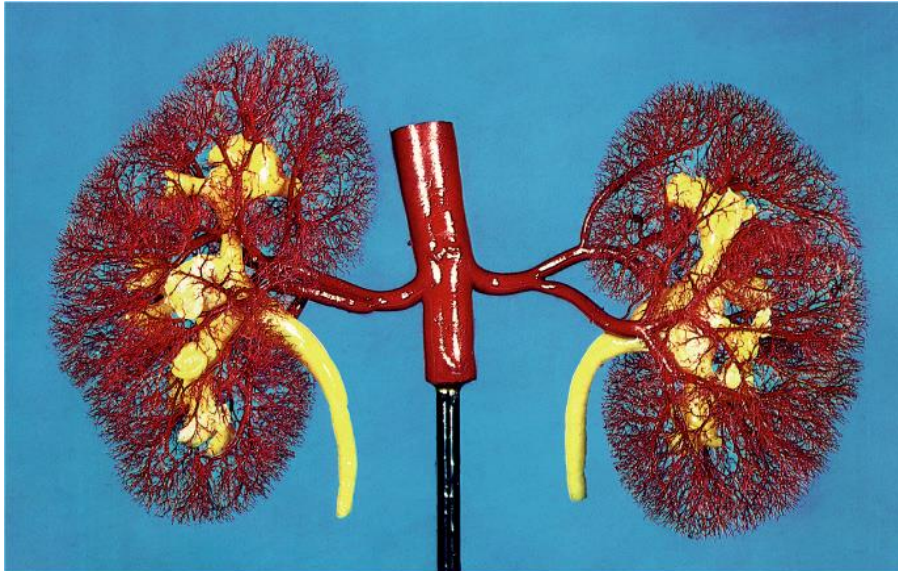
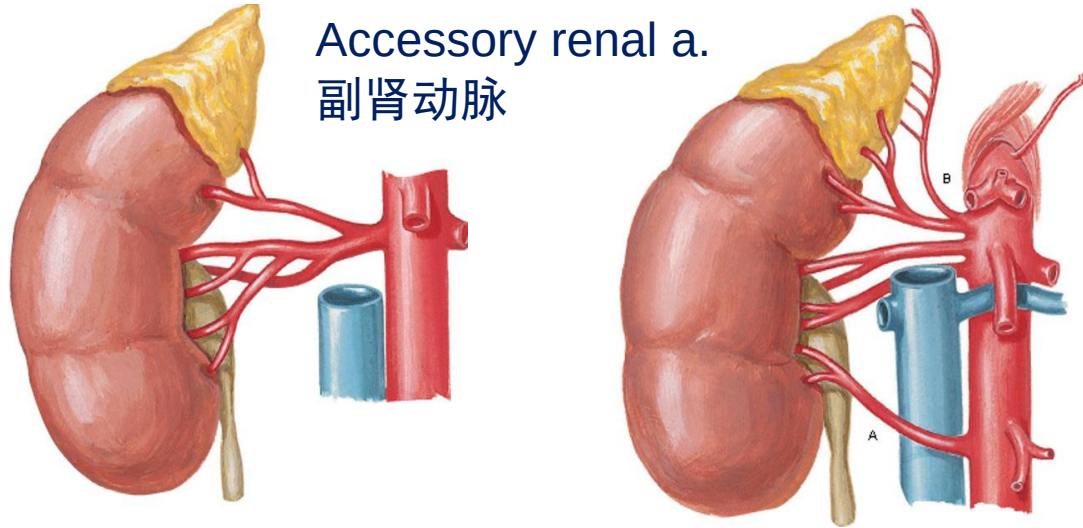


Fig. 72.14 A, The segmental arterial anatomy of the right kidney. The posterior division branches near the hilum of the kidney before the anterior division divides into the other segmental arteries. (Courtesy Dr Veronica Macchi, University of Padova, Padova, Italy.) (B, *continued online*)

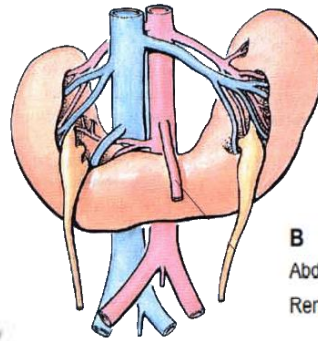
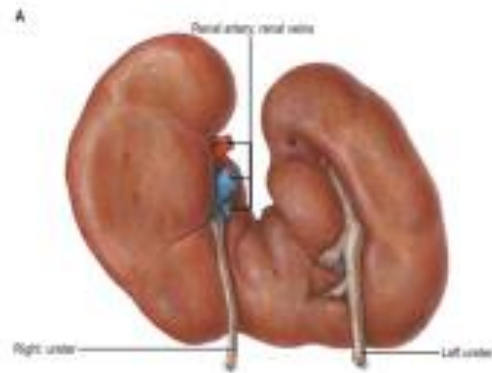
Renal arterial variation & angiography



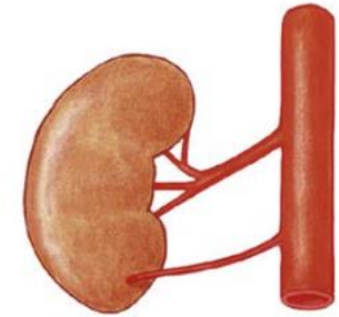
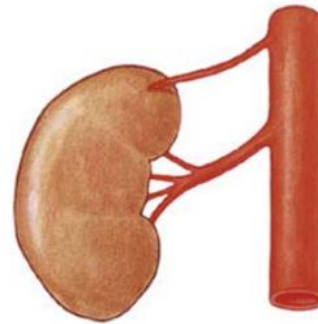
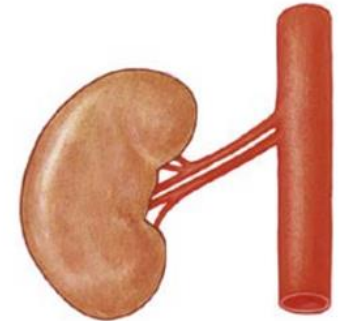
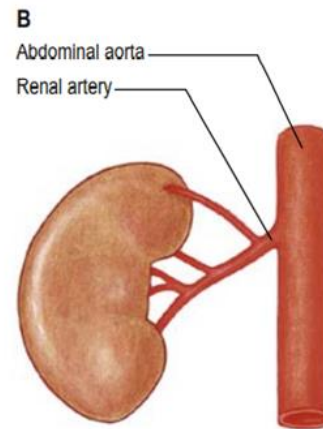
Renal artery

Renal angiography

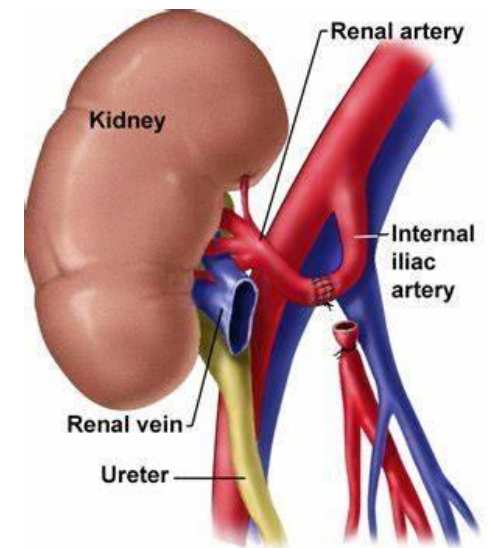
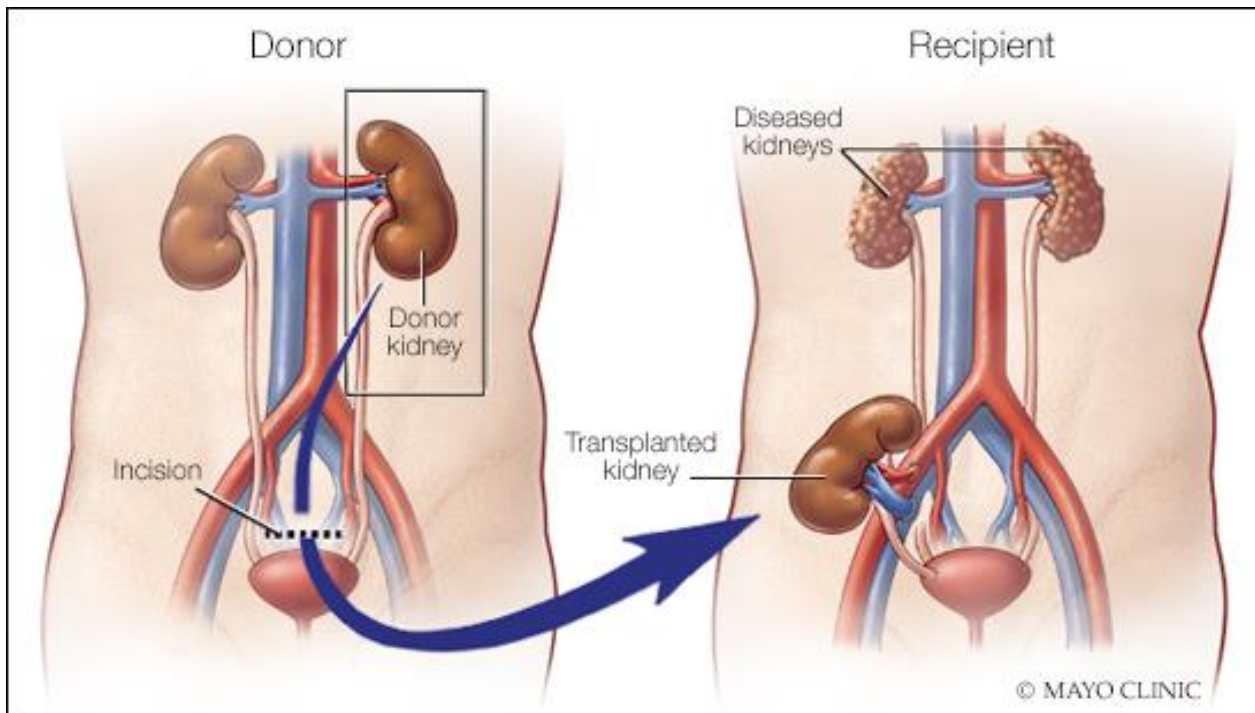
Horseshoe kidney & accessory renal artery



