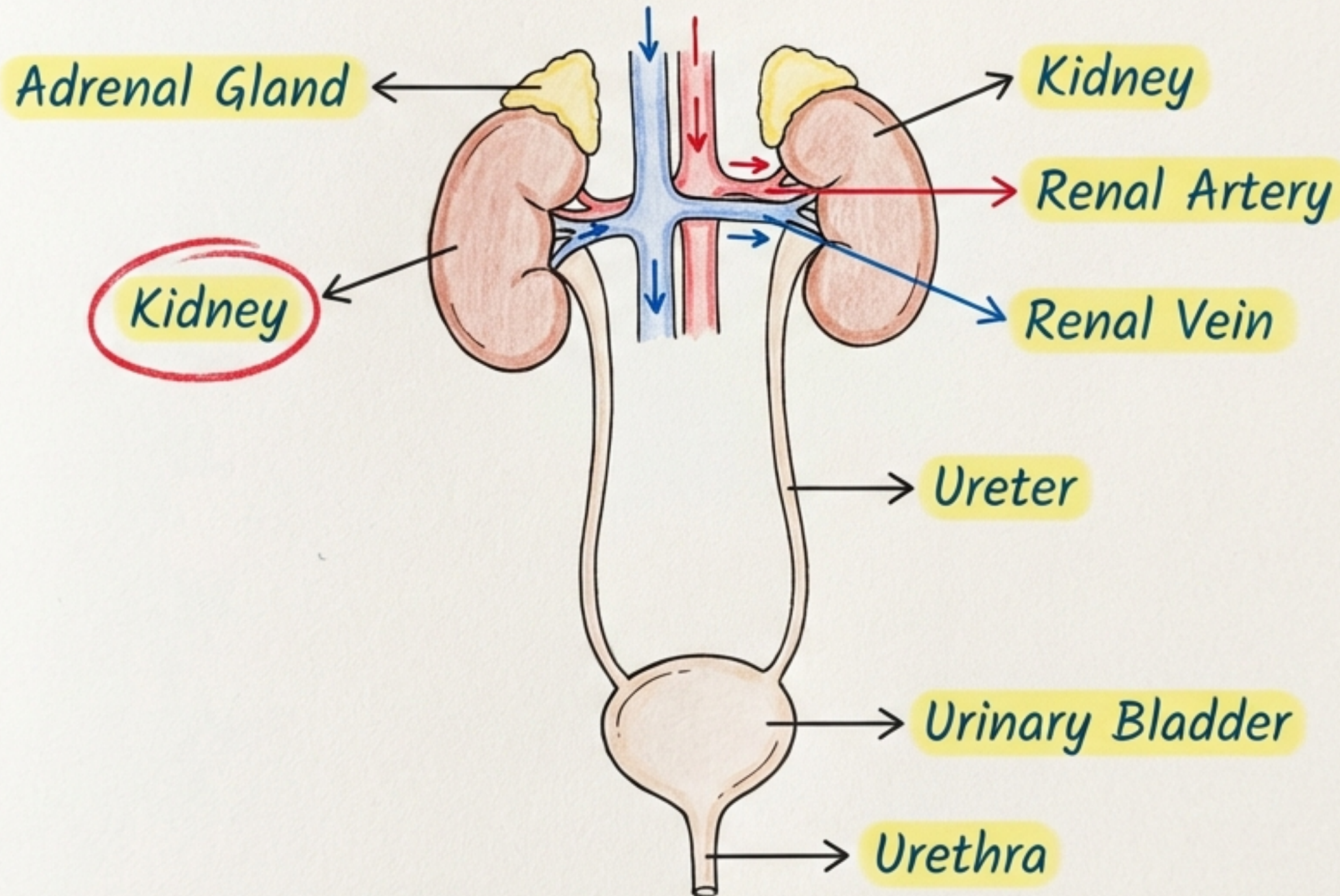


# ANATOMY OF THE URINARY SYSTEM

Quick Revision Notes - Kidney, Ureter, Bladder & Urethra

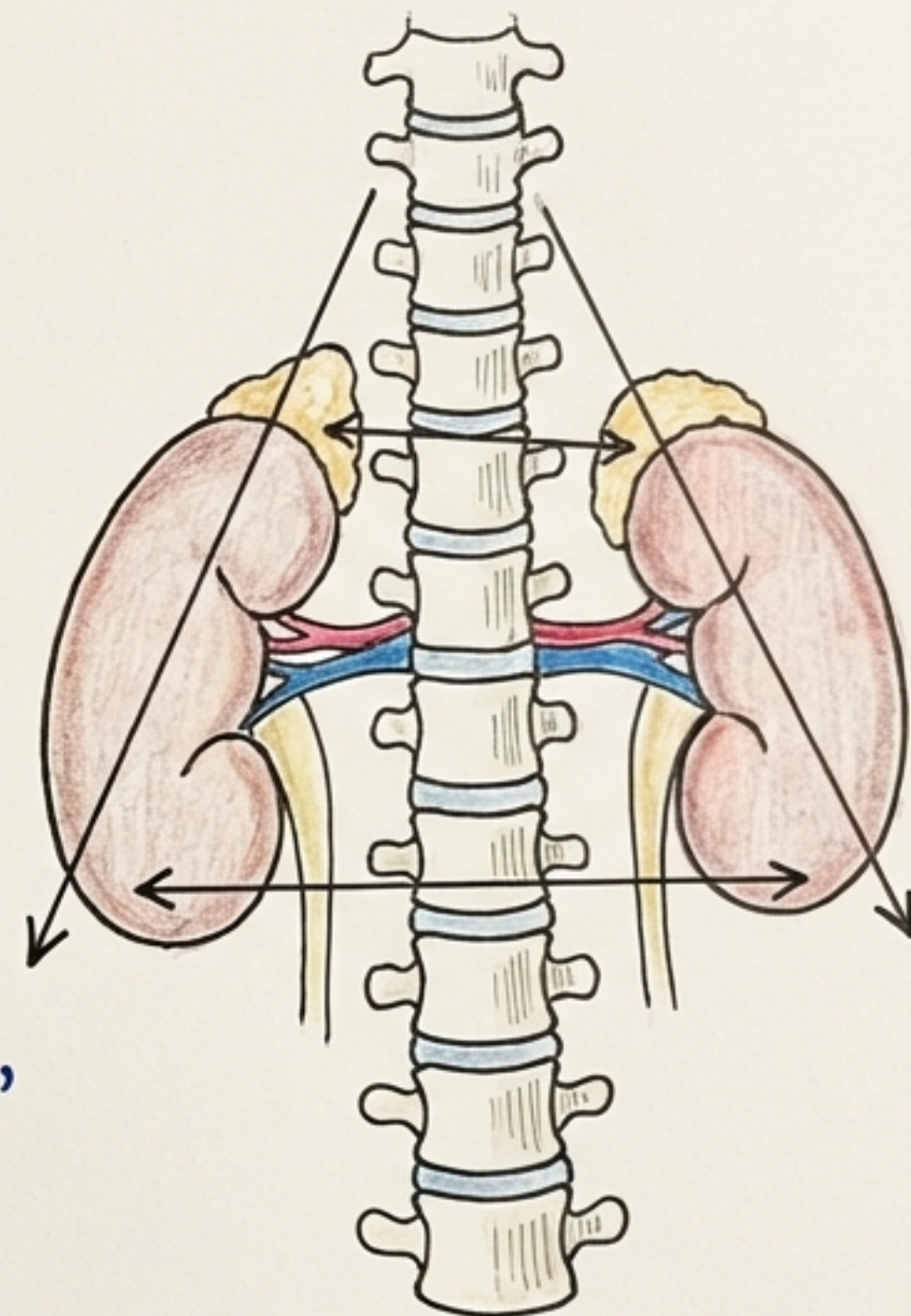




# THE KIDNEY – BASIC ANATOMY & FUNCTION

- Main job is filtration and regulation.
- **Excretory Function** : Removes waste like **Urea** and **Creatinine**.
- **Regulatory Function** : Balances electrolytes (Na, K, Ca) and water.
- **Position** : **Retro-peritoneal** on posterior abdominal wall.
- **Shape** : Bean-shaped, reddish-brown colour.
- **Poles** : Broad upper pole (with suprarenal gland), pointed lower pole.
- **Axis** : Lies obliquely, parallel to psoas major muscle.

