

# YAKEEN NEET 2.0

7.08.2025

**2026**

**EXCRETORY PRODUCTS AND ITS ELIMINATION**

**ZOOLOGY**

**Lecture – 3**

**By- SAMAPTI MAM**





## Topics to be covered

1

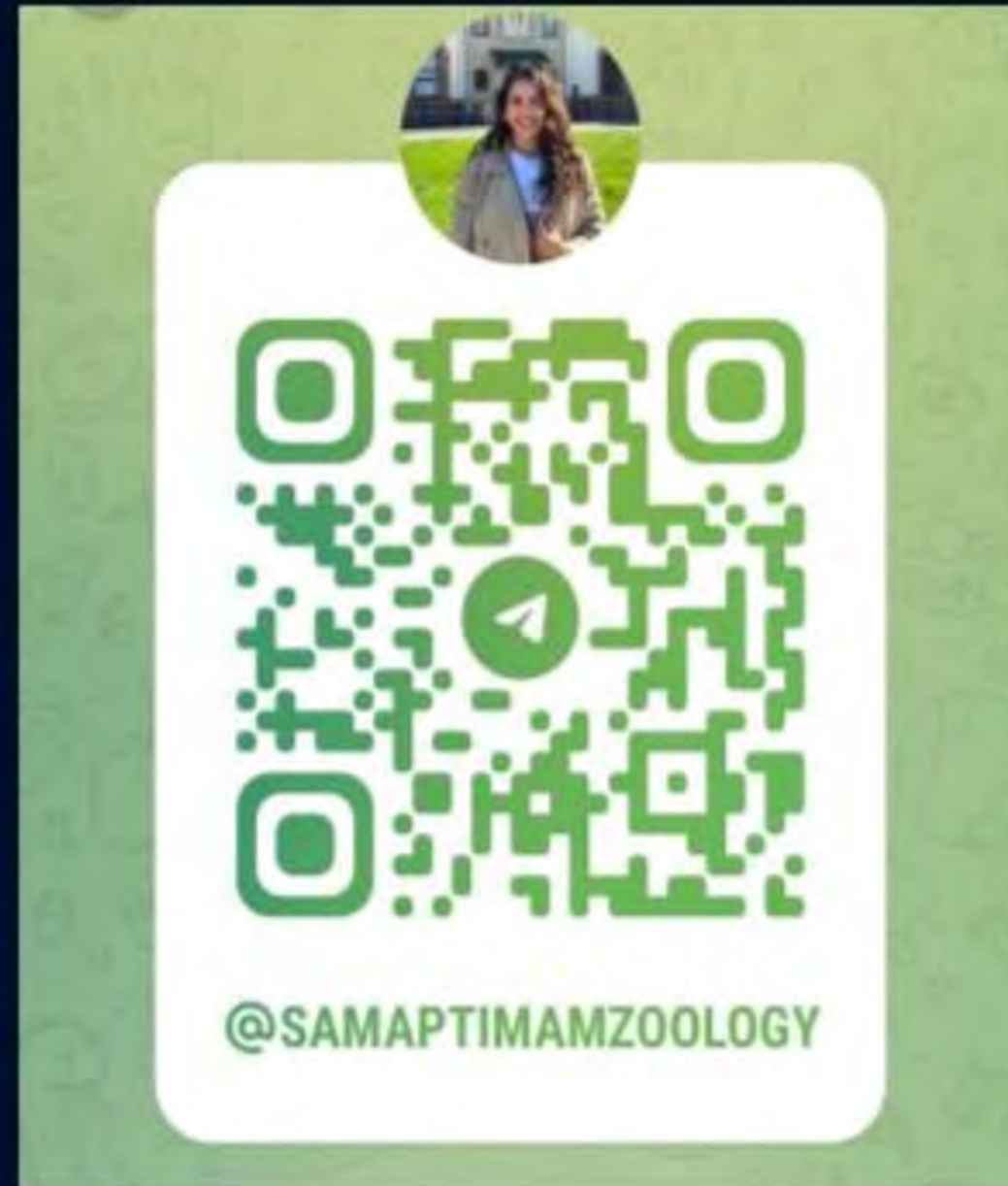
JGA, Urine formation

2

3