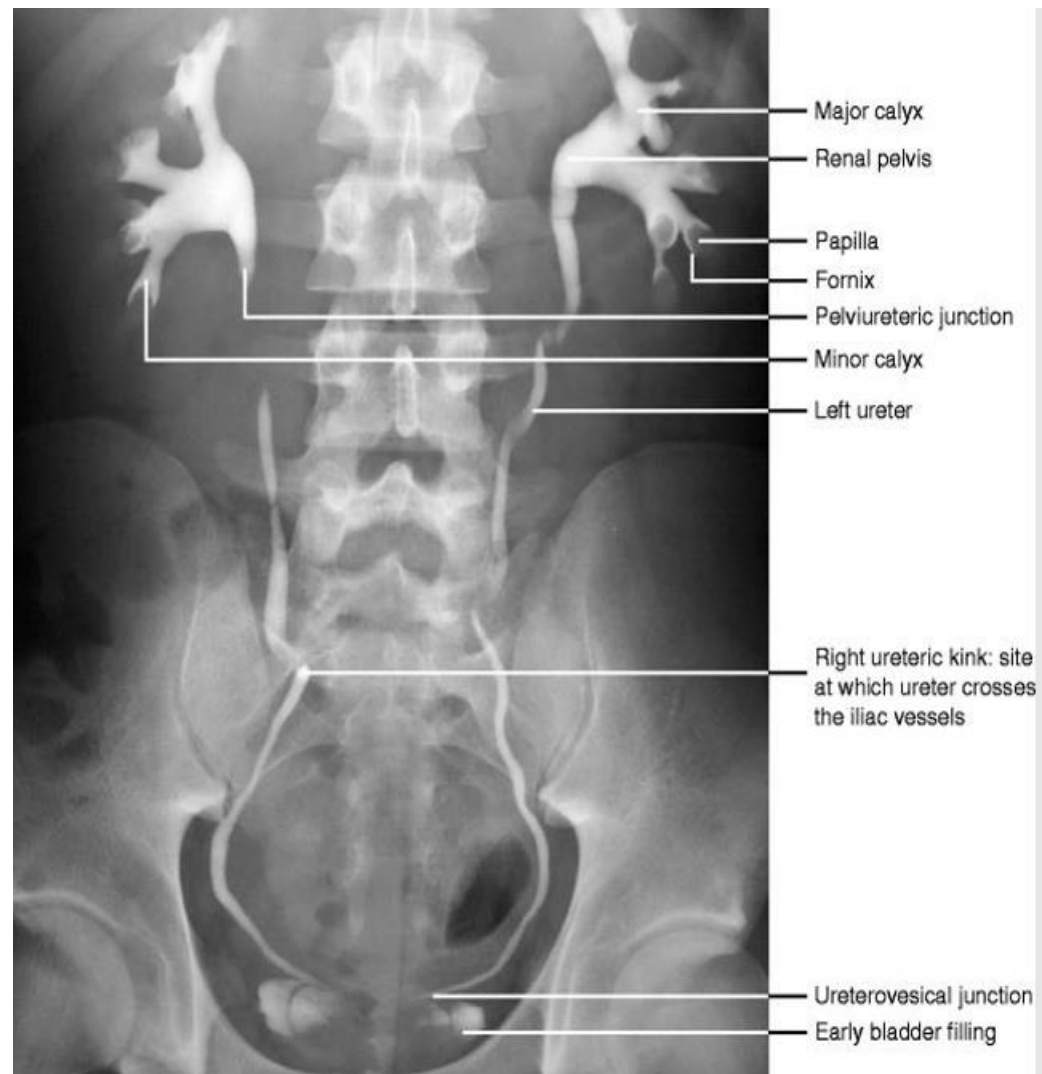
马蹄形肾与肾副动脉



Renal transplantation 肾移植



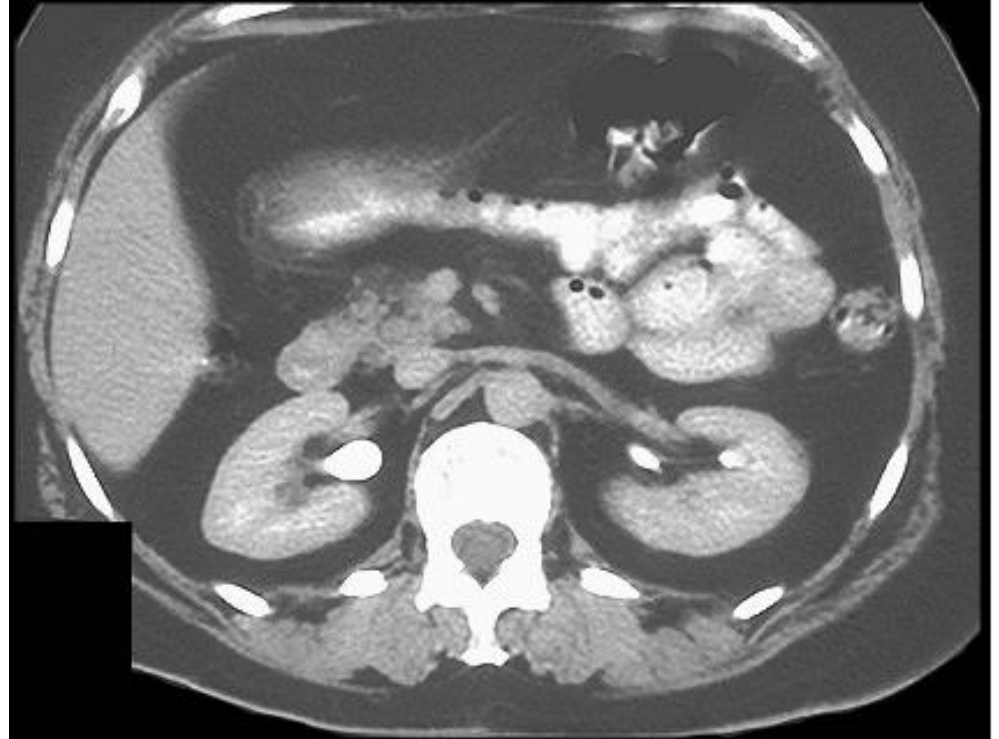
X-ray image of the kidneys



X-ray image & Introvenous urography

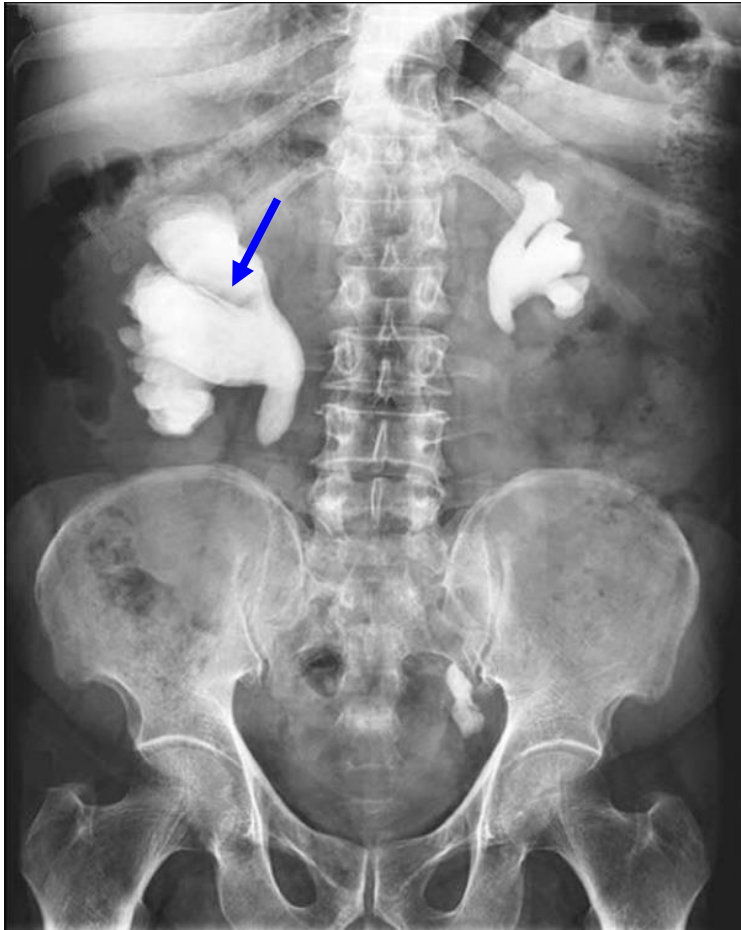


泌尿系统造影
Intravenous urography

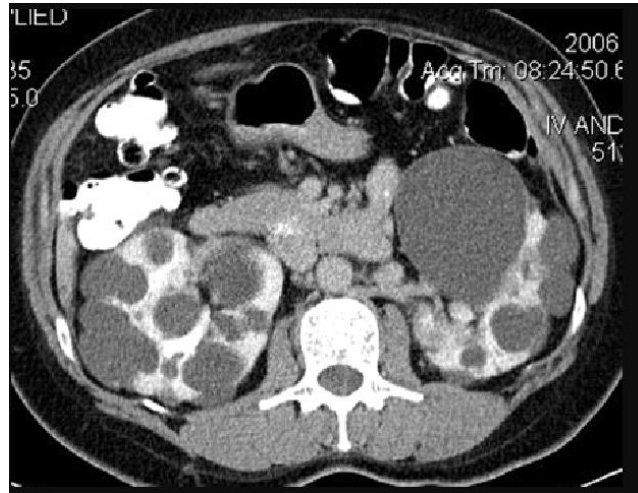
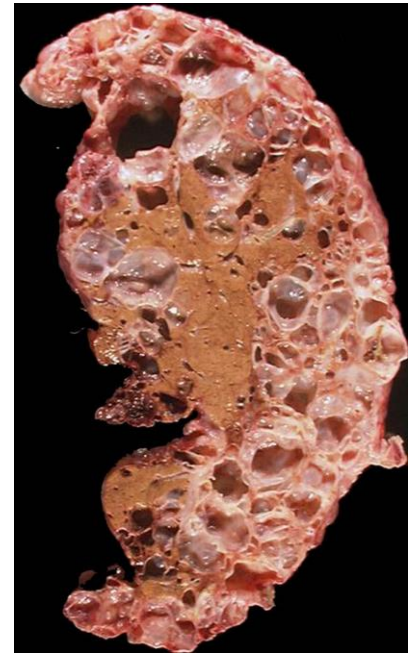


