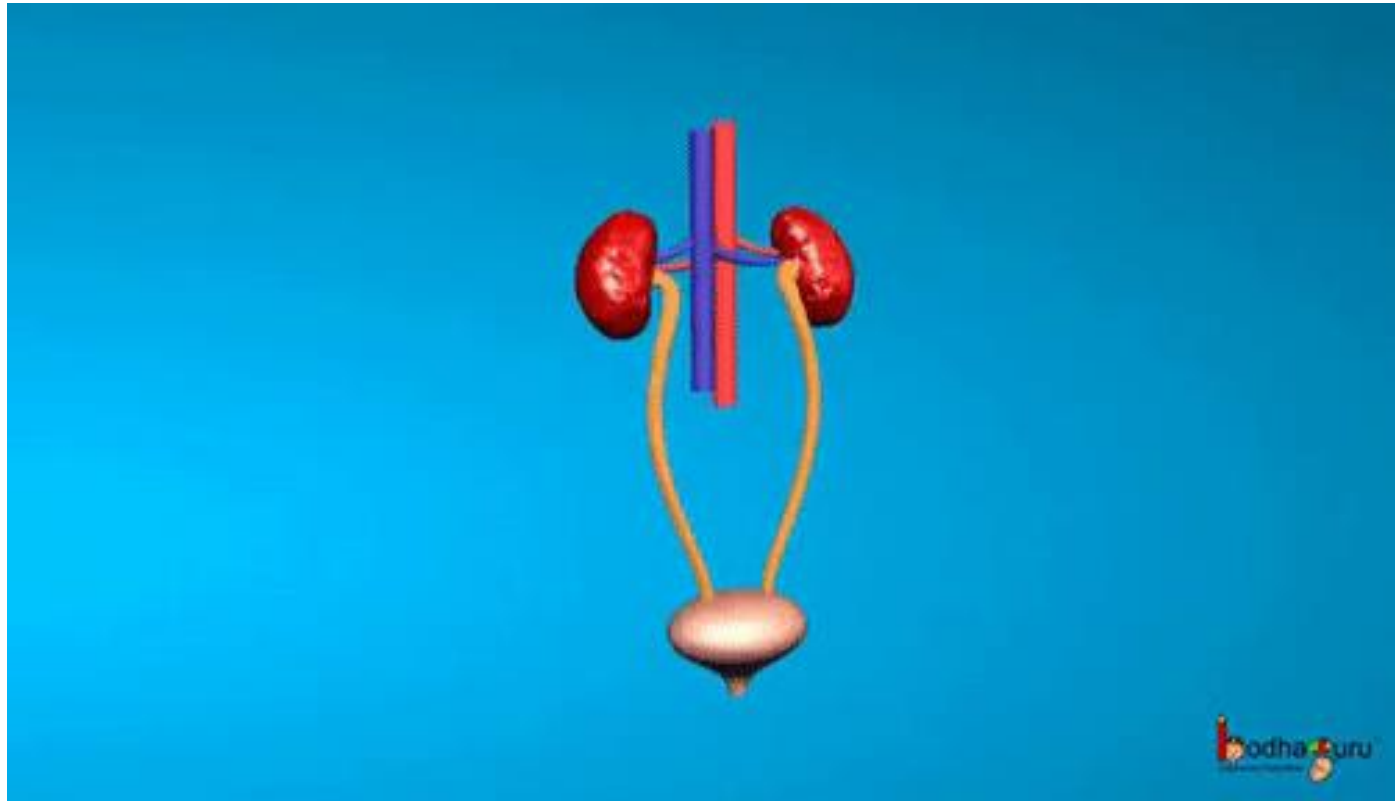


Renal Physiology – Introductory Lecture



Dr Sunita Mittal

Learning Objectives

To understand:

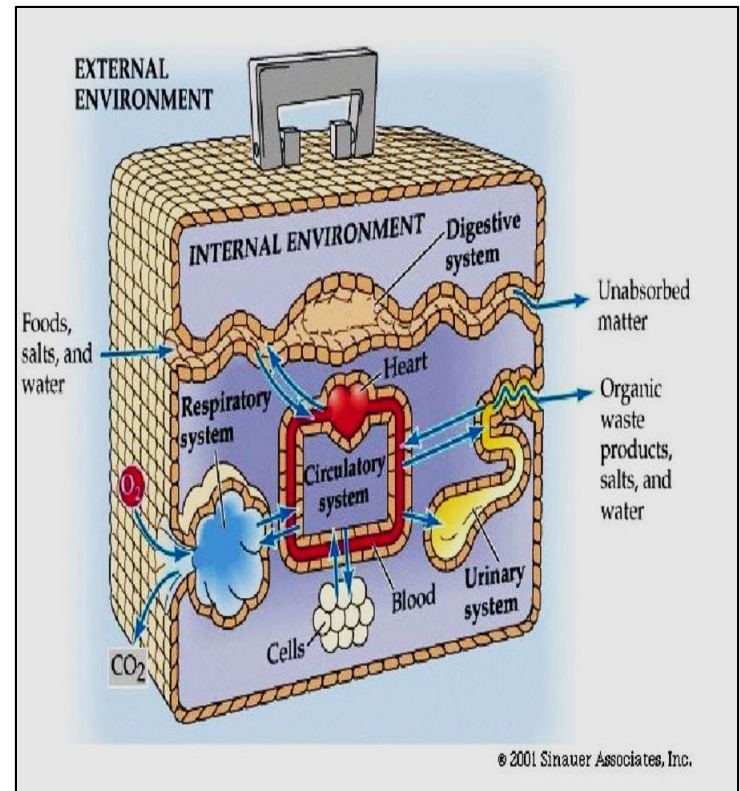
- 'Physiologic' freedom
- Components of Urinary/Excretory/Renal system
- External features & location of kidneys & applied aspects.
- Inner structure of kidneys