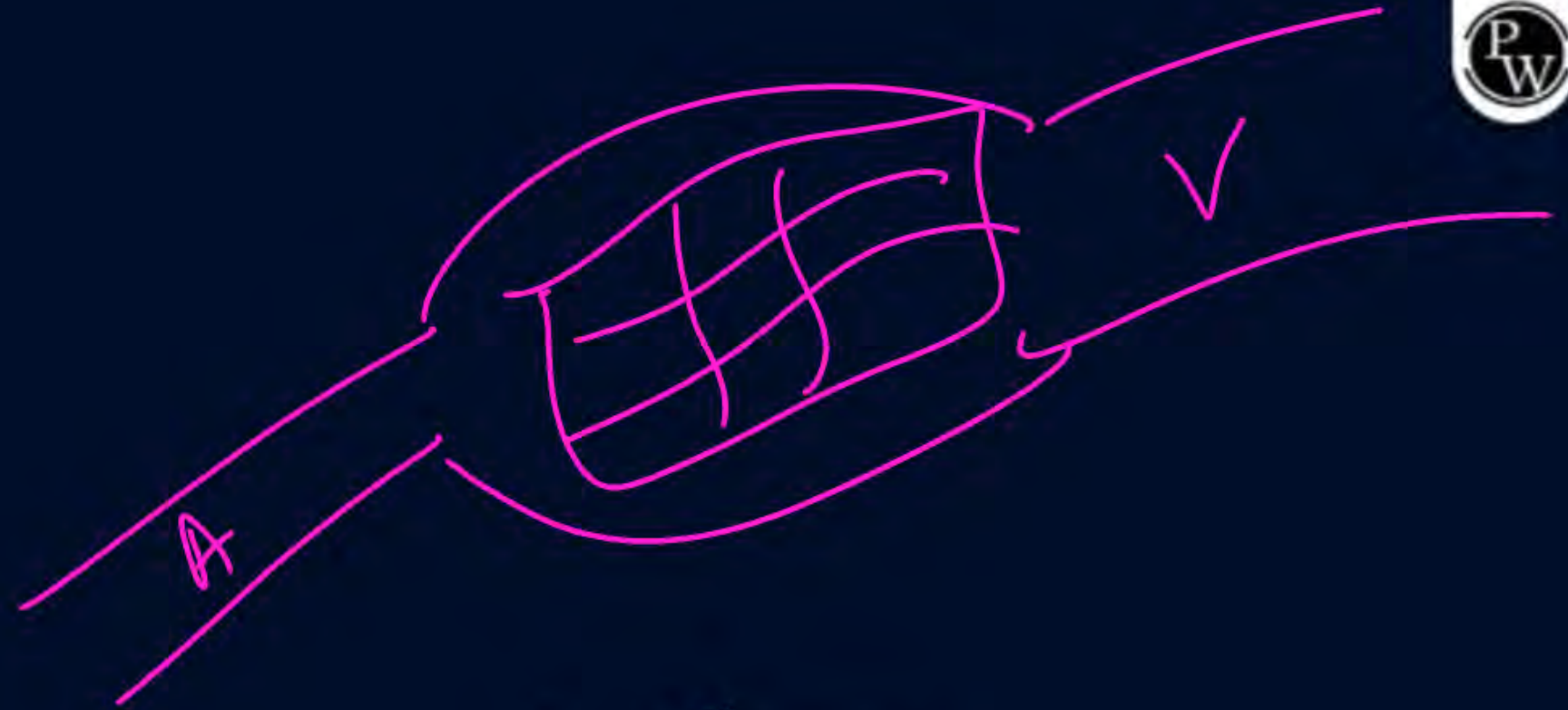
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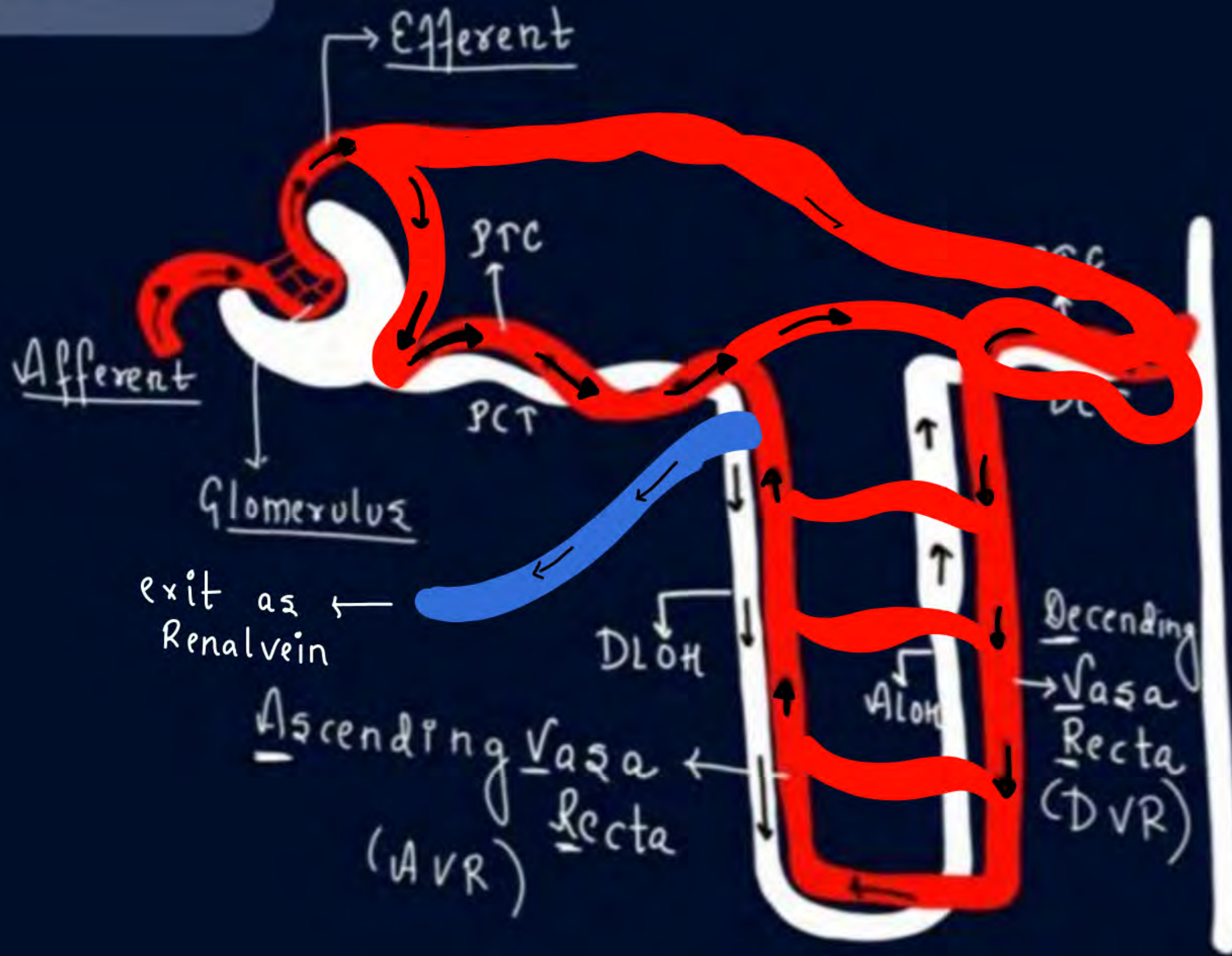