上腹部 Superior abdomen
经肾脏器官 Passing the kidney

X-ray image of the kidneys

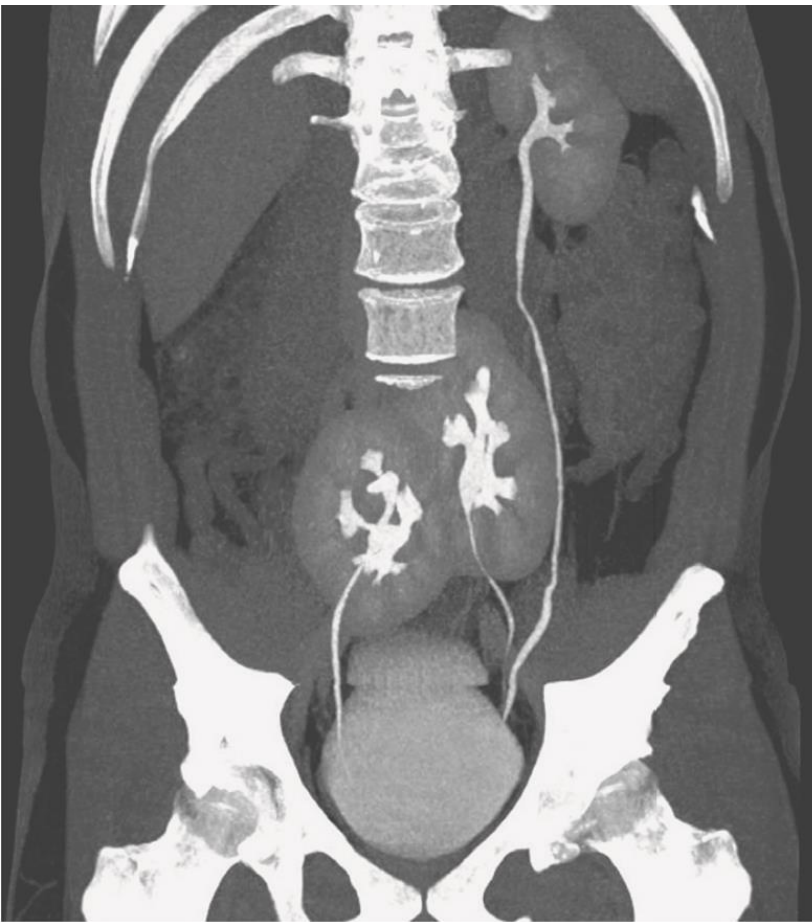


hydronephrosis
肾盂积水



Multicystic
Kidneys
多囊肾

3 kidneys in one person & double ureters one side

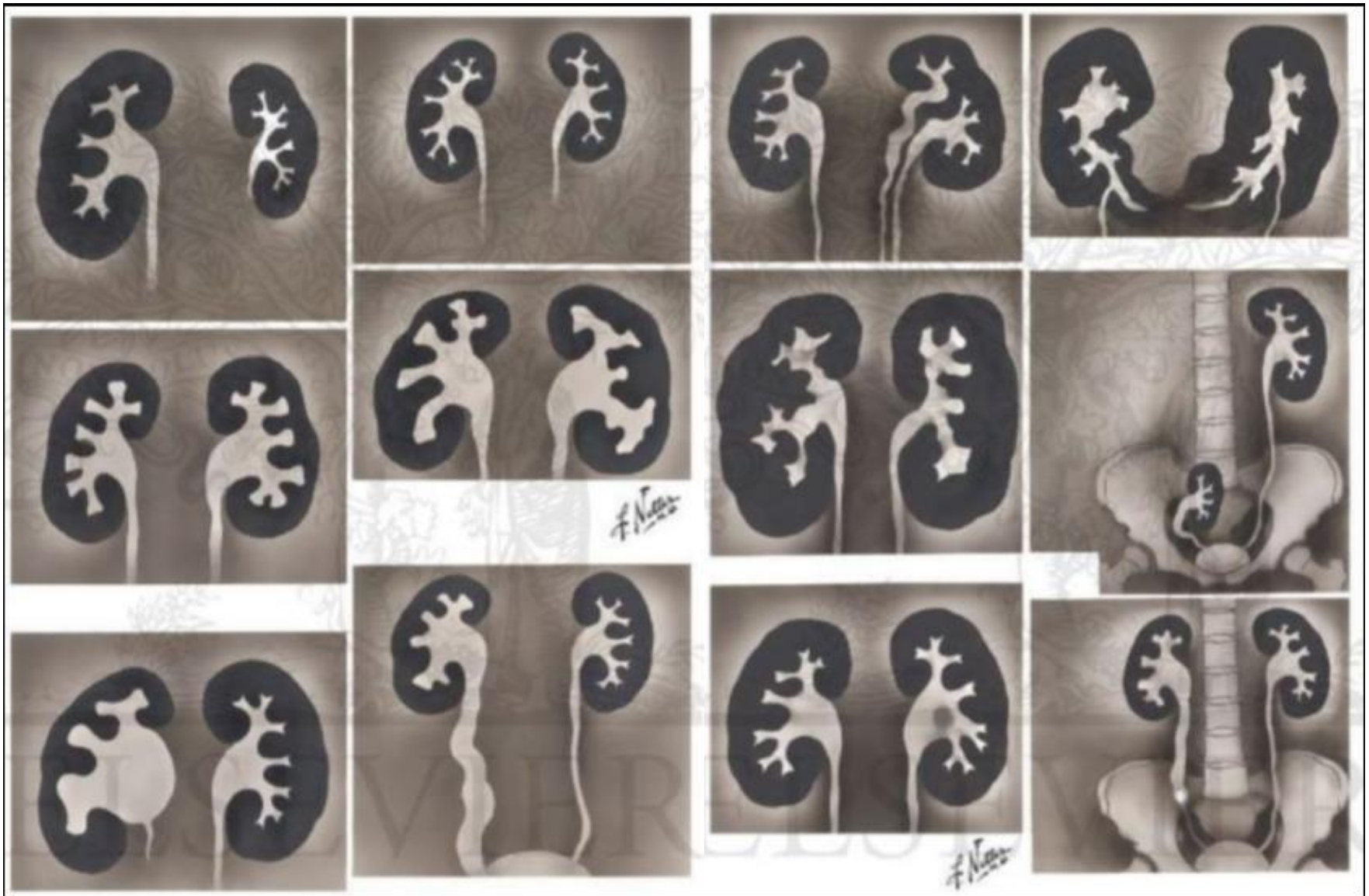


3 kidneys in one person



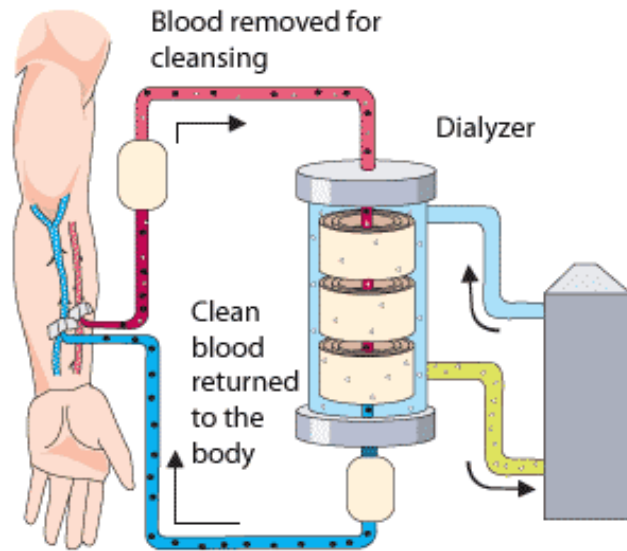
Double ureters one side

Renal pelvis and calyces 肾盂与肾盏

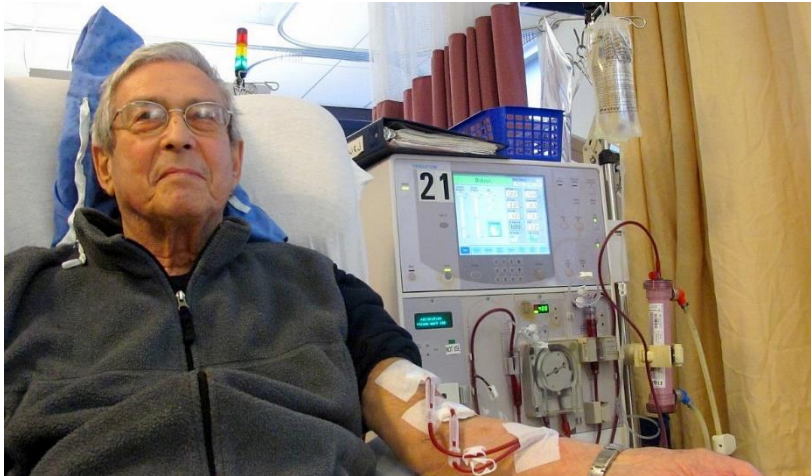
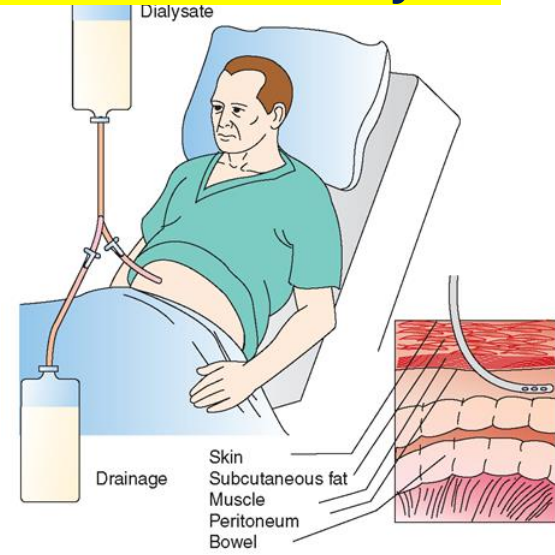