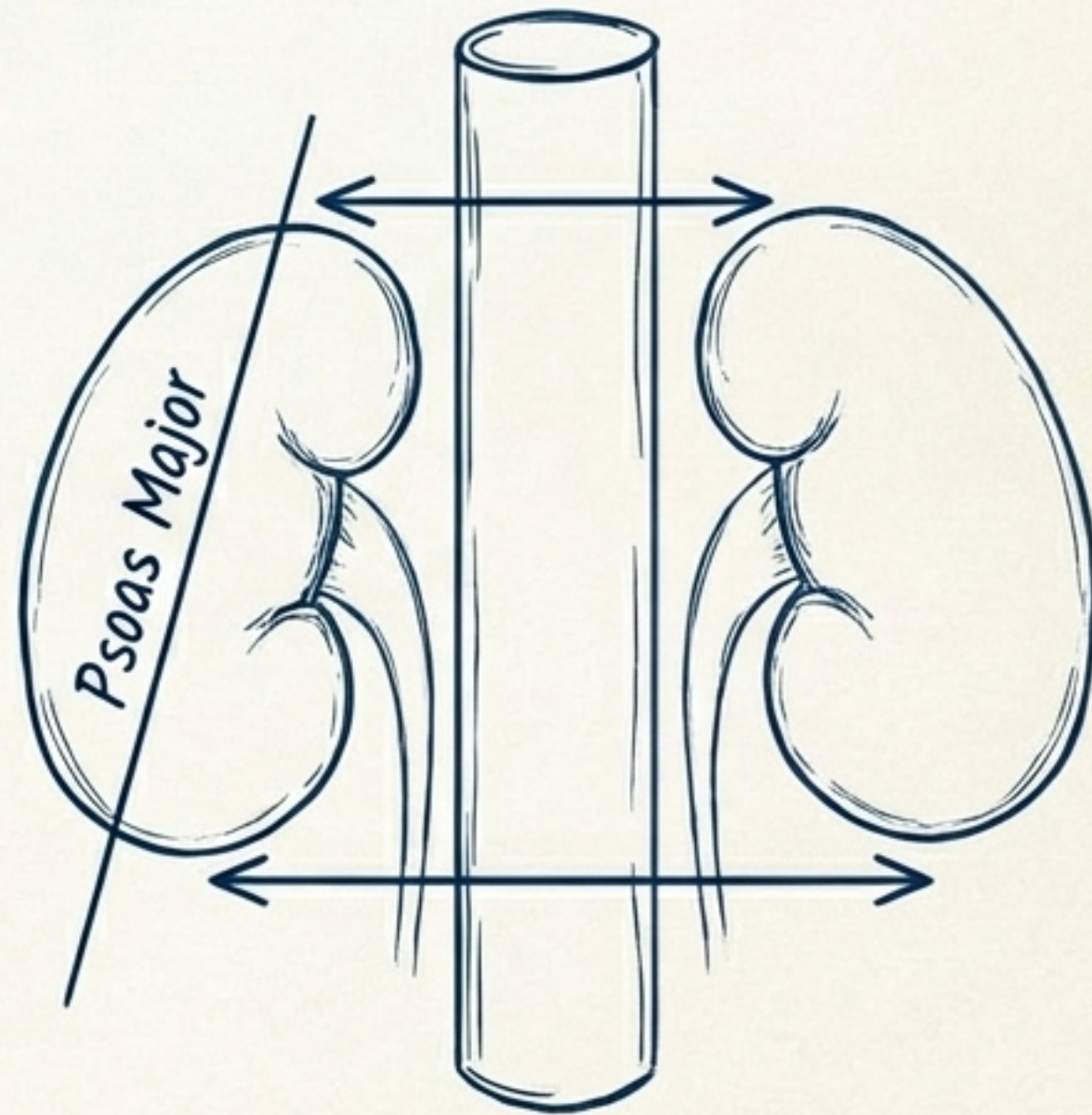
Retroperitoneal  
= Behind the peritoneum lining of the abdomen.





# Position & Orientation

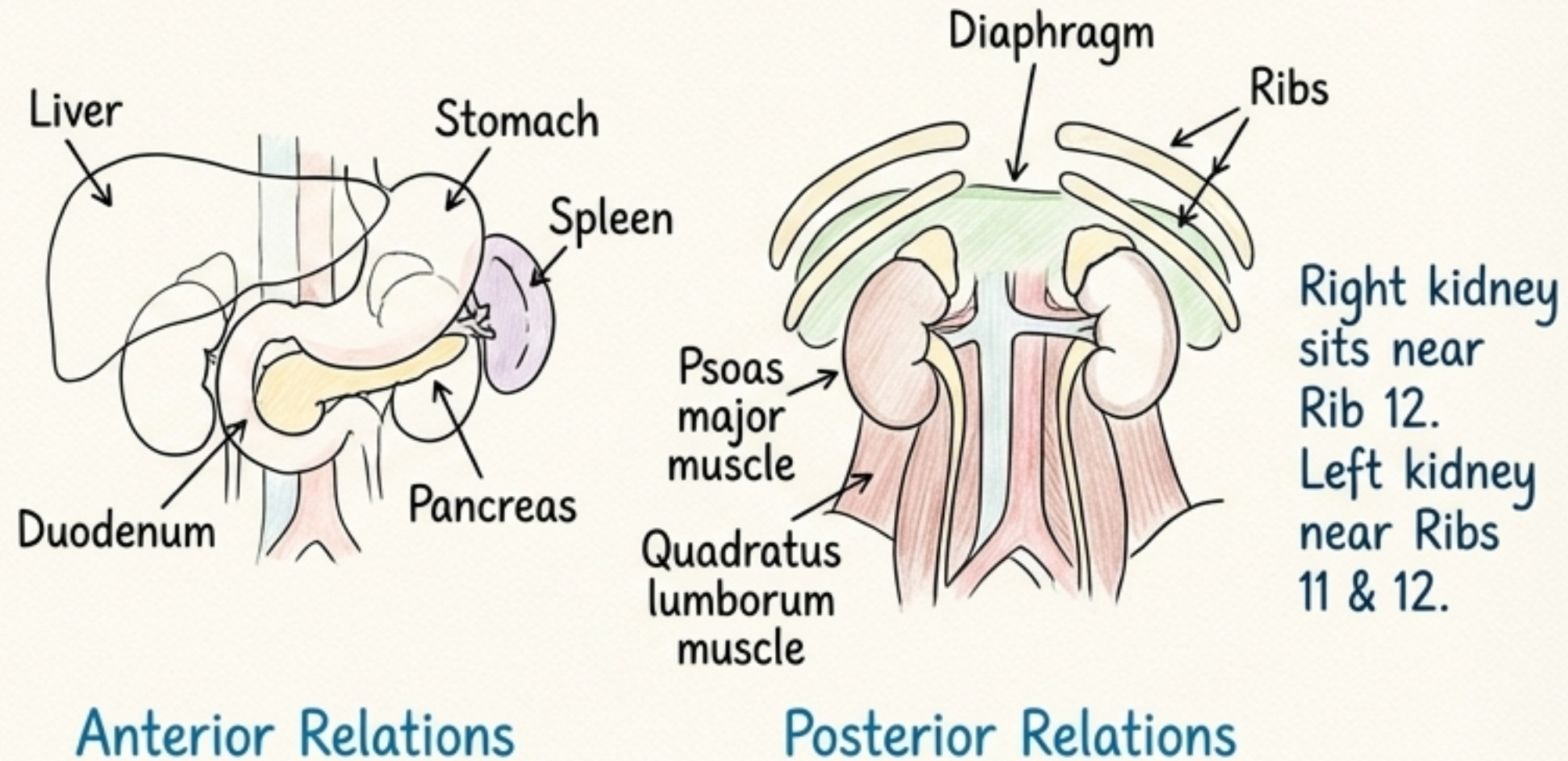
- \* Each kidney lies obliquely.
- \* Long axis is parallel to the lateral border of Psoas Major Muscle.
- \* This means: Upper poles are closer to the midline.
- \* Lower poles are farther apart.