Introduction to Renal system

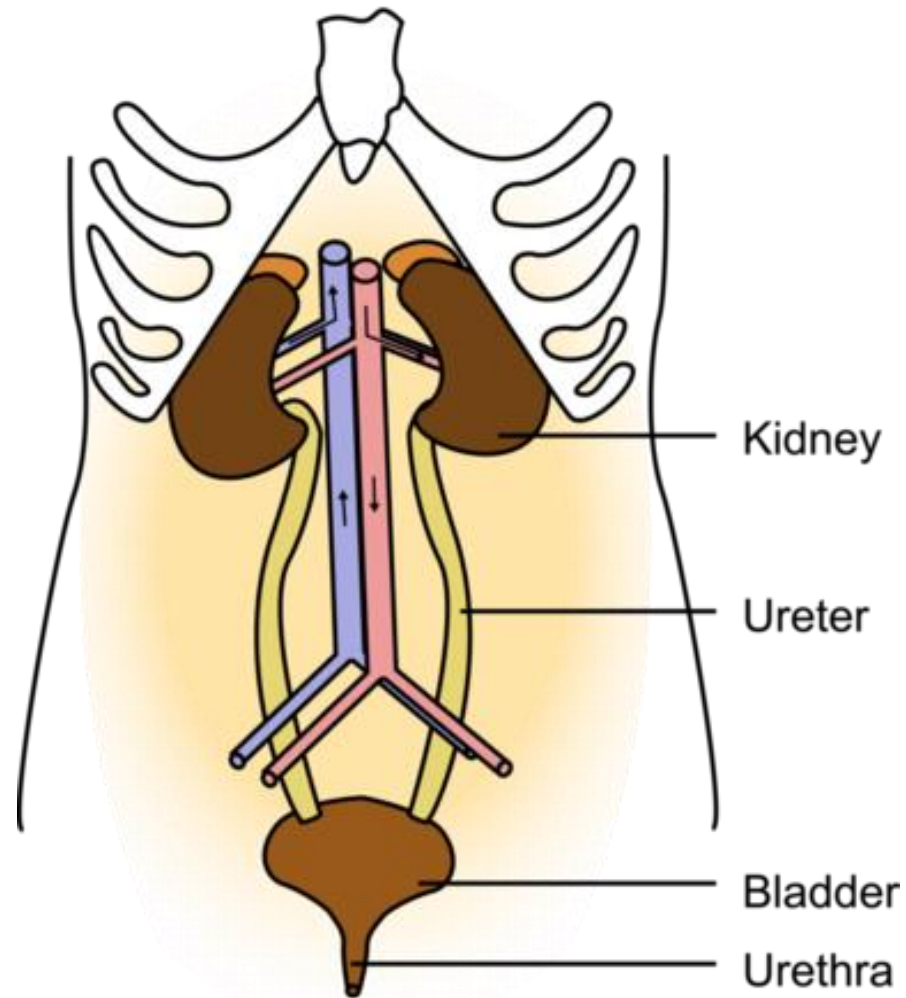
**Kidneys play very imp role
to keep**

**Constancy of 'internal milieu'
&
allow 'physiologic freedom'**



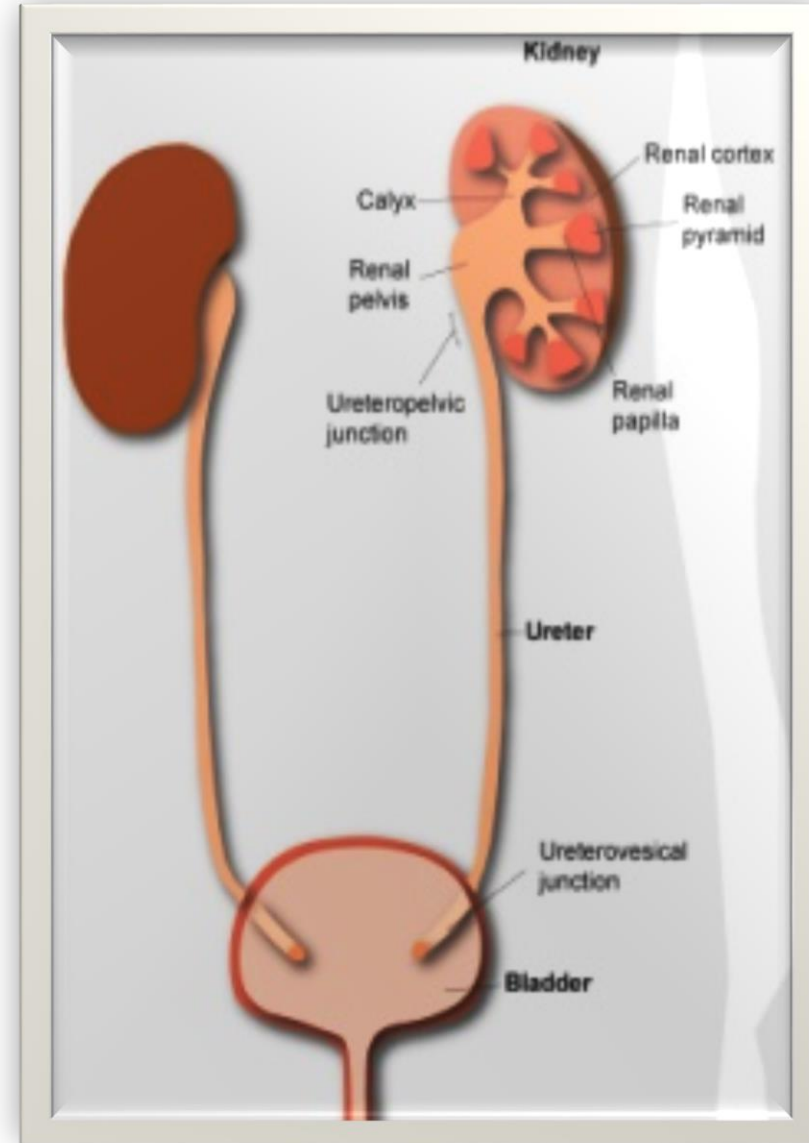
Physiologic freedom is possible as kidneys can modulate the processes of **excretion** according to need.