Blood dialysis & peritoneal dialysis 腹膜与血液透析

Blood dialysis

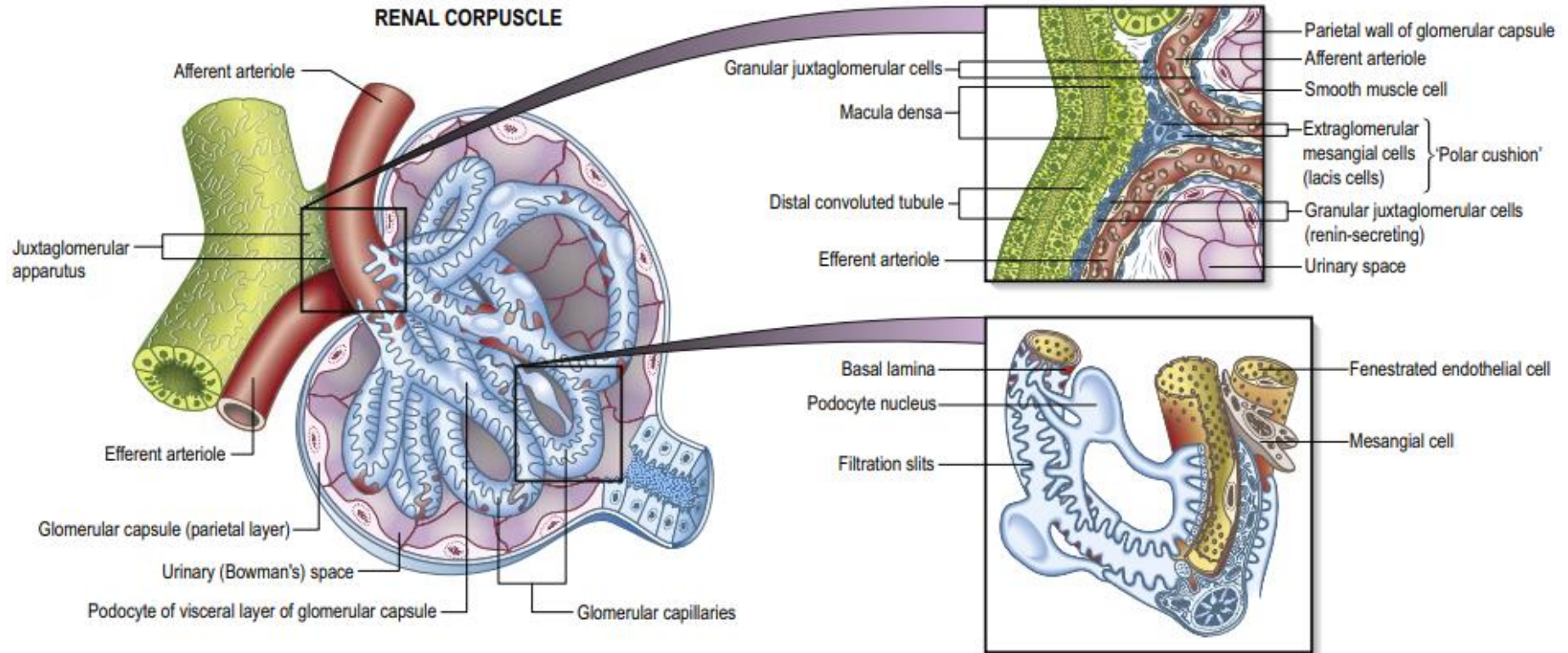


Peritoneal dialysis

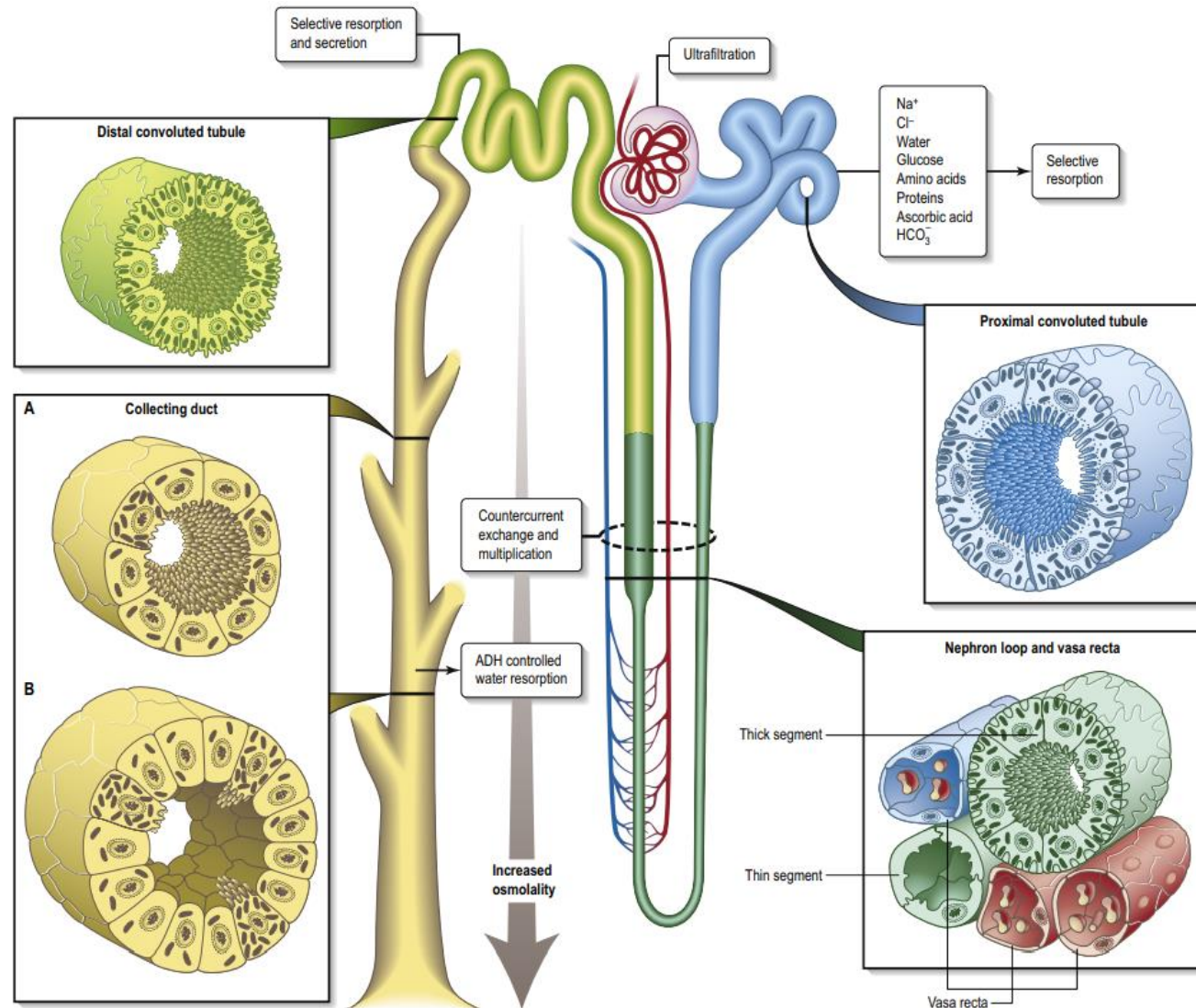


原理：肾脏功能障碍时，用人工的方法排除溶解在血液中的代谢废物。

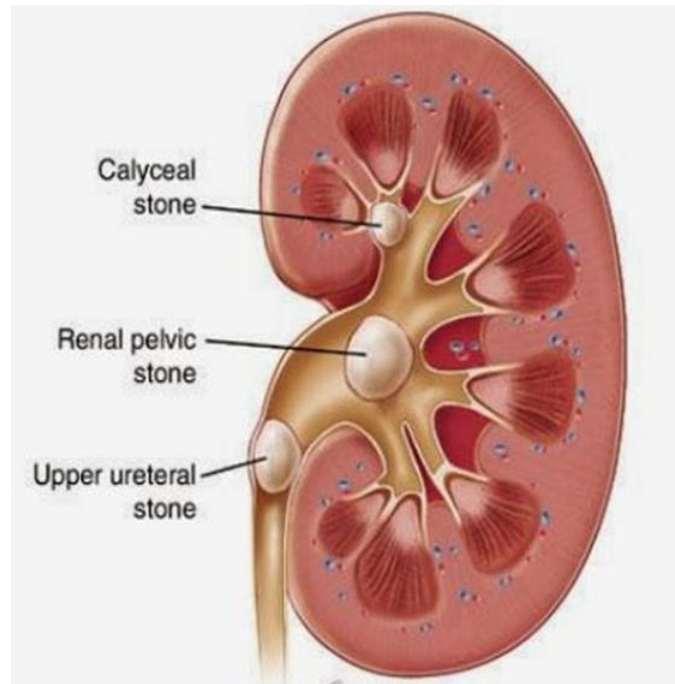
Ultrastructure of glomerulus 肾小球的超微结构



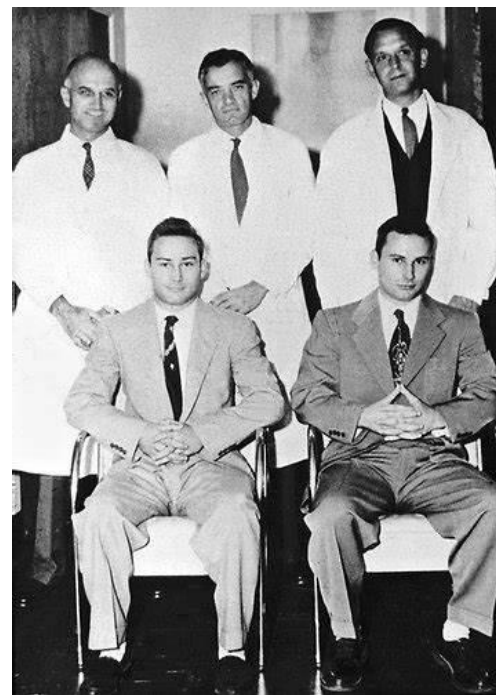
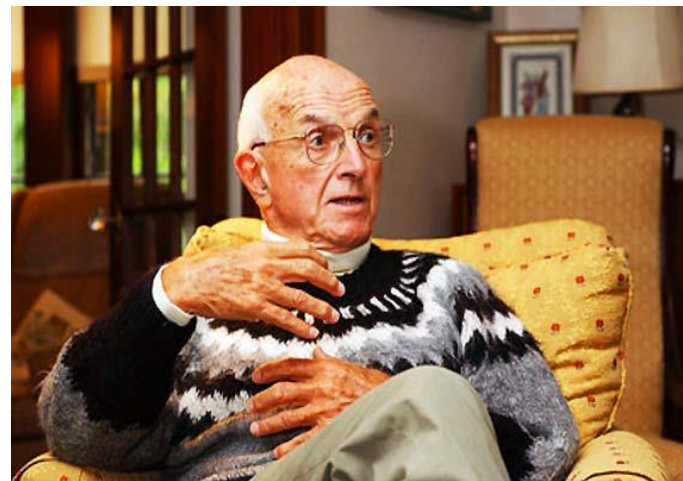
The regional microstructure and principal activities of a nephron and collecting duct.



Urinary system stone 泌尿系结石



美国默瑞完成世界首例同卵双胞胎肾移植(活8年, 1954)



Related diseases related to the kidneys