# RELATIONS OF THE KIDNEY

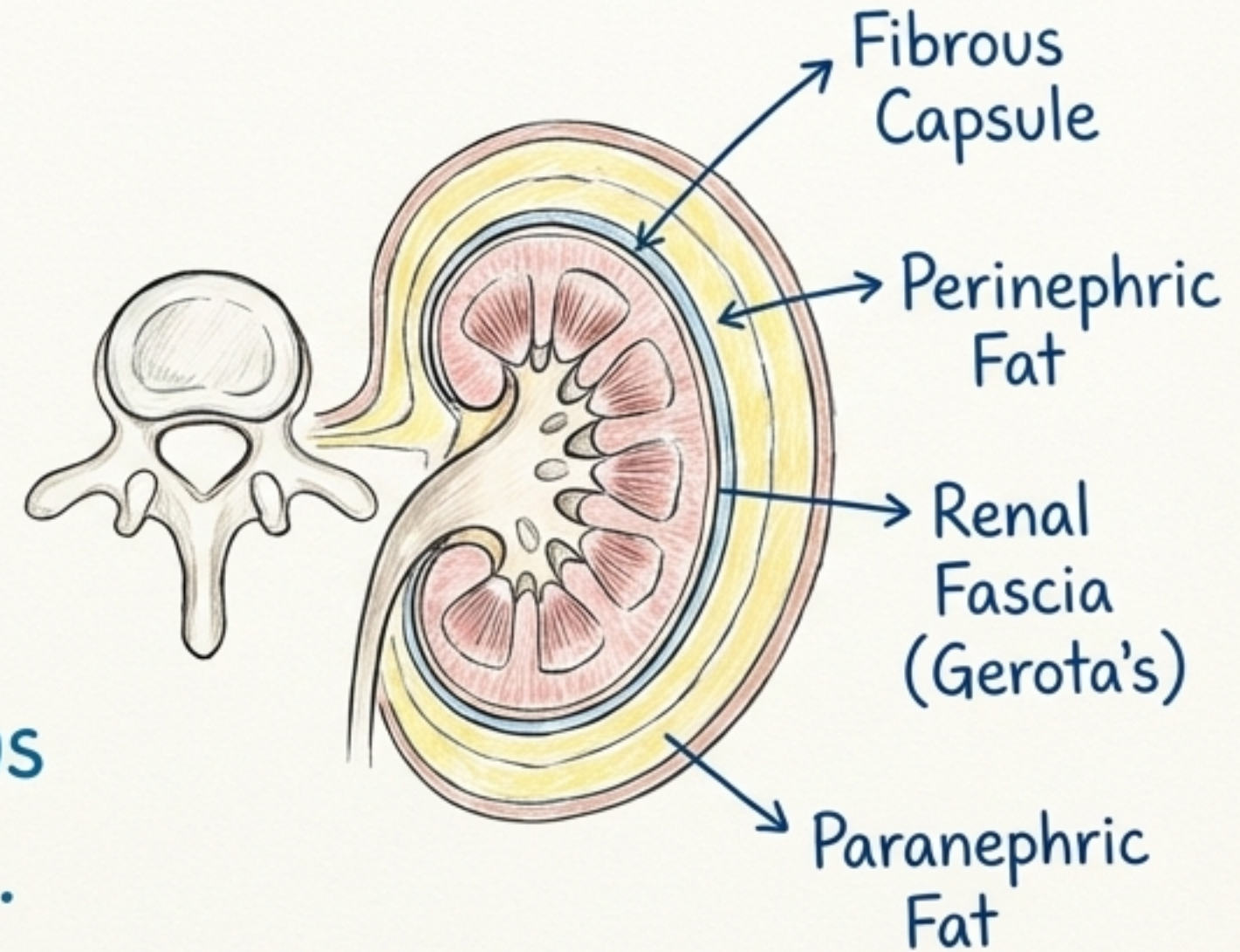
- **Vertebral Level:** Extend between T12 and L3.
- **Right Kidney is slightly lower** than the left because of the liver.
- **Posterior relations include:**
  - Diaphragm
  - Psoas major muscle
  - Quadratus lumborum muscle
  - Transversus abdominis muscle
- Anterior relations are different for each kidney (see diagram).





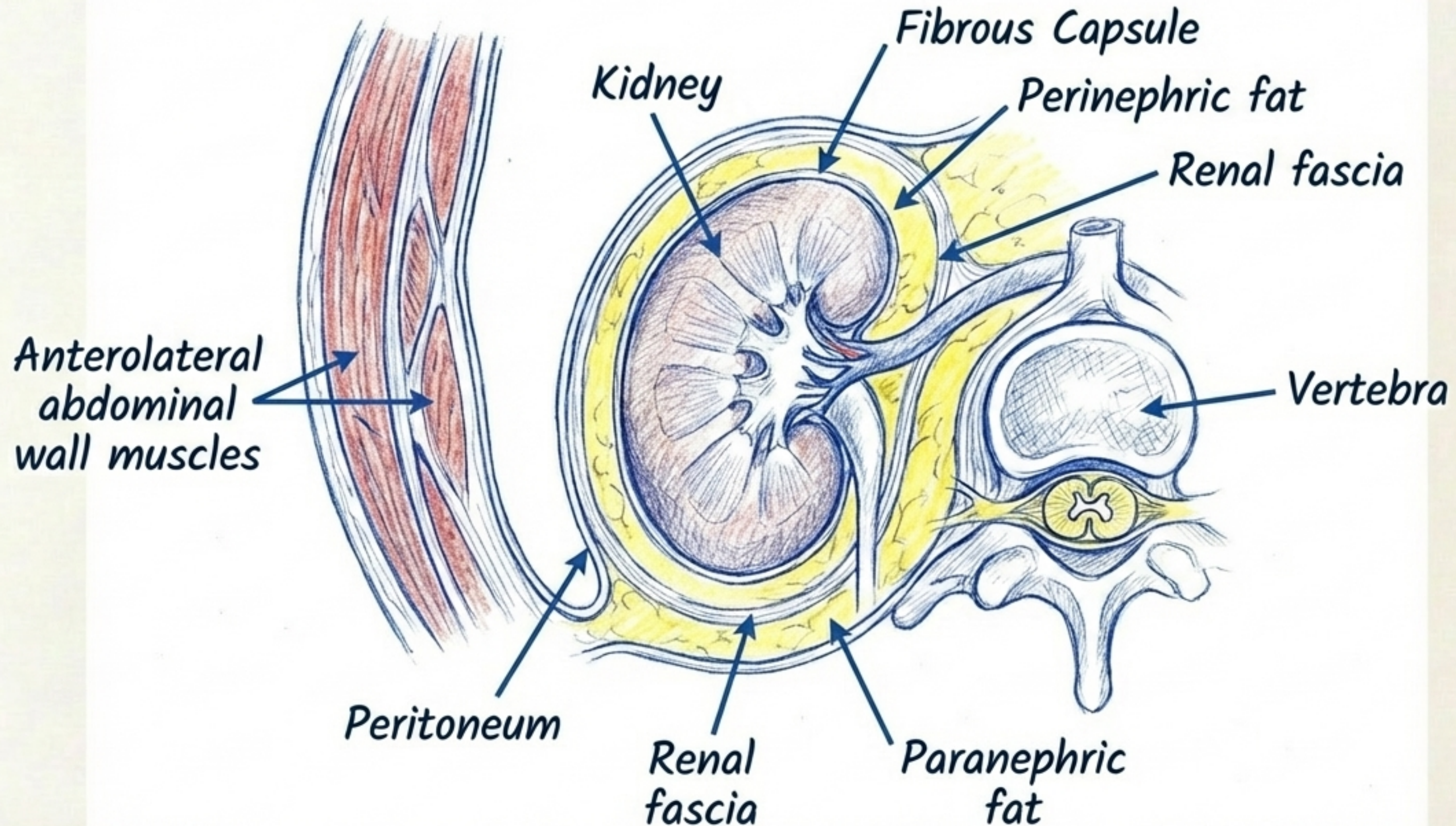
# COVERINGS OF THE KIDNEY (INSIDE TO OUT)

1. **Fibrous Capsule**: Thin, innermost layer, adheres to kidney surface.
2. **Perinephric Fat**: Layer of fat surrounding the capsule.
3. **Renal Fascia (Gerota's Fascia)**: Fibrous sheet enclosing kidney & adrenal gland.
4. **Paranephric Fat**: Outermost layer of fat, acts as a cushion.