# 2amphipress

Aorta → Artery  
↓  
Arteriole  
↓  
Capillary  
↓  
Venules  
↓  
Veins  
↓  
VC

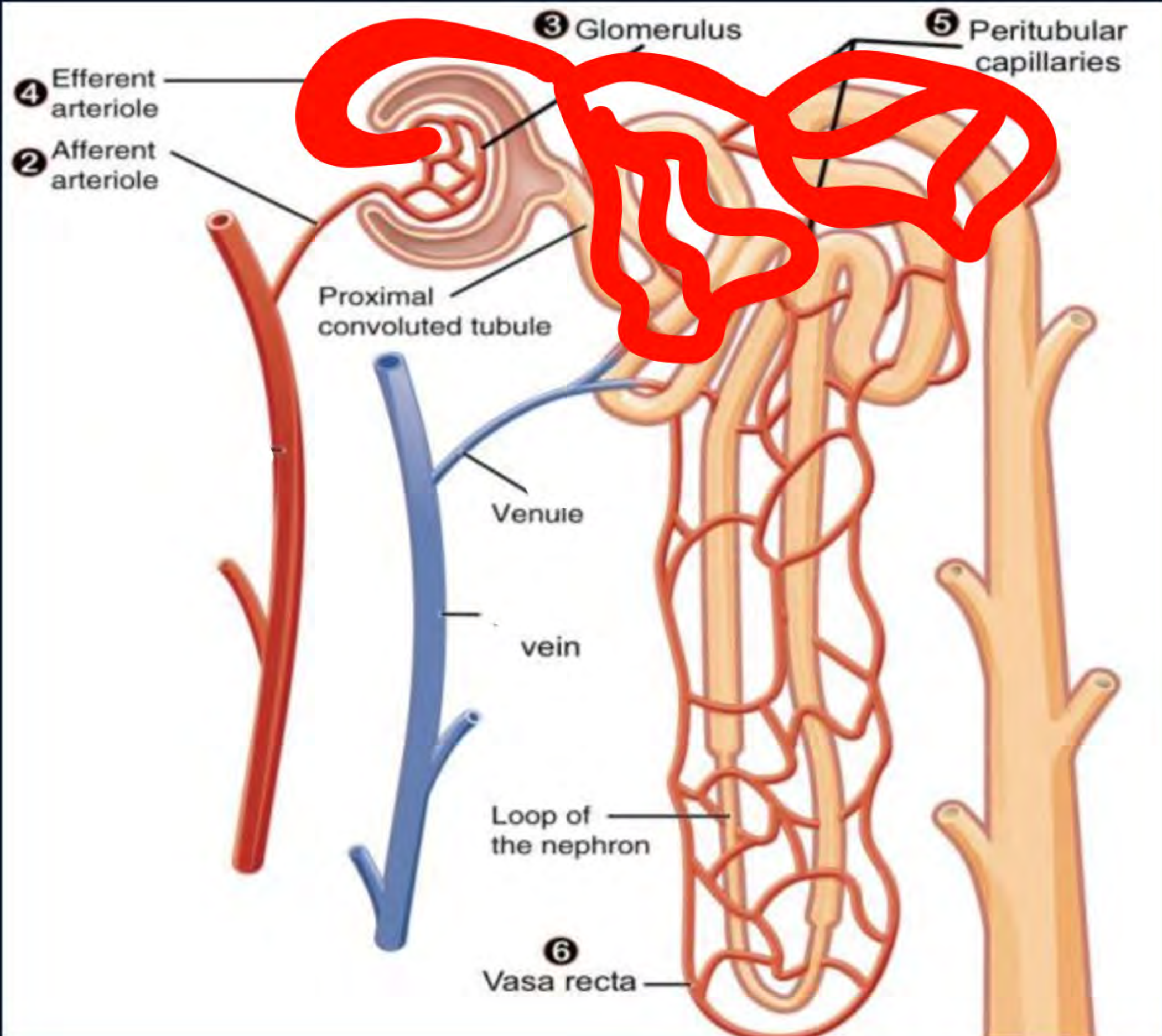


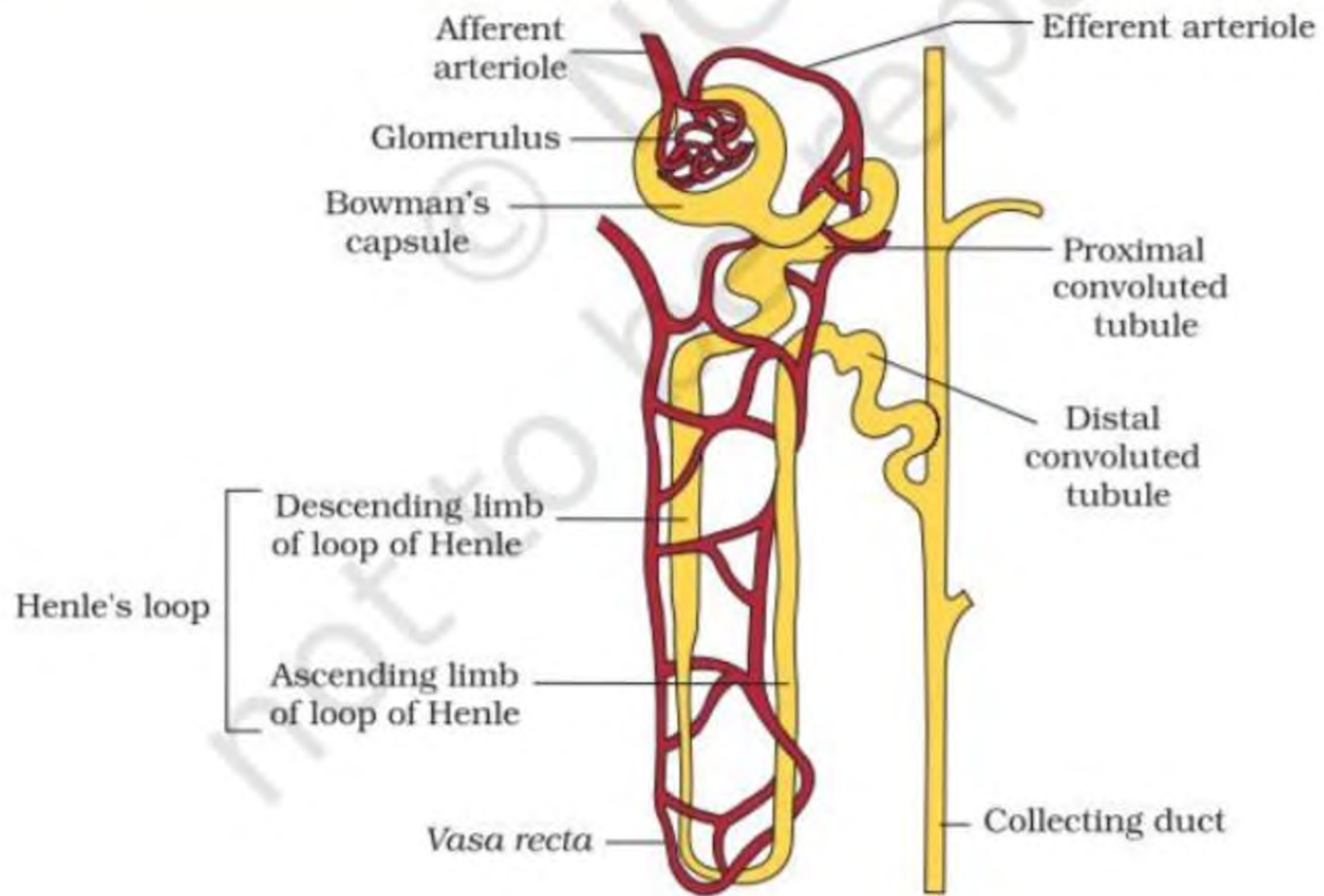




- DLOH parallel to AVR
- ALOH parallel to DVR