1. 肾炎 nephritis
2. 肾结石 kidney stones
3. 肾积水 hydronephrosis
4. 多囊肾 polycystic kidney
5. 尿毒症（慢性肾功能衰竭） uremia
6. 马蹄肾 horseshoe kidney
7. 肾肿瘤 renal tumor
8. 肾移植 renal transplantation

Urinary Ureters 输尿管

◆ Muscular tube, 25cm

◆ 3 parts

1-Abdominal part 腹部

在肾盂与输尿管移行处至骨盆入口

2-Pelvic part 盆部

穿过髂总动脉处至膀胱

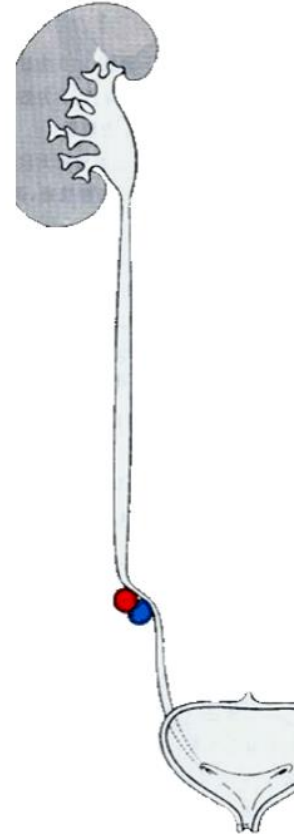
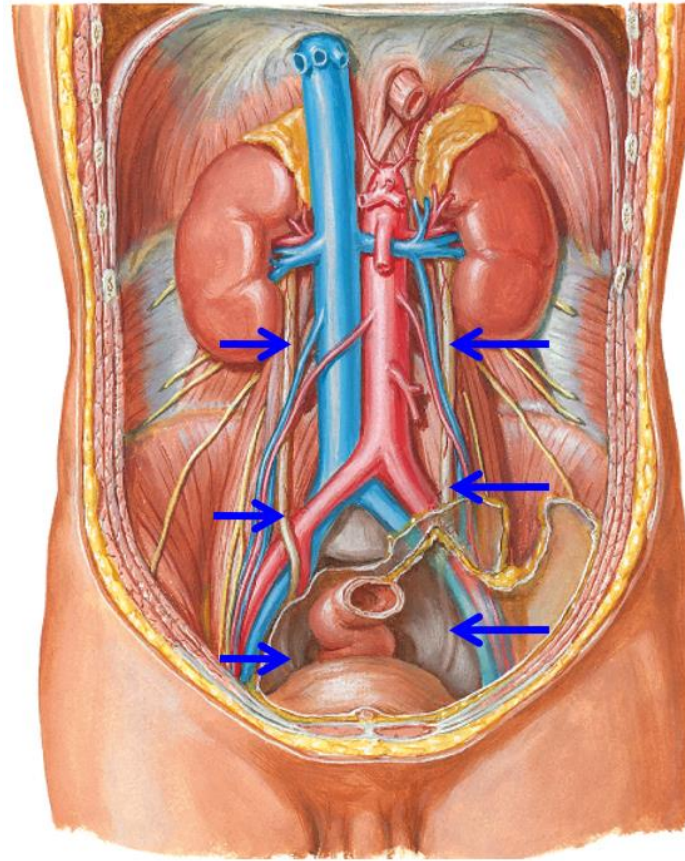
3-Intramural part 壁内部

穿过膀胱壁处

Clinical significance

结石容易滞留处，炎症好发。

输尿管结石，疼痛难忍-绞痛



Kidney in situ (anterior view)

Three strictures of ureters 输尿管三个狭窄

3 strictures 狭窄

第一个狭窄:

在肾盂与输尿管移行处

第二个狭窄

穿过髂总动脉处

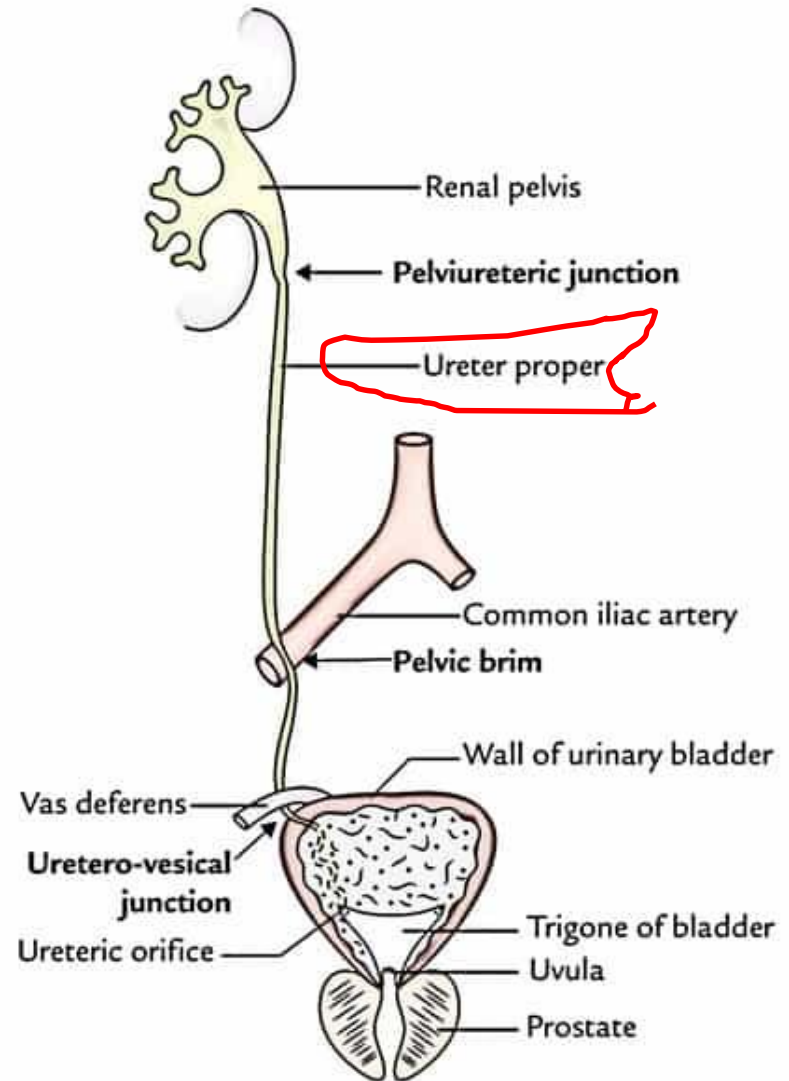
第三个狭窄

穿过膀胱壁内部

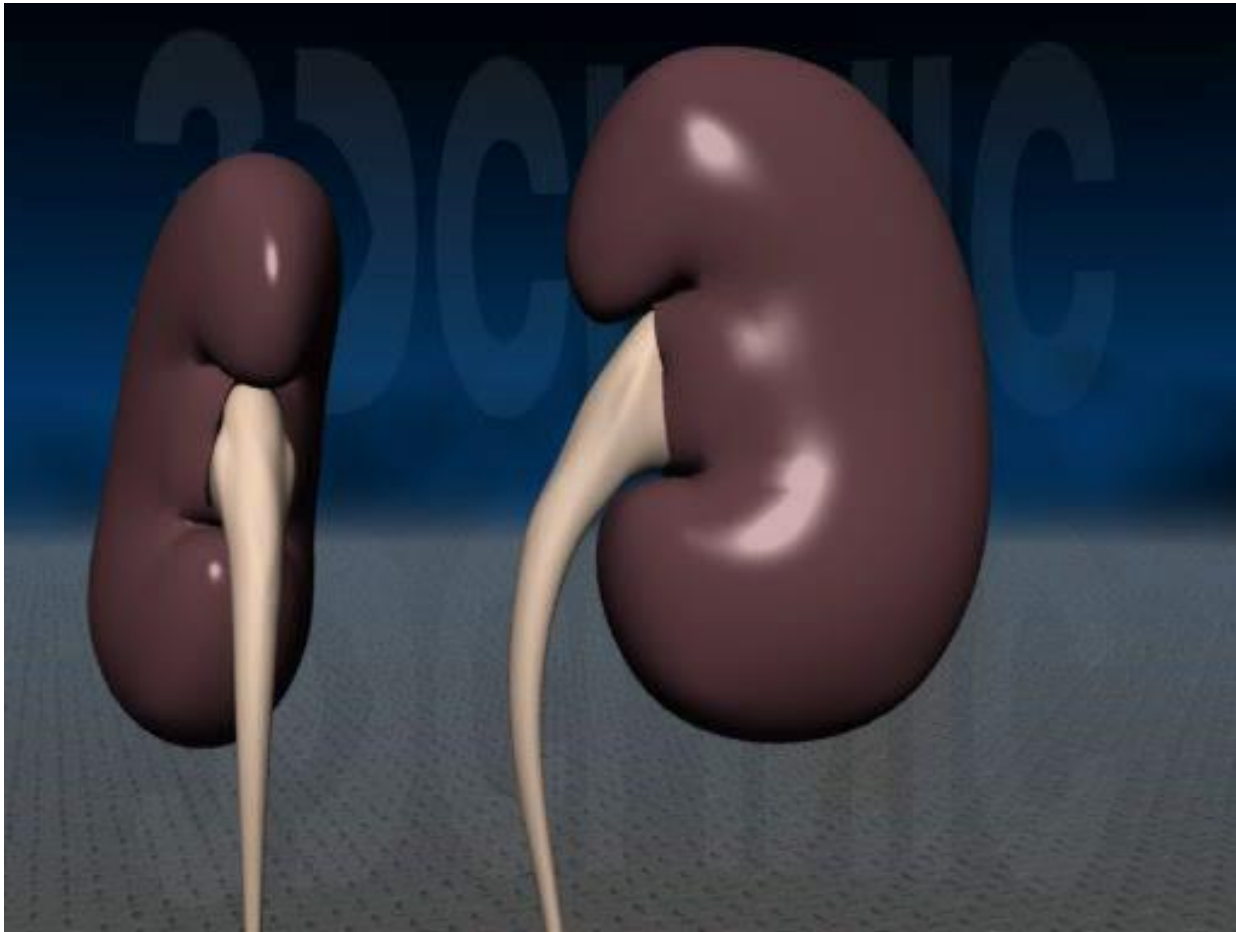
Clinical significance

结石容易滞留处，炎症好发。

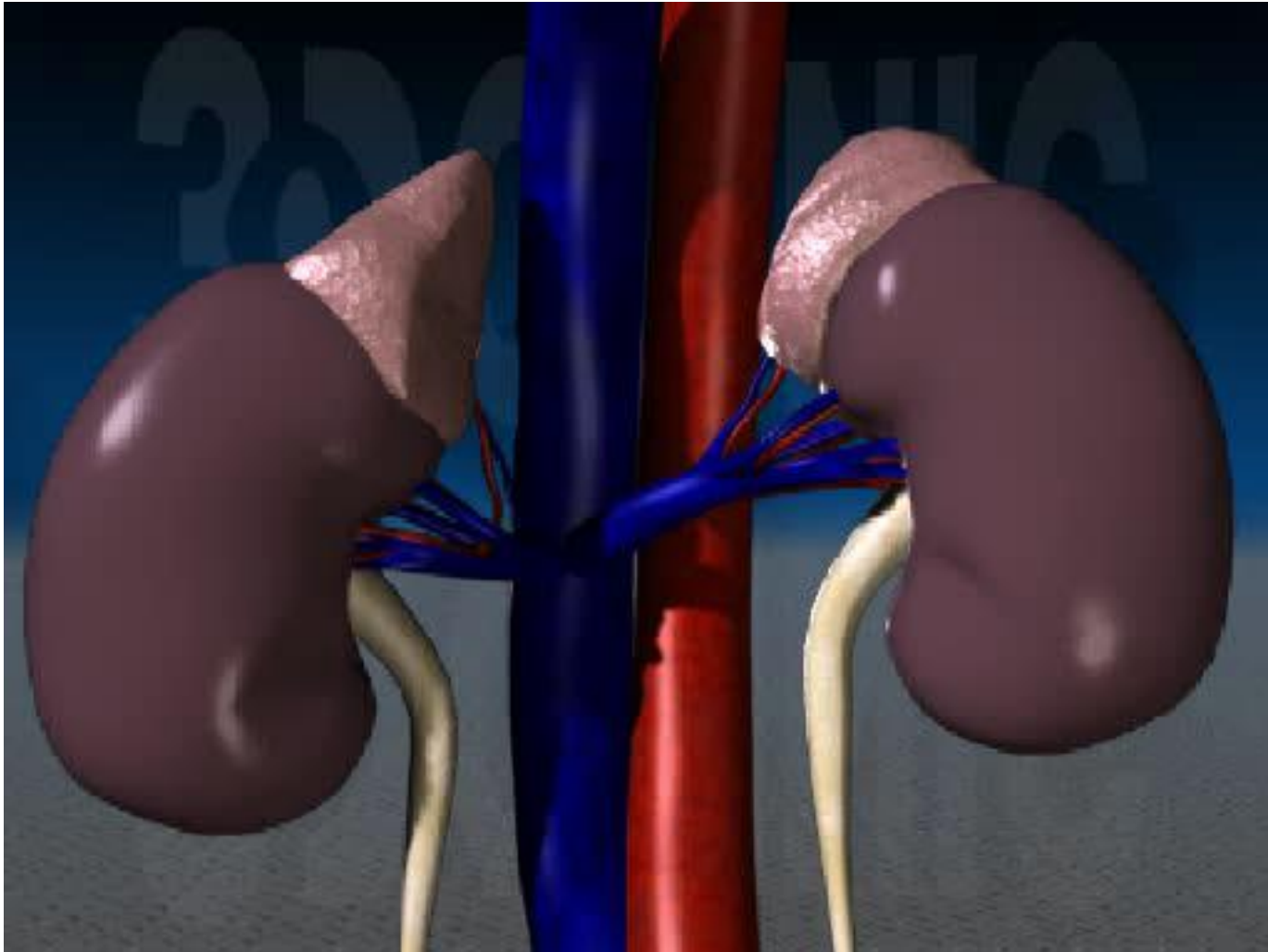
输尿管结石，疼痛难忍-绞痛



Ureter sand-like stone 泥沙样结石



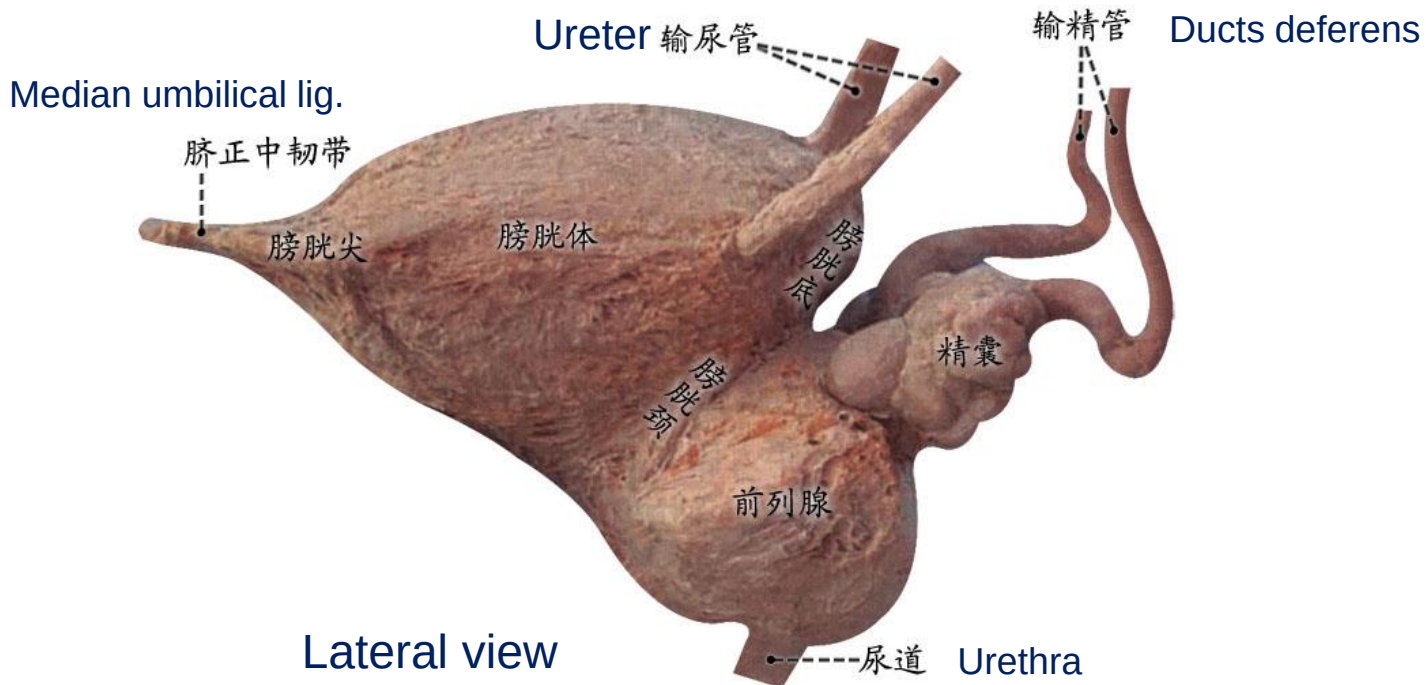
The fine structure of the kidney



Urinary bladder 膀胱