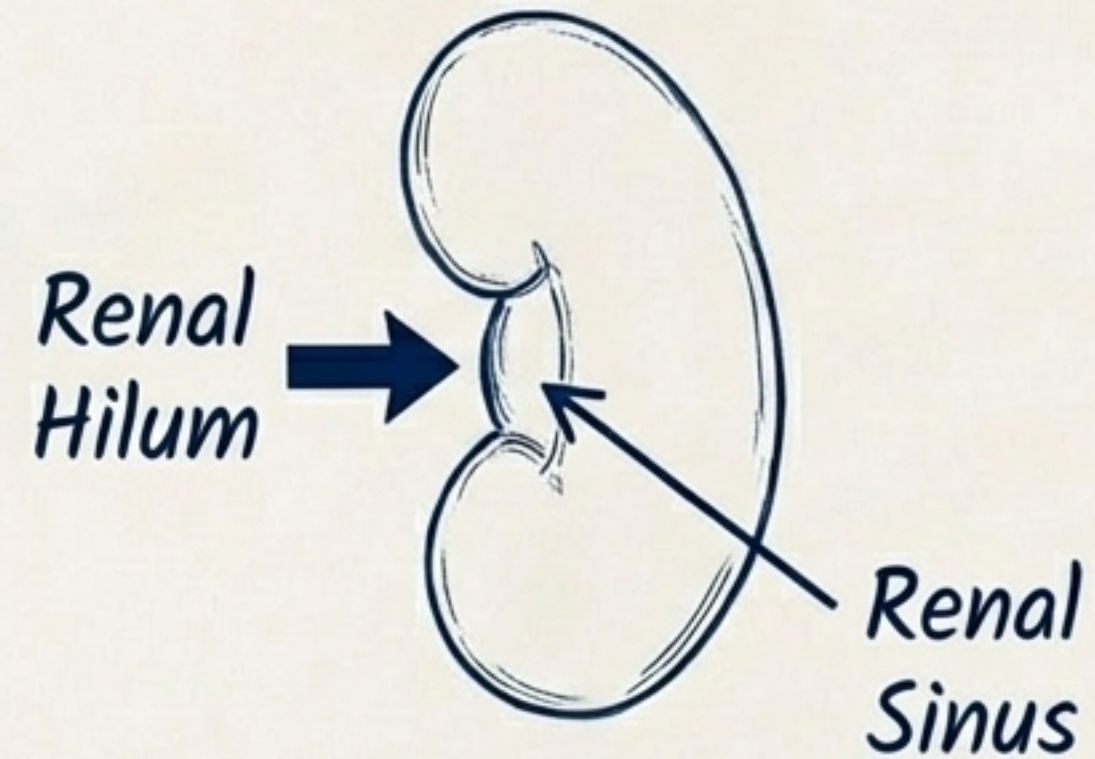
# The Layers Visualized





# The Renal Hilum - Gateway to the Kidney

- \* It is a vertical slit-like opening.
- \* Located on the medial (inner) concave border of the kidney.
- \* Acts as a gateway for structures to enter & leave the kidney.
- \* The space inside the hilum is called the Renal Sinus.



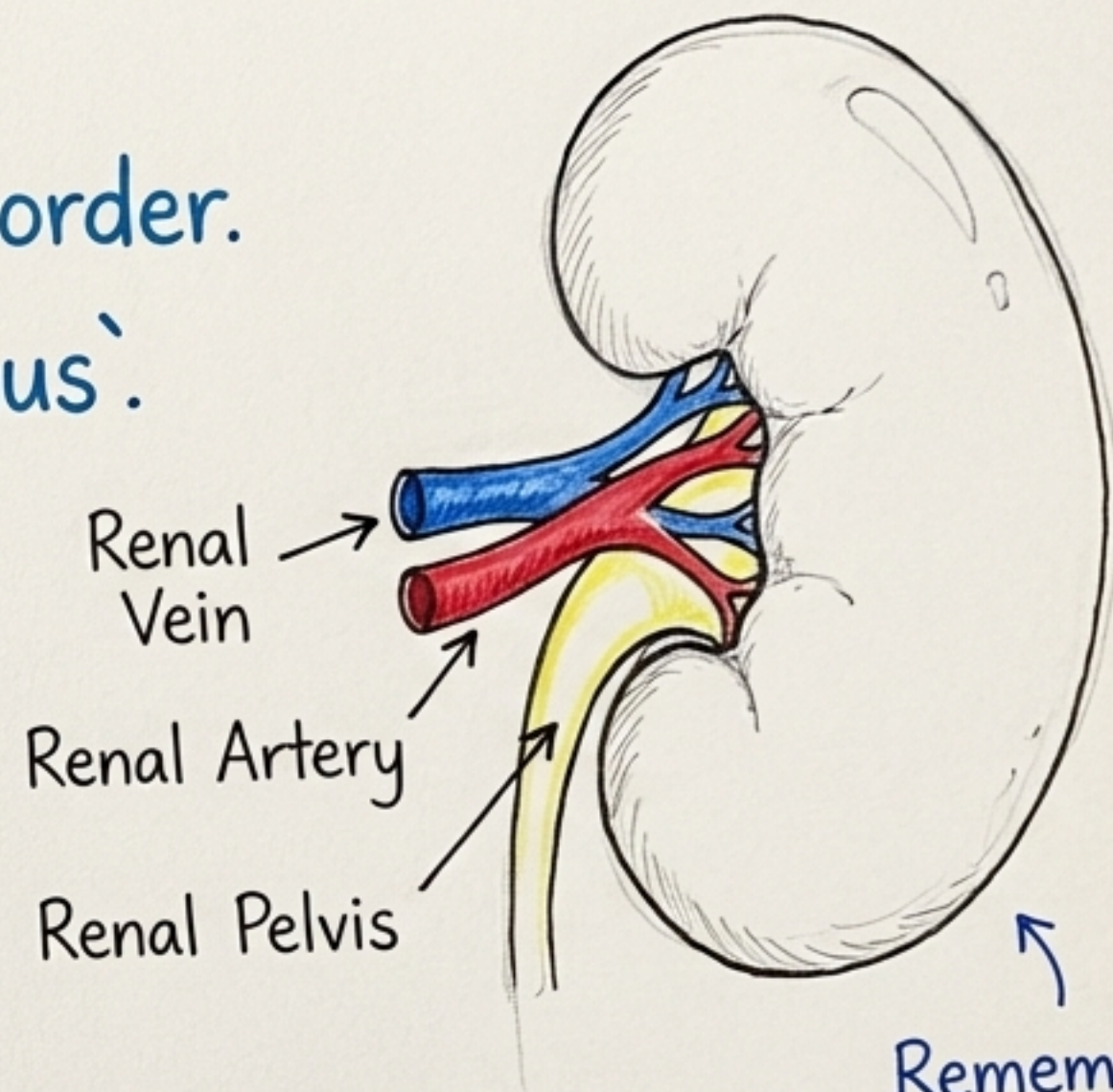


# RENAL HILUM - THE GATEWAY

- A vertical slit on the medial (concave) border.
- Leads into a space called the 'Renal Sinus'.
- Structures pass through in a specific order (front to back):