Excretory System/Urinary System-components



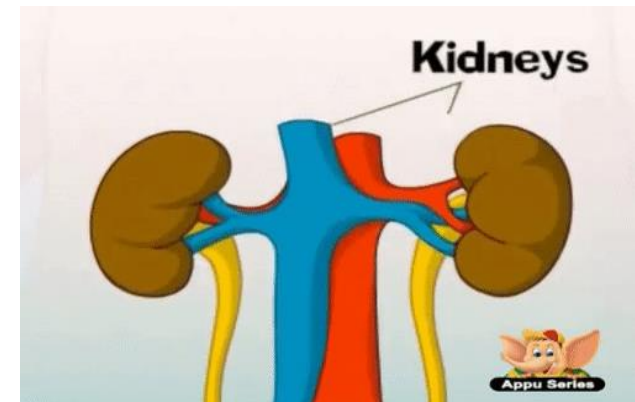
Excretory System/Urinary System- Structures and function

- Kidneys
- Urinary tract
- Urinary bladder
- Urethra

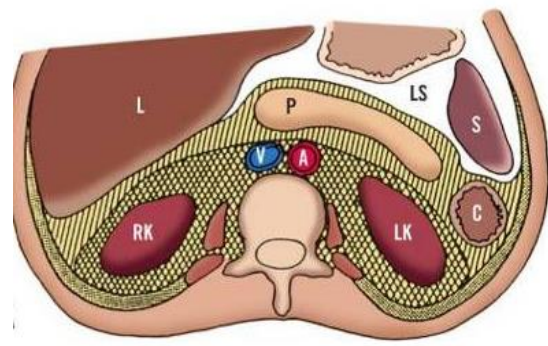
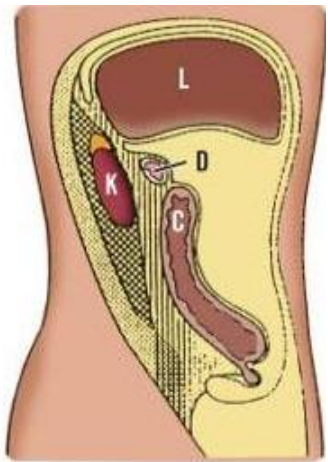


External structure of Kidneys

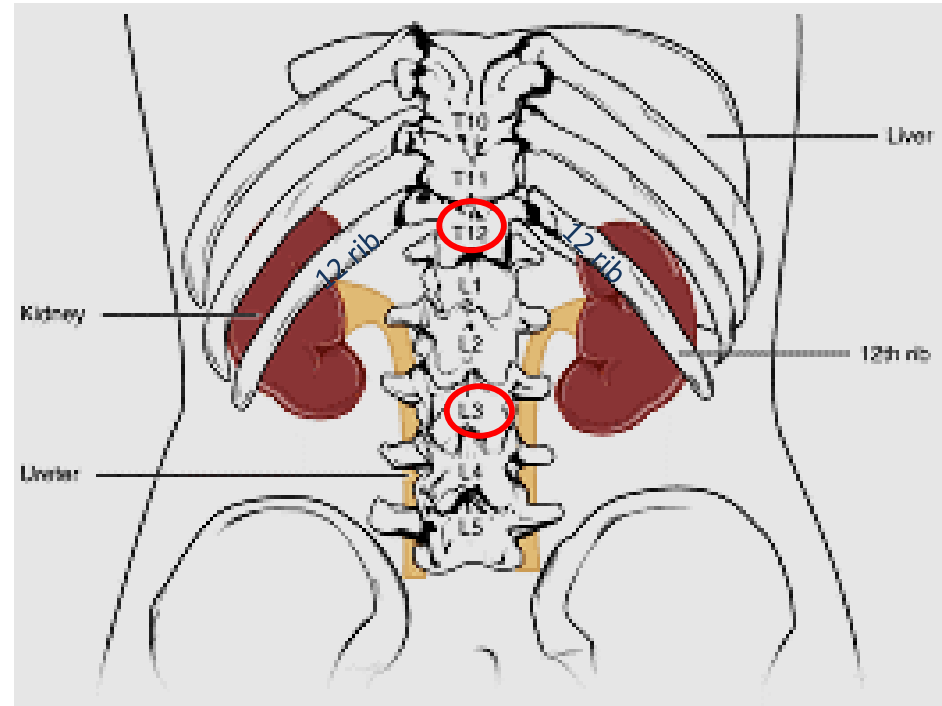
- Kidneys –
paired, reddish, bean
shaped organs,



Location of Kidneys-Located retroperitoneally

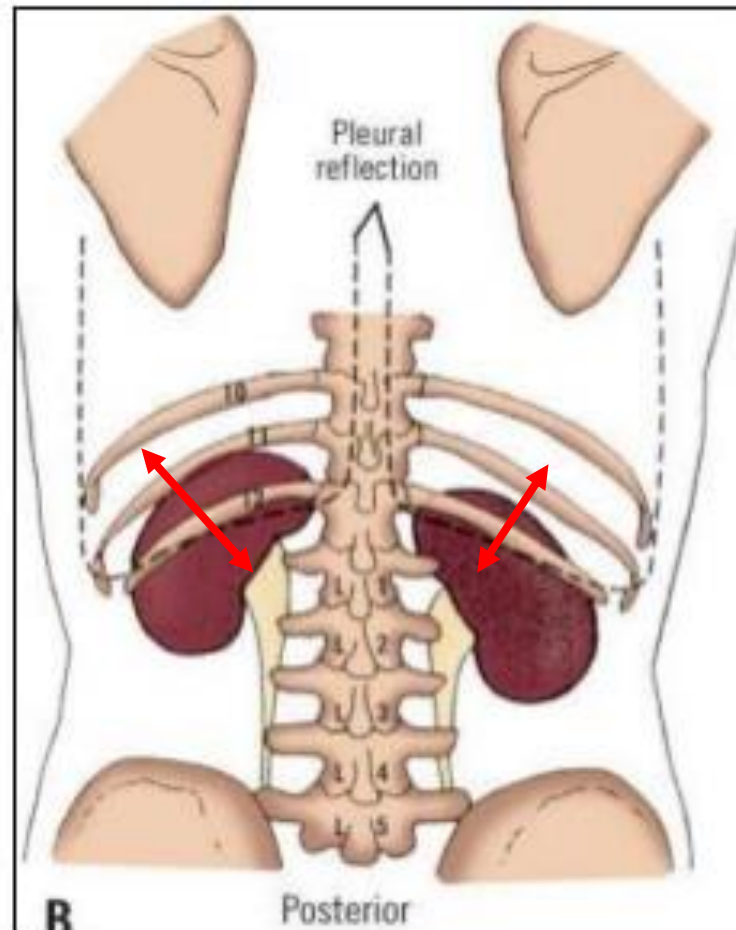


L: Liver, P: Pancreas, LS: Lesser sac, S: Spleen, C: Colon, V: Inferior vena cava, A: Abdominal aorta, D: Duodenum, RK: Right kidney, LK: Left kidney



Applied aspect

if these lower ribs are fractured (#) by trauma – they can puncture the kidneys & cause major damage.