A urinary bank (volume is 400-500ml). Volume in newborn
Is 1/10 of that in adult. pyramidal in shape, when empty,

◆ 4 parts 1- Apex 2 – Fundus 3 - Body of bladder 4 - Neck

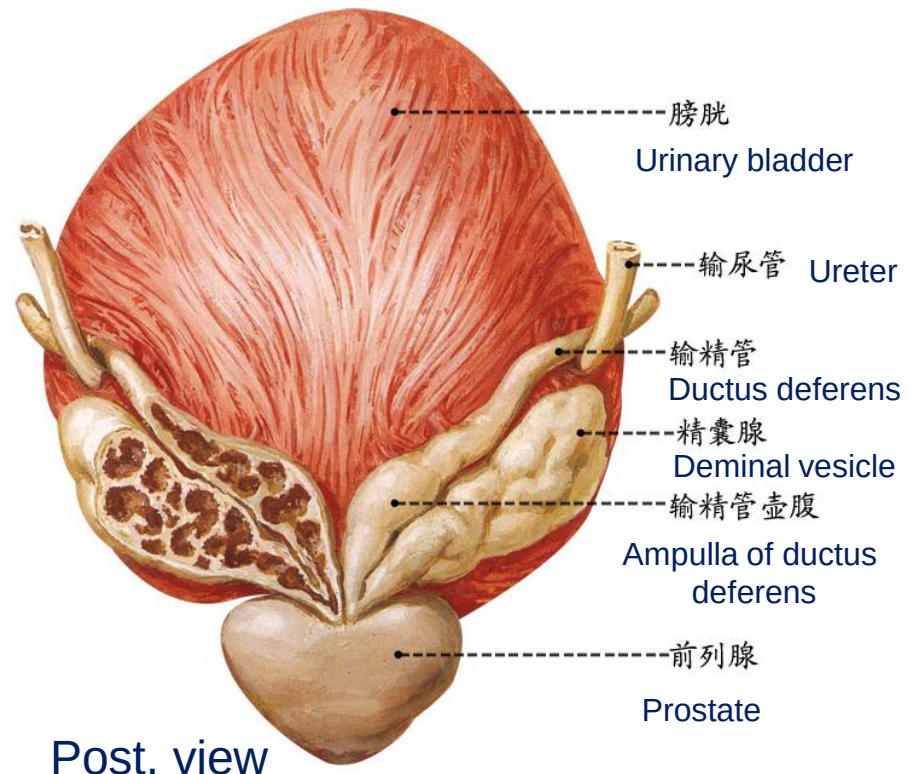
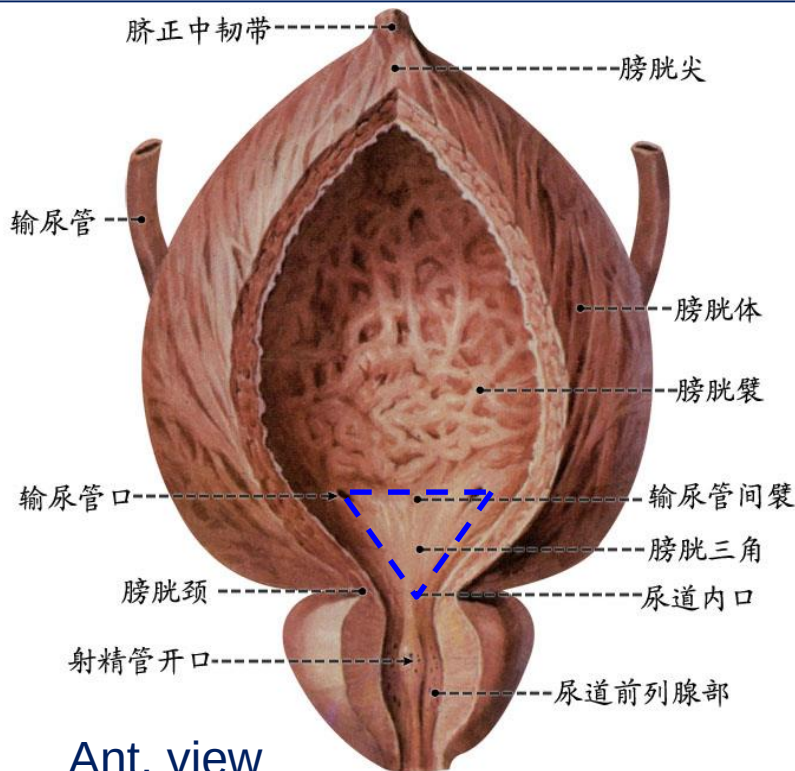


Urinary bladder

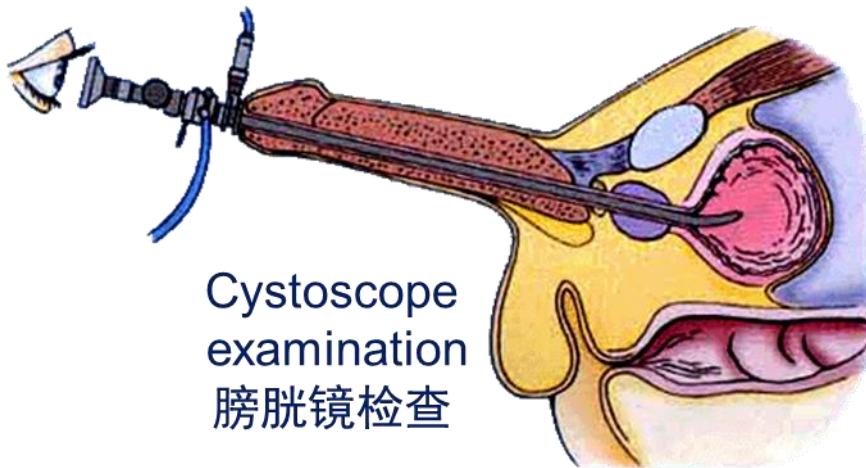
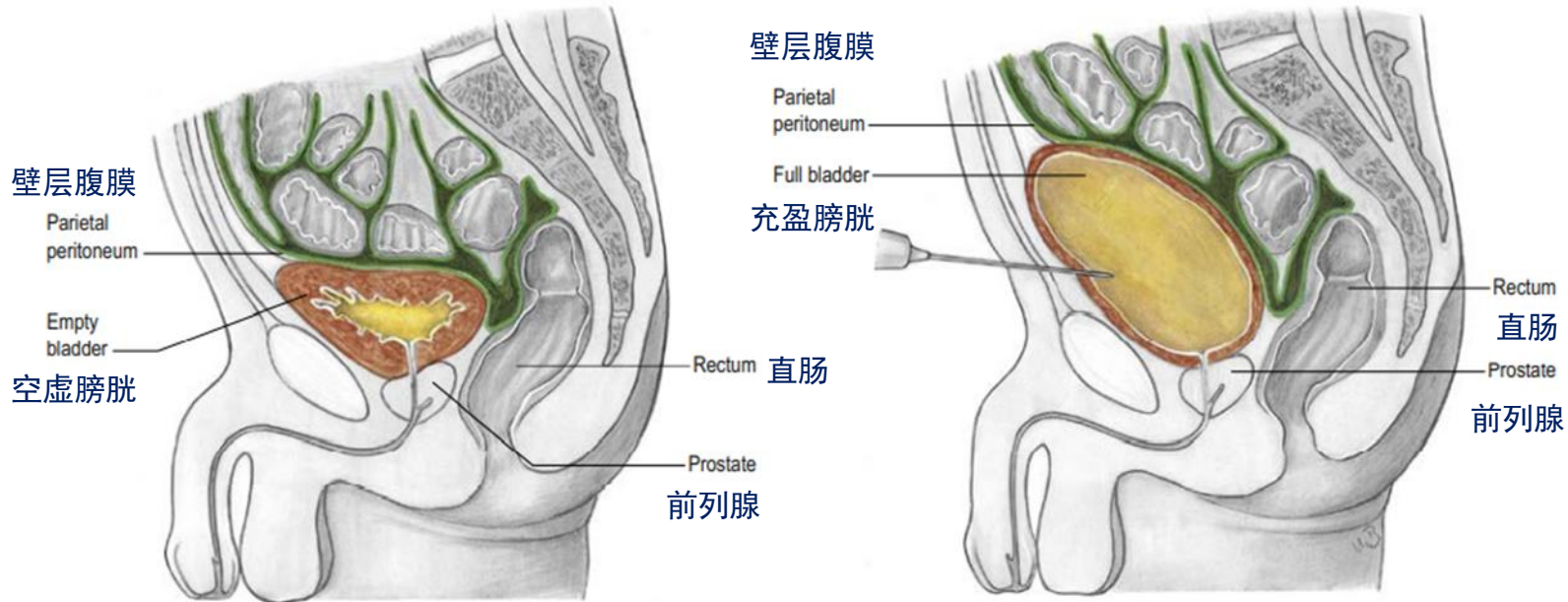
Trigone of bladder 膀胱三角