1. Renal **V**ein
2. Renal **A**rtery
3. Renal **P**elvis

**V - A - P (Anterior → Posterior)**

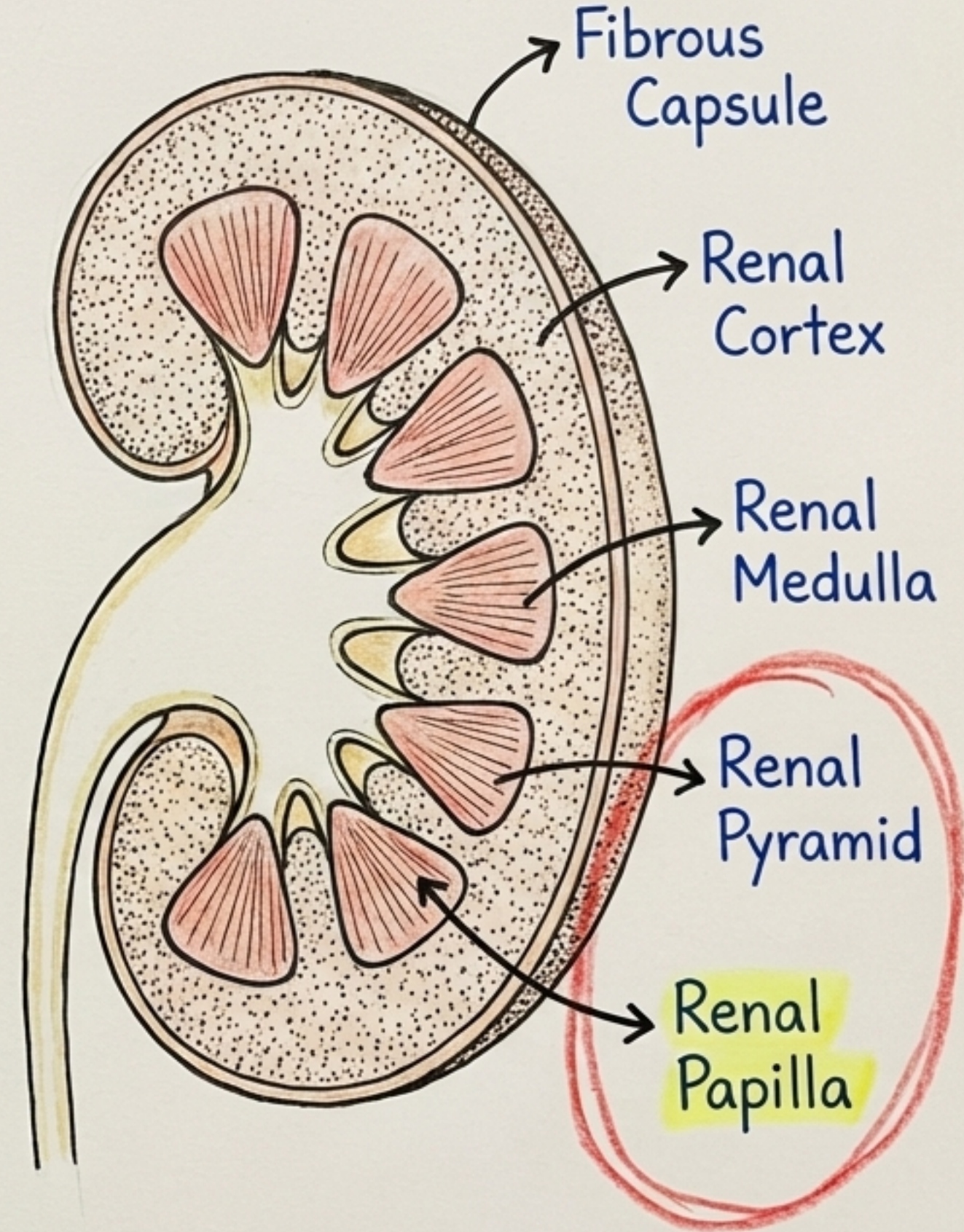


Remember  
VAP! Very  
Important  
Point for  
viva!



# INSIDE THE KIDNEY - INTERNAL STRUCTURE

- Renal Cortex: Outer granular layer, just under the capsule.
  - ↳ Contains the 'Nephrons' (functional units for filtering blood).
- Renal Medulla: Inner portion, made of Renal Pyramids.
  - ↳ Renal Pyramids: Cone-shaped structures.
  - ↳ Base faces cortex, Apex (called 'Renal Papilla') points inwards.

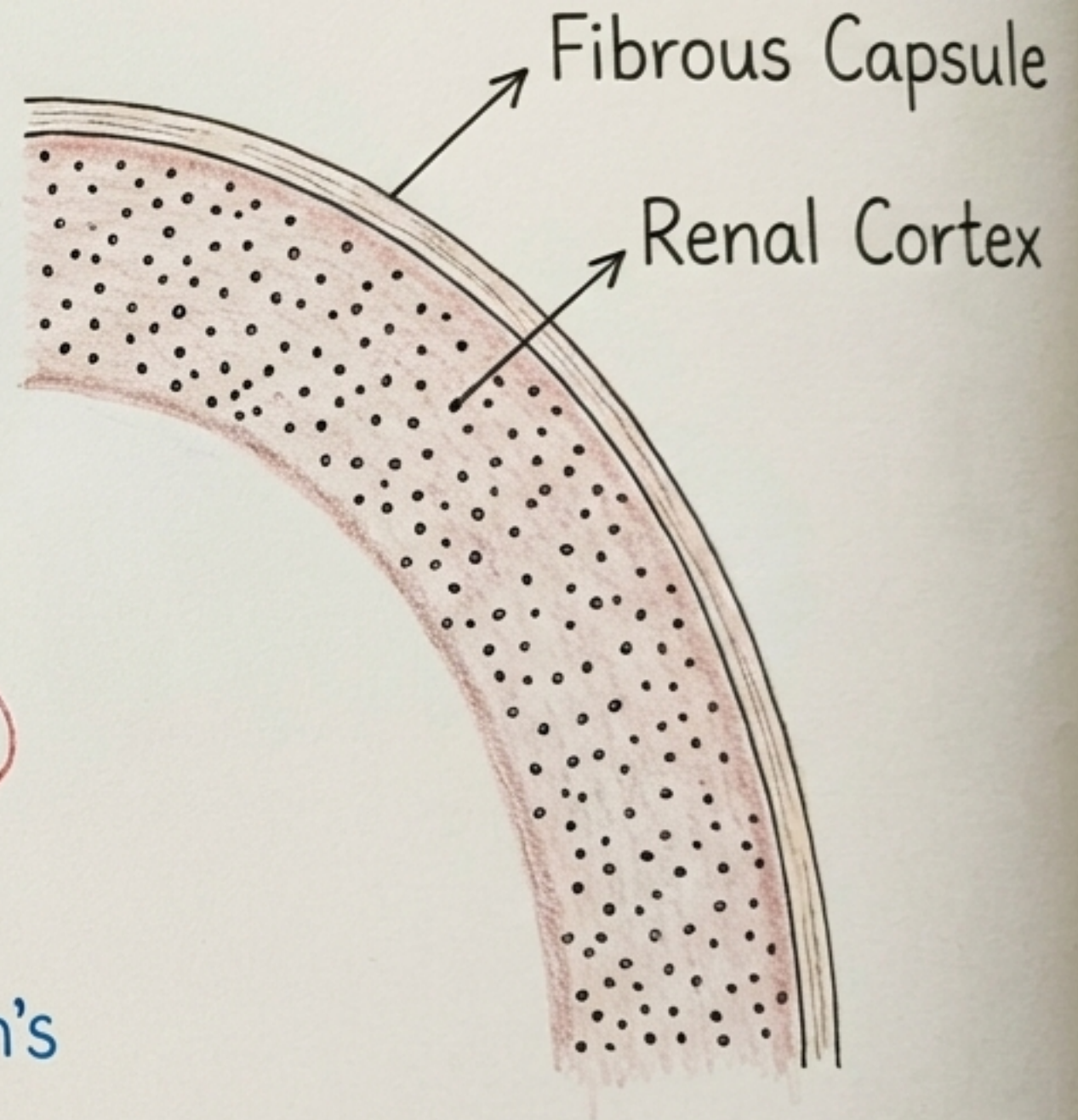


Cortex = Filtering.  
Medulla = Collecting &  
Concentrating.



## Step 1: The Renal Cortex (The Outer Layer)

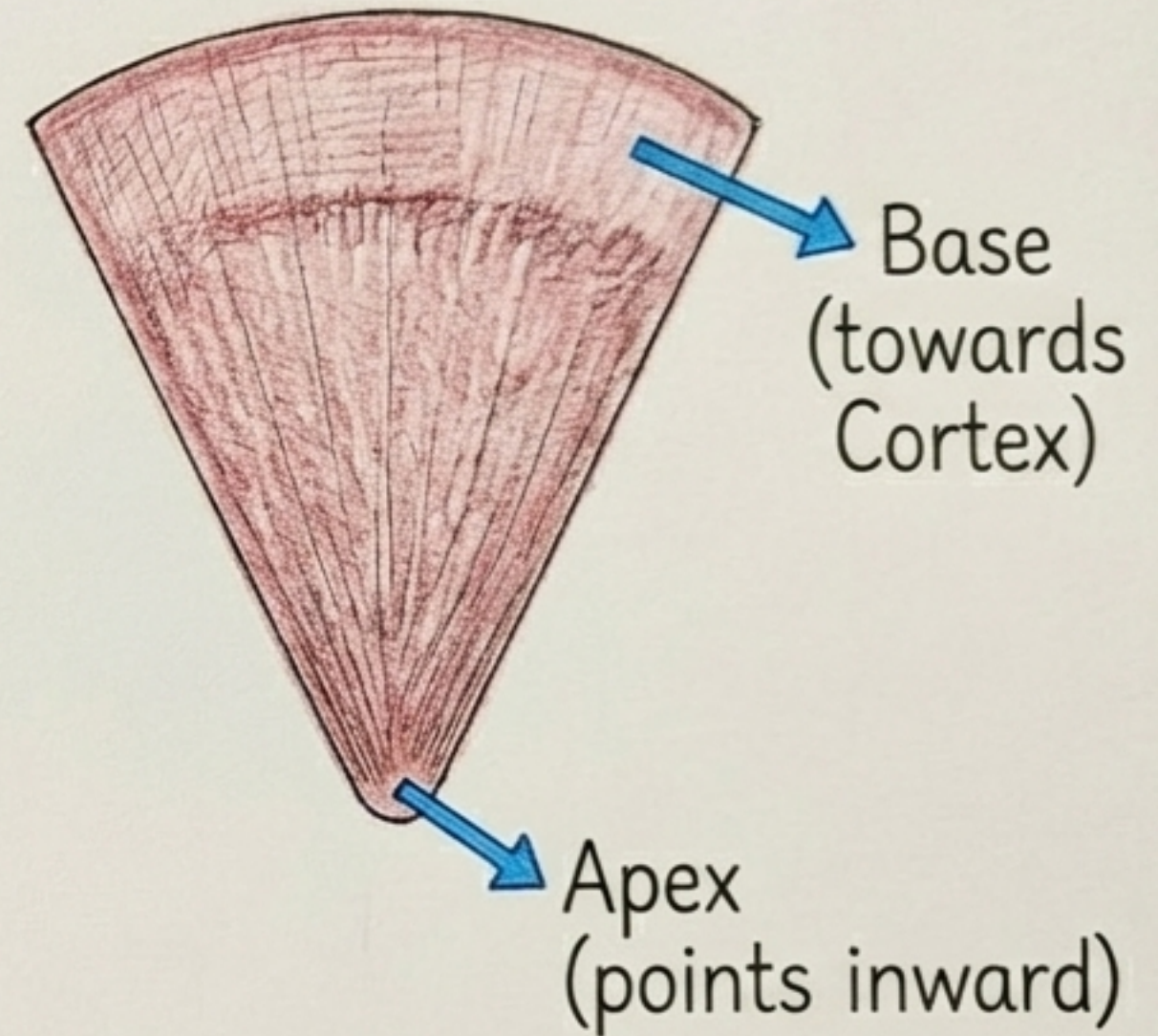
- Outer granular layer, just under the capsule.
- This is where blood is filtered.
- Contains the Nephrons.
- Nephrons are the functional units that filter blood and produce urine. Exam point!
- Also contains Renal Corpuscle (Bowman's Capsule) & Renal Tubules.