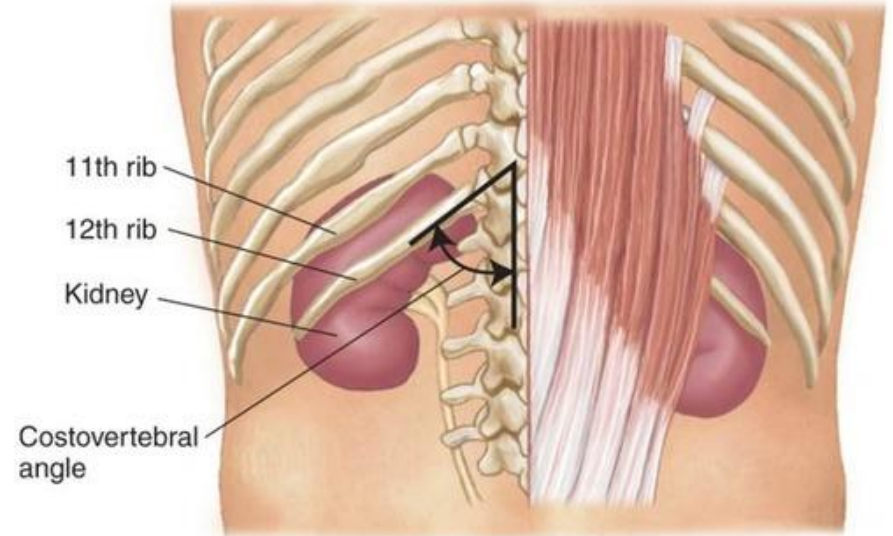
Applied: 'Loin to Groin' Pain



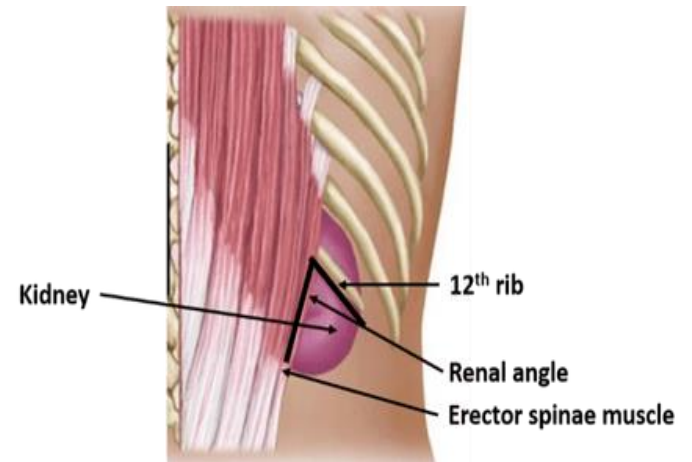
Applied: Tenderness of Costovertebral angle (CVA)

Causes

- renal stone
- pyelonephritis
- perinephric abscess



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Applied: Tenderness of Costovertebral angle (CVA)

*Because the kidney is directly anterior to this area, tapping disturbs the inflamed tissue, **causing pain.**

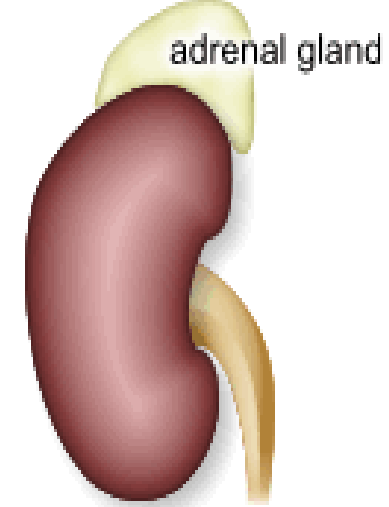


Ulnar Surface

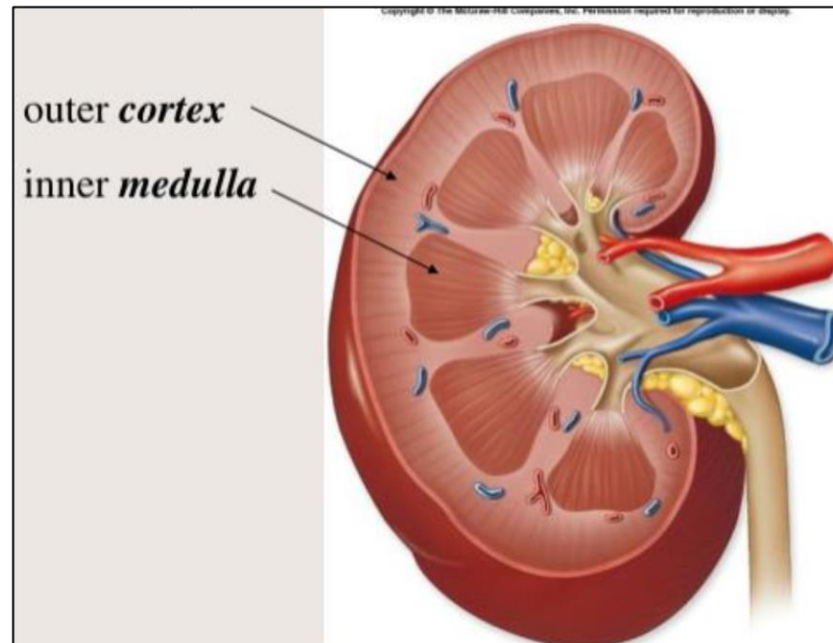
Inner structure of kidney

A frontal section through kidney shows two distinct regions:

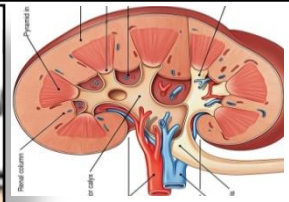
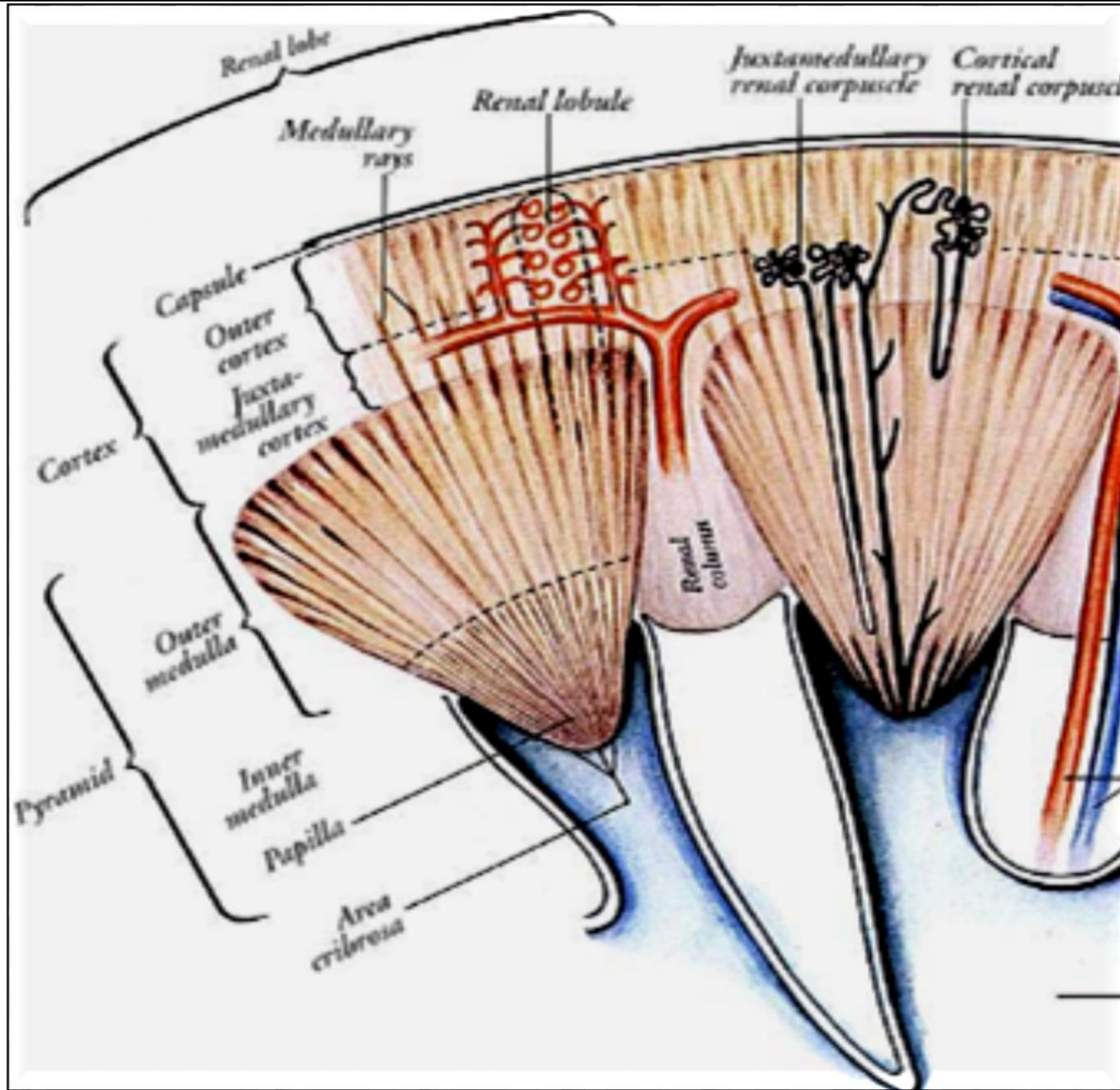
1. Superficial (outer) **renal cortex**
2. Deep (inner region) is called **renal medulla**



Together, renal cortex & renal pyramids constitute renal **parenchyma**.



Inner structure of kidney - Cortex & Medulla



Functional Configuration of Kidney

Nephrons



'papillae of renal pyramids'



Minor (8-9) and Major (3-4) calyces)



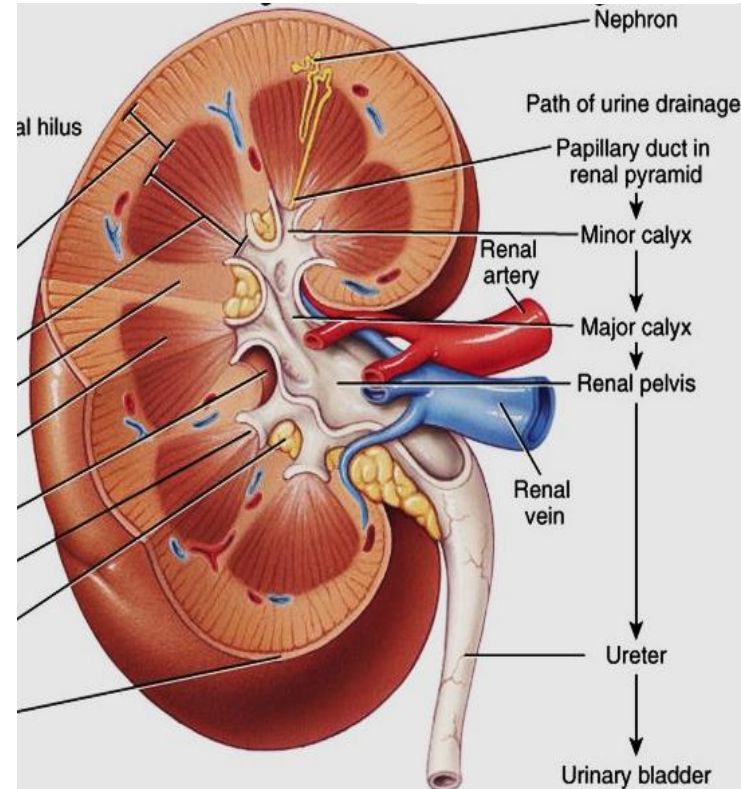
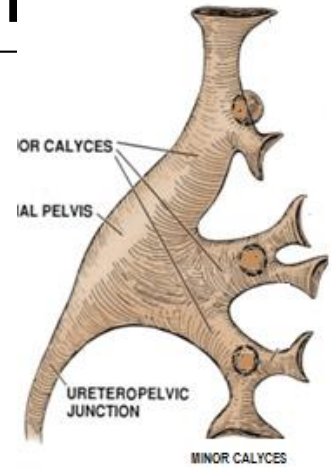
Renal pelvis (pelv- basin)