是位于膀胱底部内面左、右输尿管口（两口之间有输尿管间襞，是膀胱镜检是的重要标志）与尿道内口之间的一个三角形区域，该区由于缺乏粘膜下层，粘膜与肌肉直接相贴，无论是在充盈还是空虚均不形成粘膜皱襞，由于该区还是站立时膀胱的最低处，尿液在此处滞留时间最长。

Clinical significance 临床意义：是肿瘤，炎症，结核好发部位。



Location of bladder 膀胱的位置



1. 耻骨联合后方
2. 上有腹膜覆盖
3. 后方男女有别
4. 下有尿生殖隔
5. 新生儿高于成人
6. 位置因尿量不同而变化

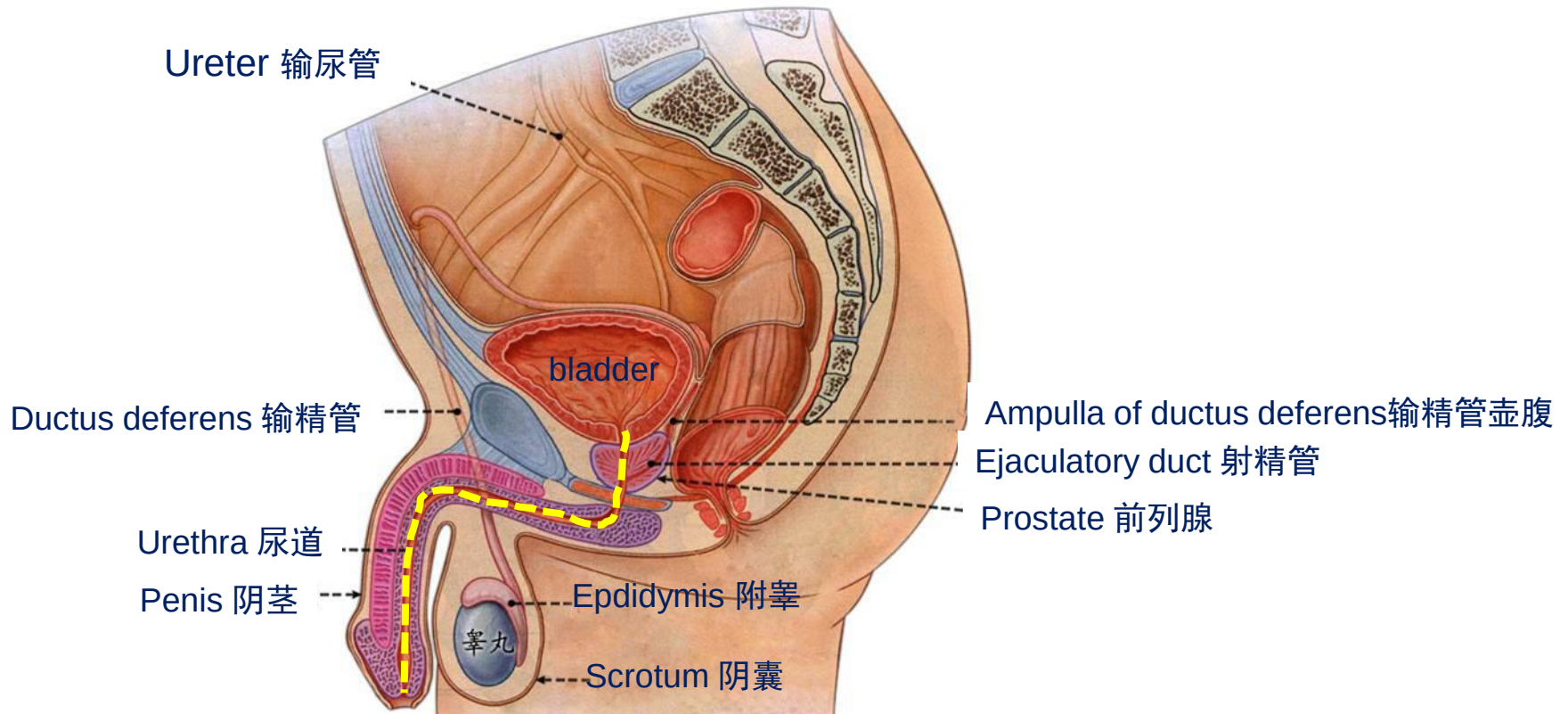
The tumor in urinary bladder 膀胱肿瘤



Male urethra 男性尿道

Male urethra

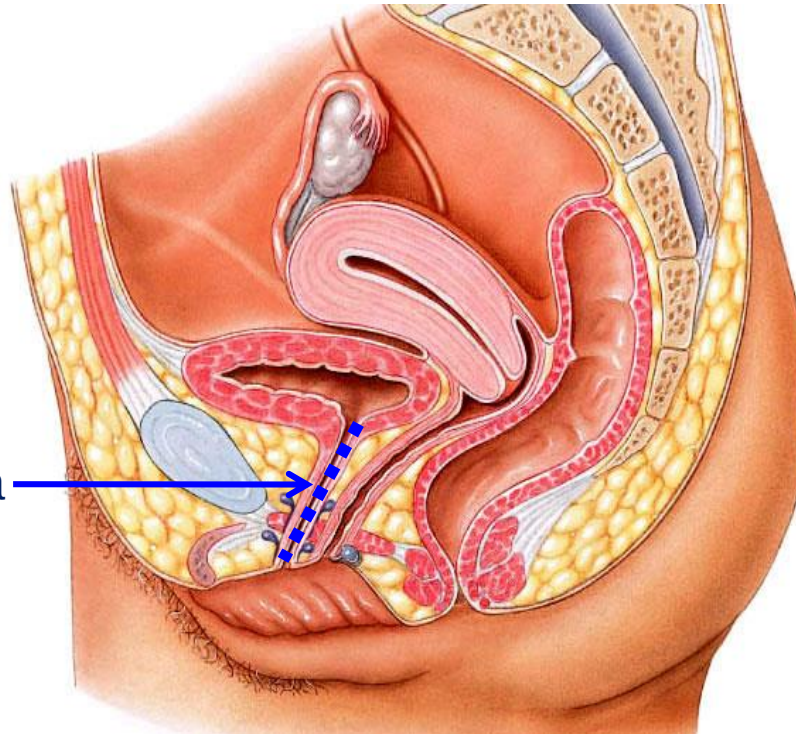
- ◆ Relatively longer than that of female (length 16-20cm) 细长弯。
- ◆ Locate between int.& ext. orifice of urethra. 位于尿道内外口之间。
- ◆ Detail description, see in male reproductive system. 不易患感染。



Female urethra 女性尿道

- ◆ Relatively **short** (about 5cm long), **wide** and **straight**, compared with the male urethra 短、宽、直.
- ◆ Opens into vaginal vestibule 阴道前庭.
- ◆ Male urethra will be learn in male genital system.
- ◆ Clinical importance: urethritis(easily infected) woman>man 易患感染.

Female urethra
女性尿道



Urinary system video



Urinary system video show



The important English words

1. Urinary system 泌尿系统
2. Kidney 肾
3. Superior extremity 上极
4. Renal hilum 肾门
5. Renal pedicle 肾蒂
6. Renal sinus 肾窦
7. Renal cortex 肾皮质
8. Renal medulla 肾髓质
9. Renal column 肾柱
10. Renal pyramid 肾椎体
11. Renal papilla 肾乳头
12. Renal calices 肾盏
13. Renal pelvis 肾盂
14. Fibrous capsule 纤维囊
15. Renal segment 肾段
16. Ureter 输尿管
17. Urinary bladder 膀胱
18. Trigone of bladder 膀胱三角
19. Ureteric orifice 输尿管口
20. Internal urethral orifice 尿道内口
21. Interureteric fold 输尿管间襞
22. Urethra 尿道
23. External orifice of urethra 尿道外口

高手在民间

一位农民伯伯上医院做尿检怕花钱，他自己在家搞免费检测，得出以下经验：尿在一棵树下，如果蚂蚁聚拢，是含糖高；如果苍蝇飞来，是有炎症；如果很快就干了，是含盐过多；要是肉味，是高胆固醇；如果忘记了脱裤衩，是老年痴呆；如根本闻不到尿味，是新冠肺炎！如果发黄，是上火；如果太清，是水喝多了，如果蚂蚁或者苍蝇都东倒西歪-那是酒喝多了；如果那棵树死了，那是吃的蔬菜除草剂含量过高；如果蚂蚁或者苍蝇都死了，那是吃的农药残留高！

“高手在民间”～

The important content you have to master

1. The constitution and function of urinary system.
2. The shape, position, covering of the kidney.
3. The structures and arrangement of the renal hilum.
4. The position, shape and divisions of the ureter.
5. The shape, position and mucosa feature of urinary bladder.
6. The concept of trigone of urinary bladder.
7. The morphological feature of both male and female urethra.



See you next time!