## Step 2: Into the Renal Medulla

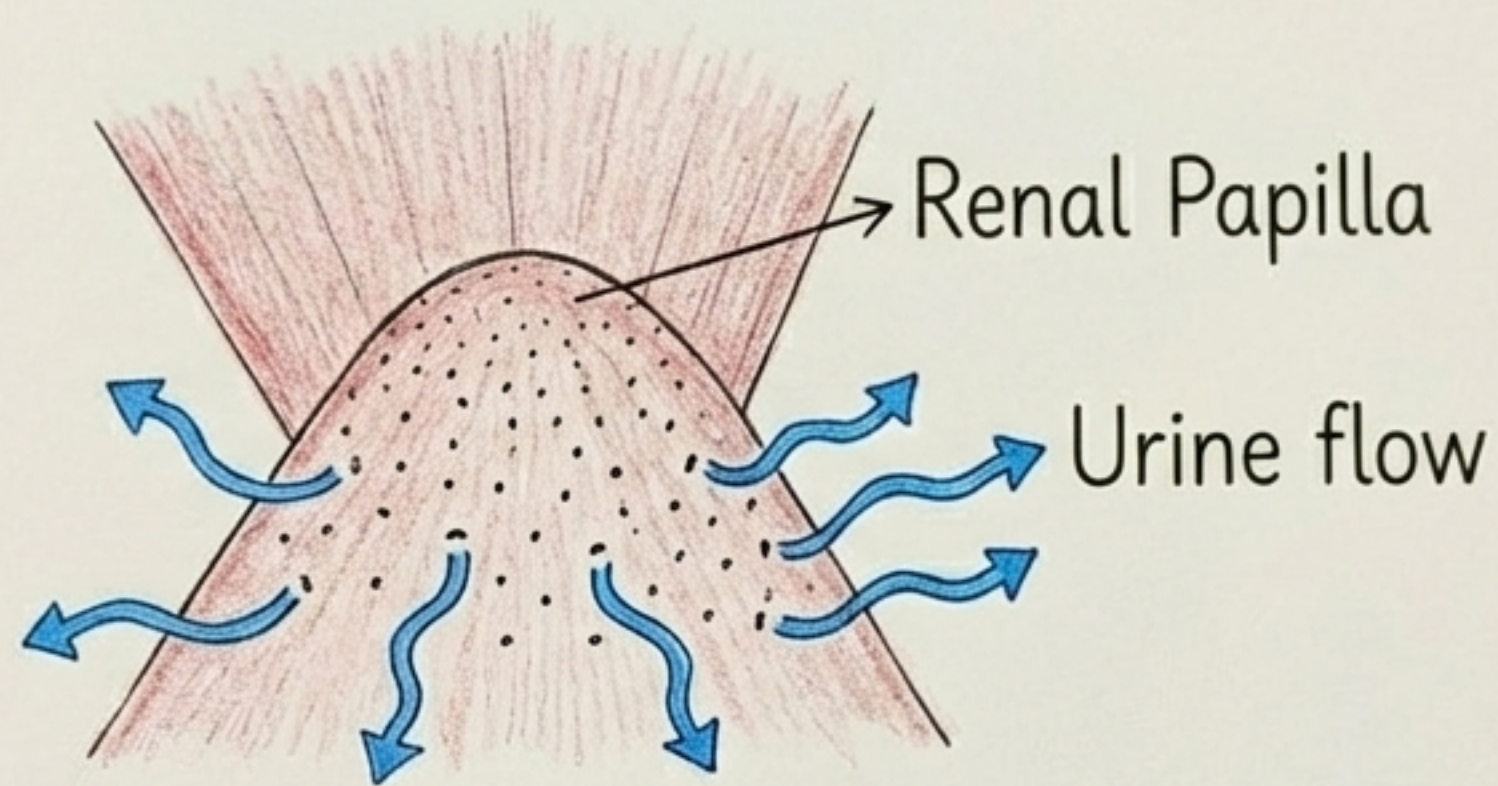
- The inner part of the kidney.
- It is made up of Renal Pyramids.
- Pyramids are cone-shaped structures.
- Base of pyramid faces the cortex.
- Apex (tip) points inwards.
- Main job: Transport urine towards the center.



Think of them like funnels pointing to the middle.



### Step 3: The Renal Papilla (Tip of the Pyramid)



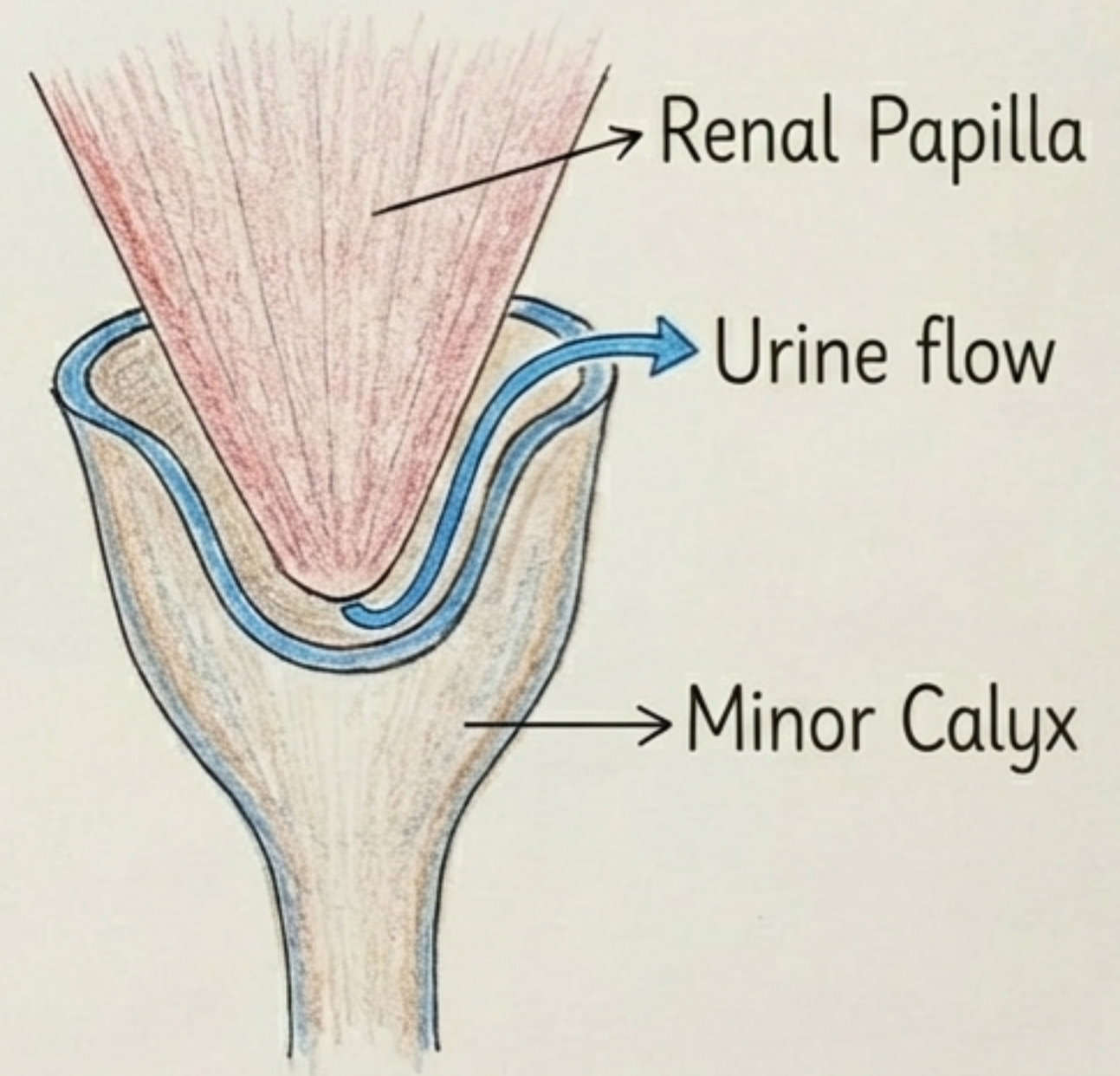
- The Renal Papilla is the apex (tip) of each renal pyramid.
- It has small openings.
- These openings are called ducts of Bellini.
- Urine drains through these ducts into the next part.