Out through ureter



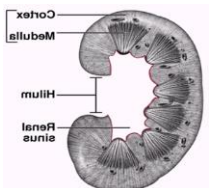
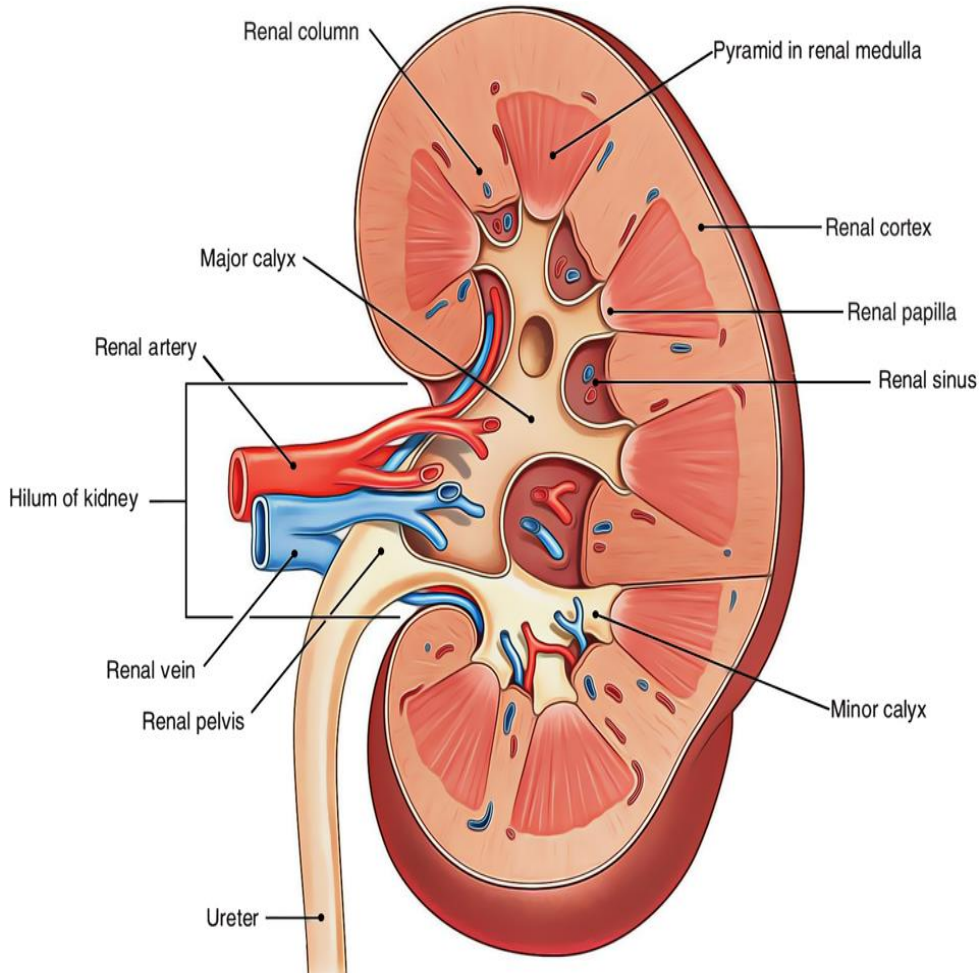
urinary bladder.