Papilla = "nipple"  
in Latin. It's the  
pointy tip!



## Step 4: First Stop - The Minor Calyx

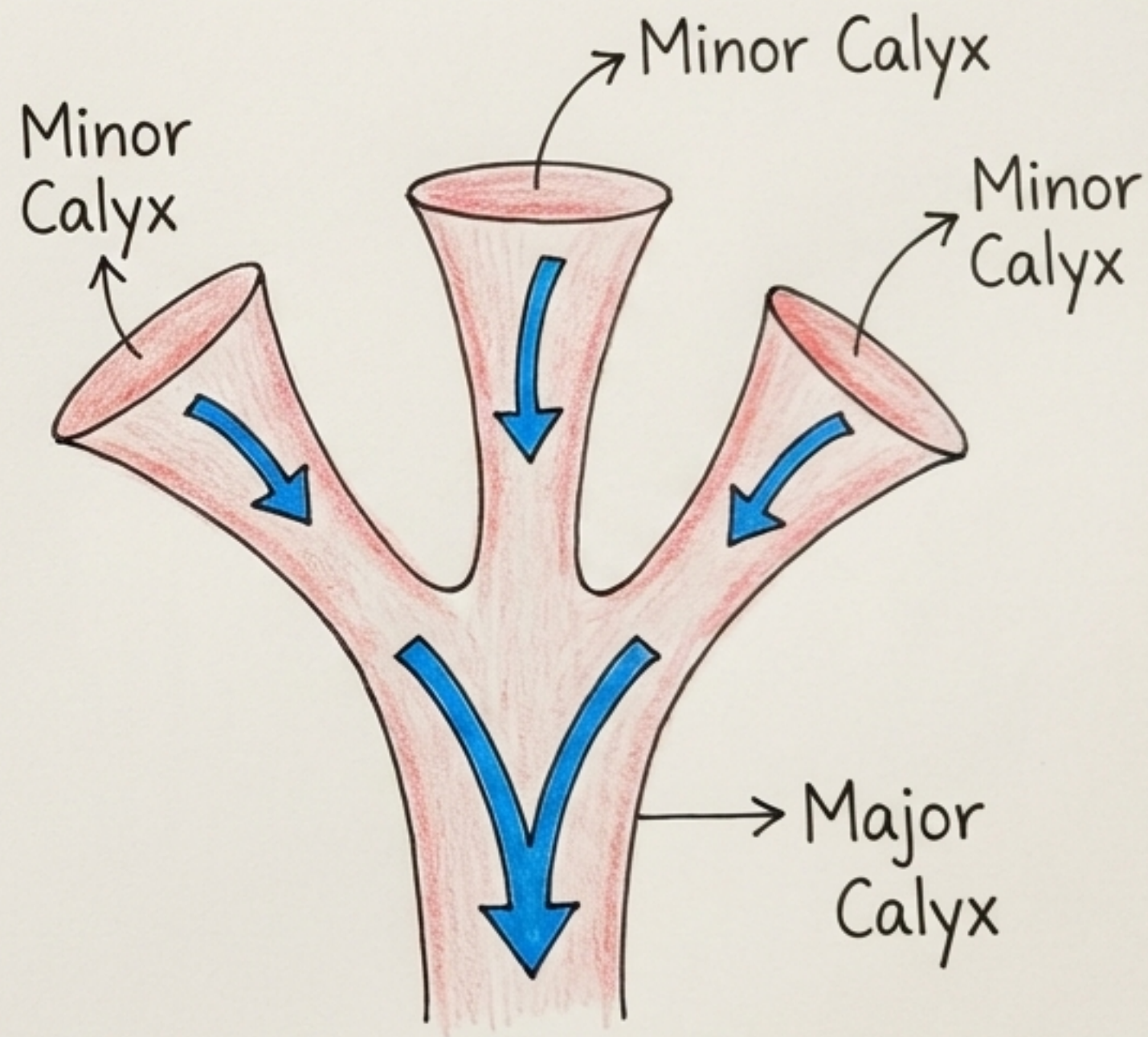
- Small, cup-shaped structures.
- They are located in the renal sinus (the central cavity).
- Each minor calyx collects urine from one renal papilla.





## Step 5: Joining the Streams - The Major Calyx

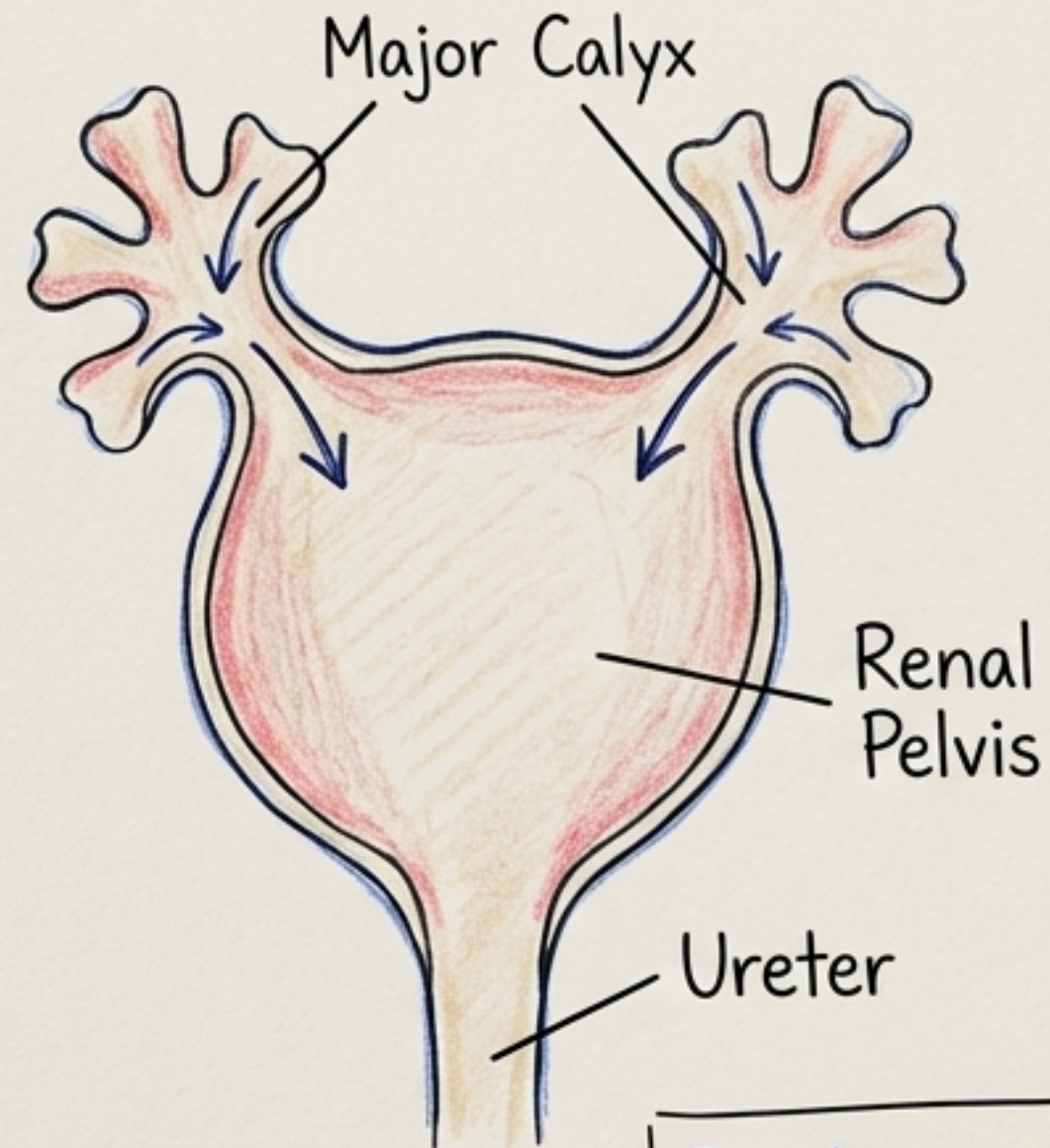
- Formed by the joining of two or more minor calyces.
- Its function is to channel the collected urine.
- It directs urine towards the renal pelvis.