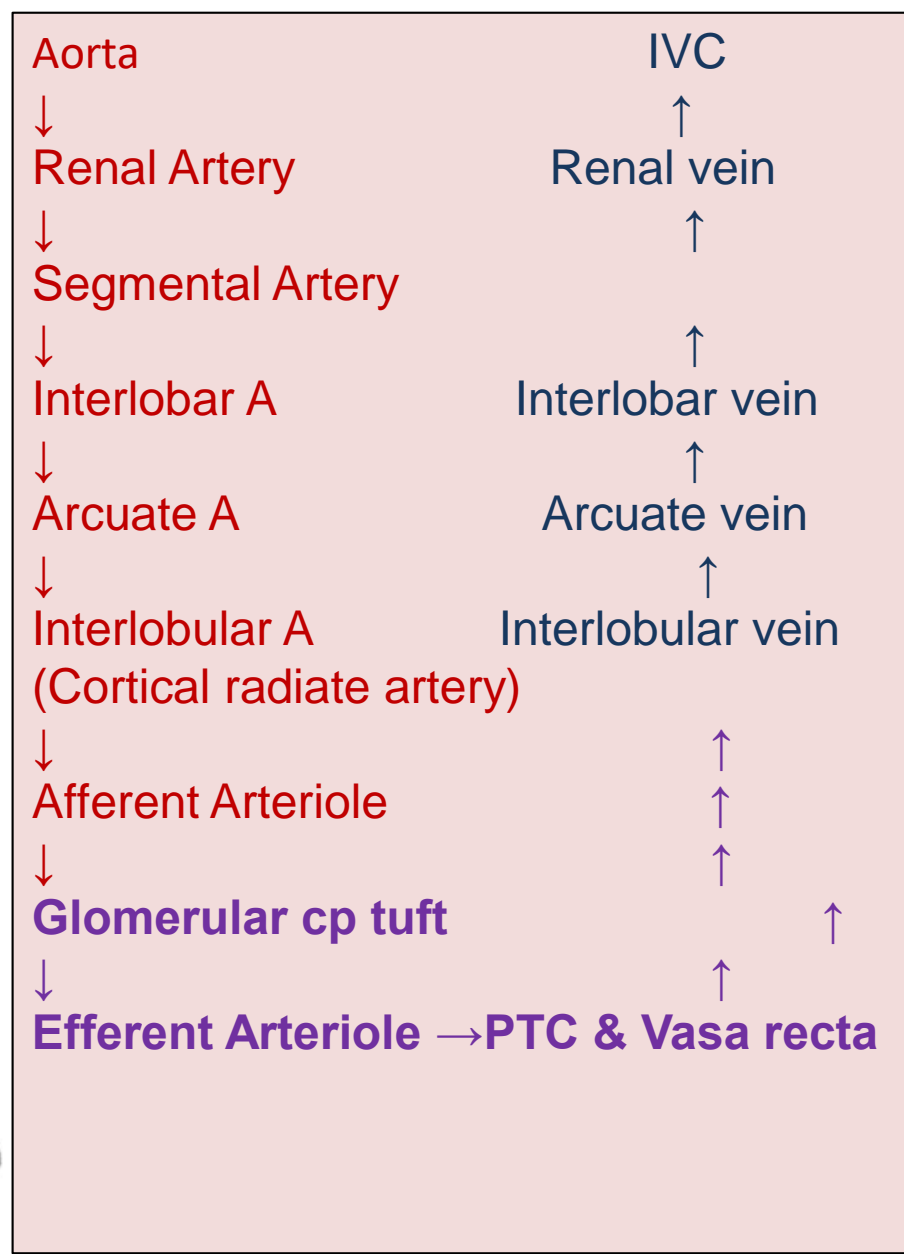
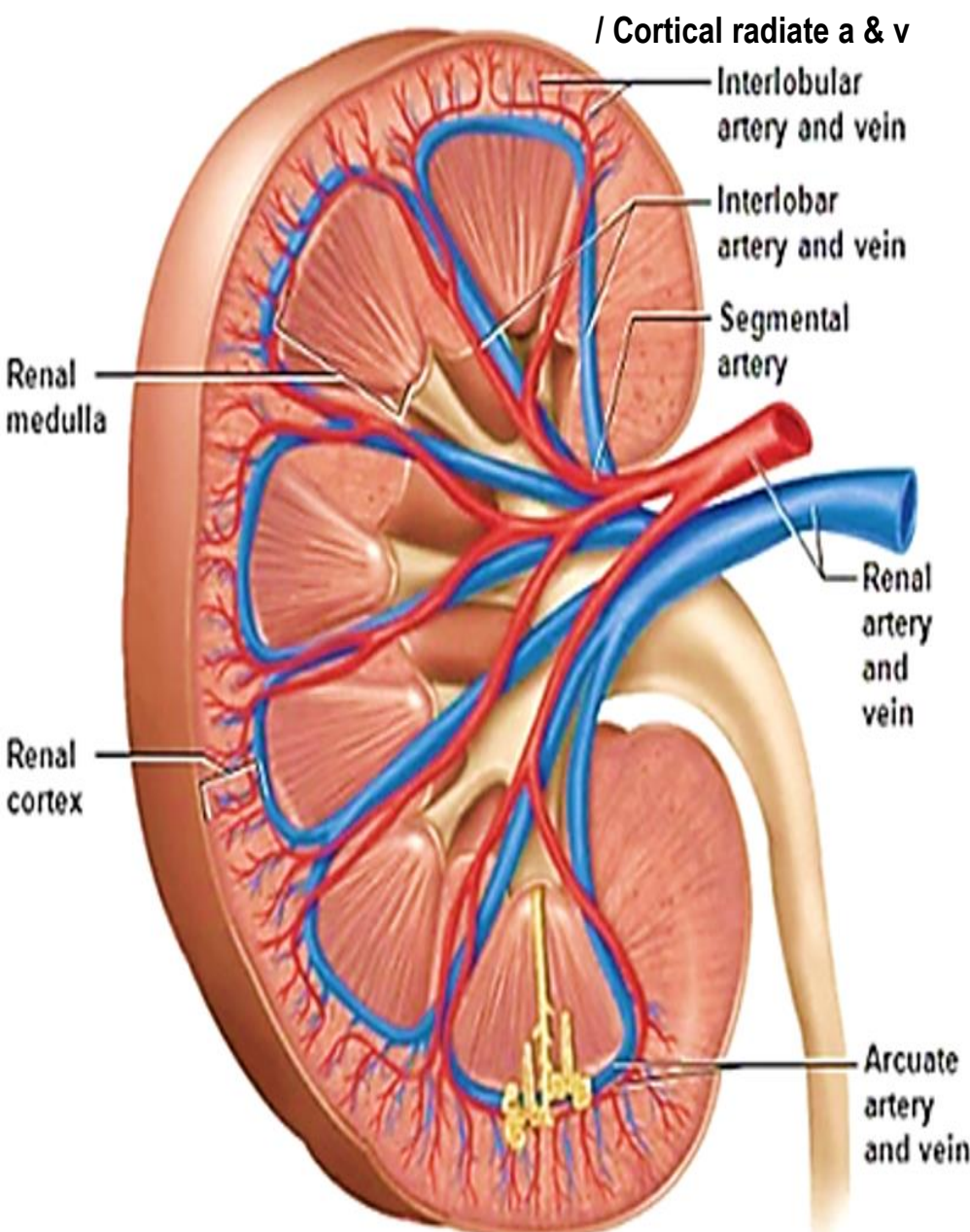
Renal hilum and renal sinus