## Step 6: The Main Funnel – Renal Pelvis

- A large, **funnel-shaped** area.
- It is an expansion of the upper part of the ureter.
- It collects all the urine from the major calyces.
- From here, it passes the urine into the ureter.

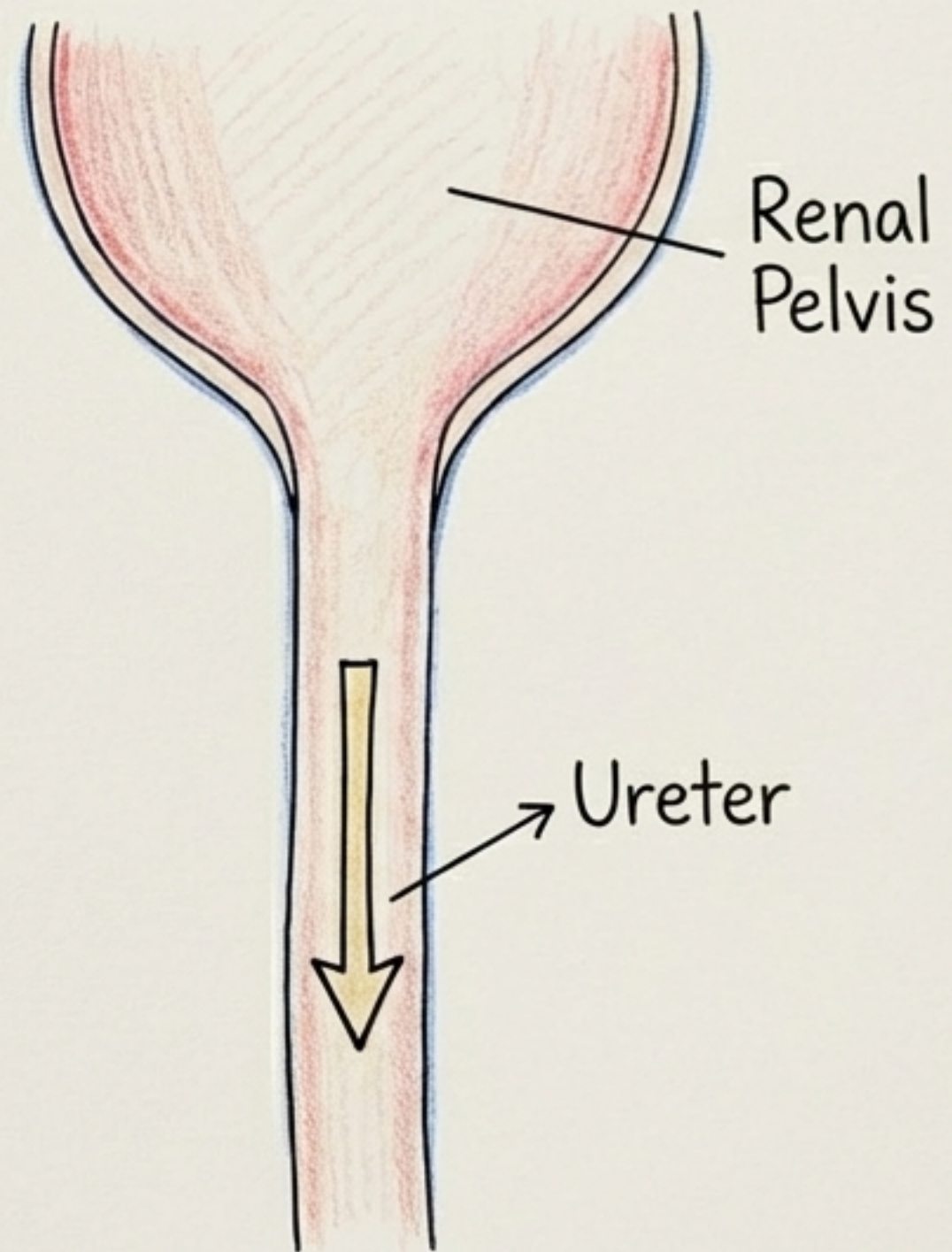


Don't confuse  
Calyx and Pelvis!  
Pelvis is the big,  
final funnel.



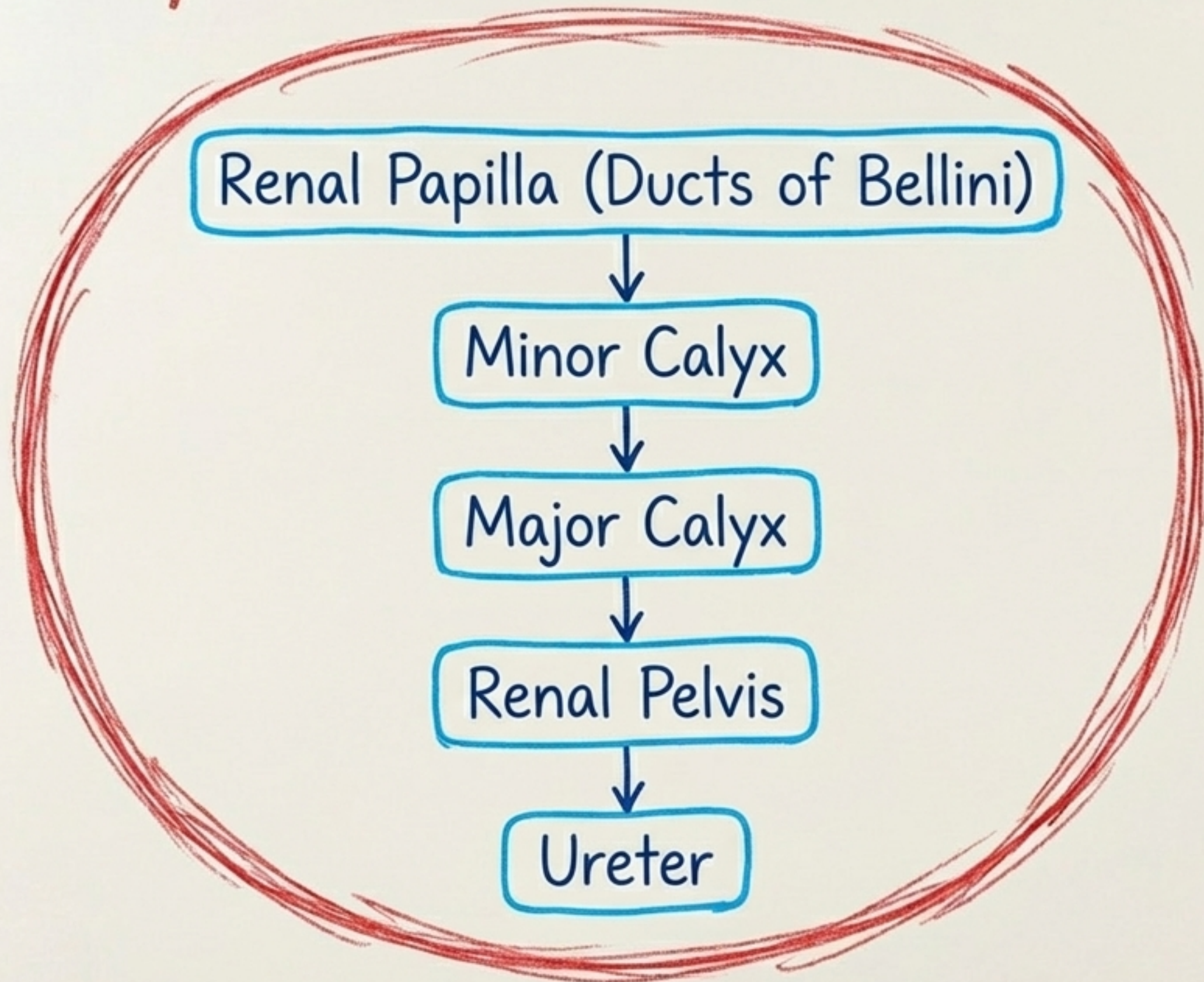
## Final Step: Exiting via the Ureter

- The Ureter is the tube that carries urine away from the kidney.
- The Renal Pelvis narrows to become the ureter.
- It transports urine down to the urinary bladder (not shown).





# Summary: The Path of Urine Flow



Memorize  
this flow!  
Very important  
for exams!



# Quick Revision - Full Diagram

- Use this for last-minute revision before the exam.
- Practice drawing this 2-3 times! All labels are important.