Renal hilum

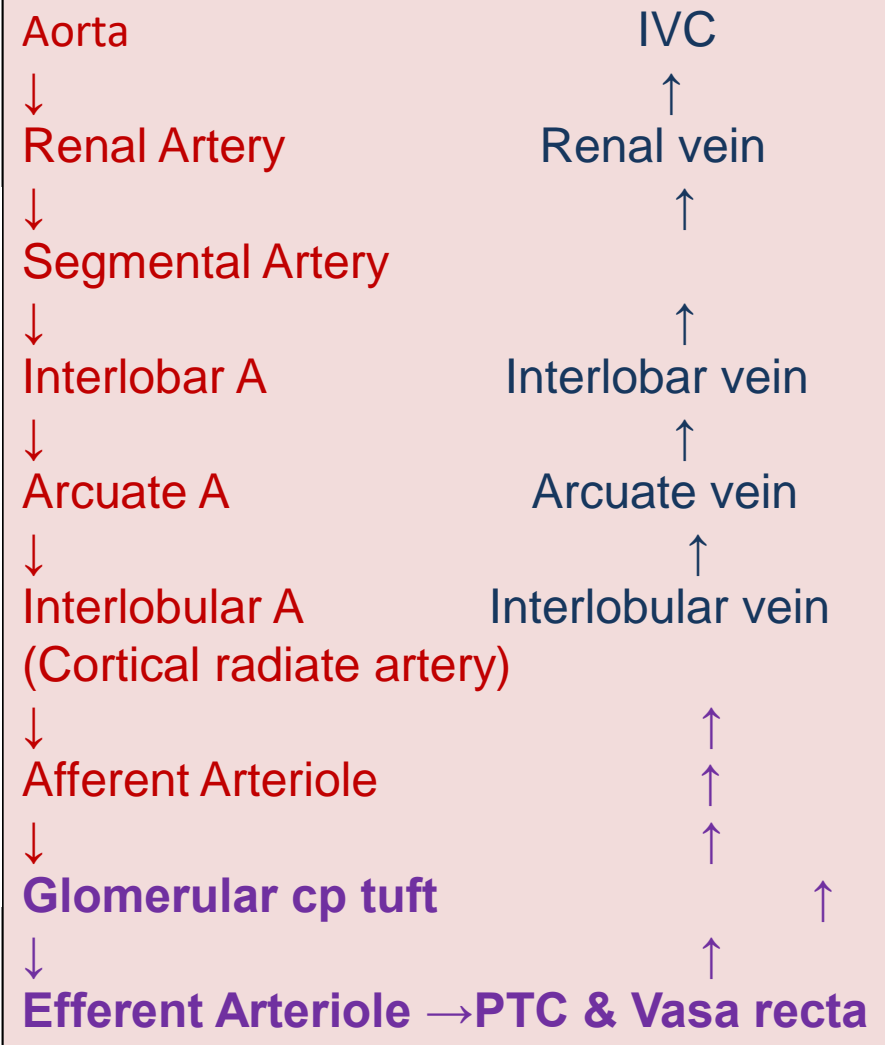
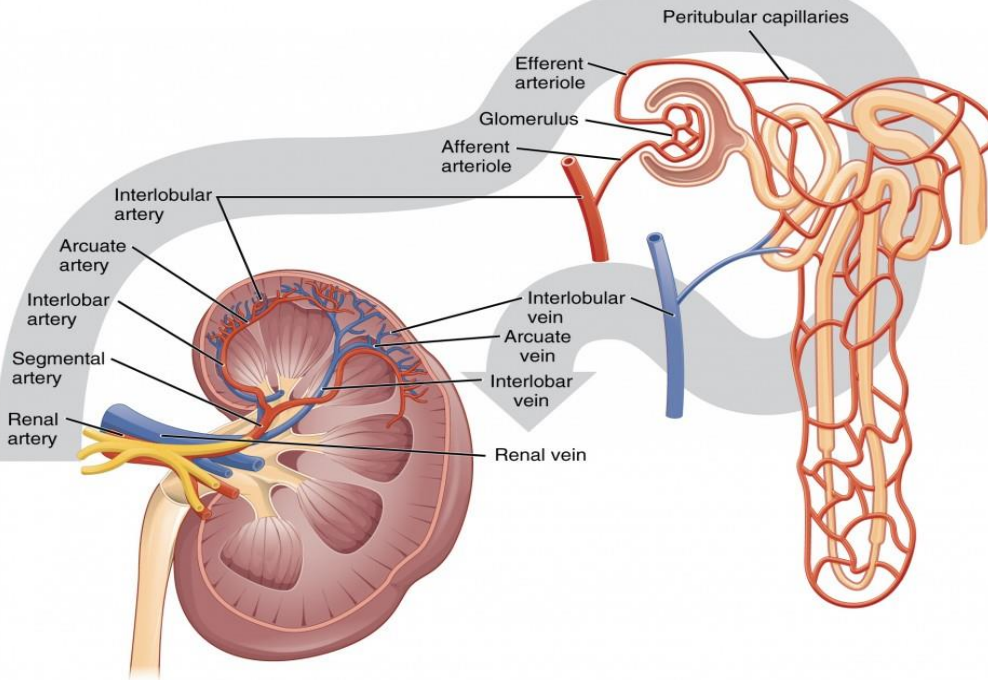
Renal sinus



Blood supply to kidney - nephrons



Blood supply to kidney - Nephrons



Salient features of the lecture

As we know morphological and anatomical characteristics – we can relate these to functioning of kidney

Components of excretory system:

Location-

Loin to Groin Pain, Tenderness of Costovertebral angle / Renal angle

Two distinct regions in kidney...

The **renal lobe**

Nephrons →

Aorta → Renal Artery →

Self Assessment



Urinary tract actually includes

1. Ureter
2. Ureter and pelvis
3. Calyces, pelvis and ureter
4. Calyces and ureter

In kidney, pyramids represent:

1. Cortex
2. Medulla
3. Cortex and medulla
4. Renal column

Kidneys are situated at this vertebrae level:

1. L₁-L₄
2. L₂-L₄
3. T₈-T₁₂
4. T₁₂-L₃

Afferent Arteriole is a branch of

1. Segmental artery
2. Arcuate artery
3. Interlobar artery
4. Cortical radiate artery

Thank you