- PTC & VR: has Blood





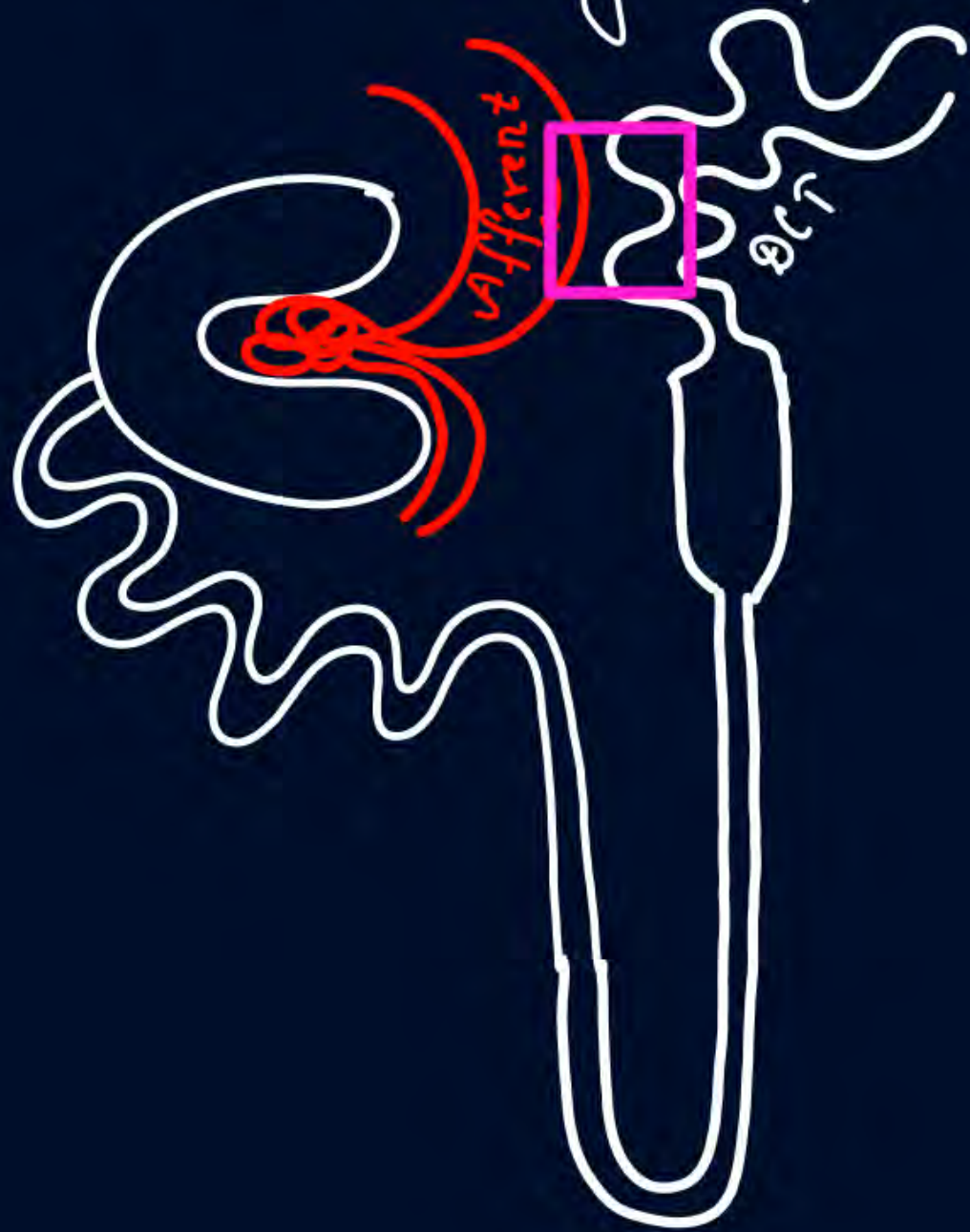


**Figure 16.3** A diagrammatic representation of a nephron showing blood vessels.



# \* JGA (Iuxta Glomerular Apparatus): Regulation of KIDNEY FUNCTION.

- Sensitive Region formed by close proximity b/w: Afferent Arteriole, DCT



Both shows modifications at contact point

## i) Afferent Arteriole

- At contact point, smooth muscle fibres modified c/a JG cells

Secretes  
'Renin'

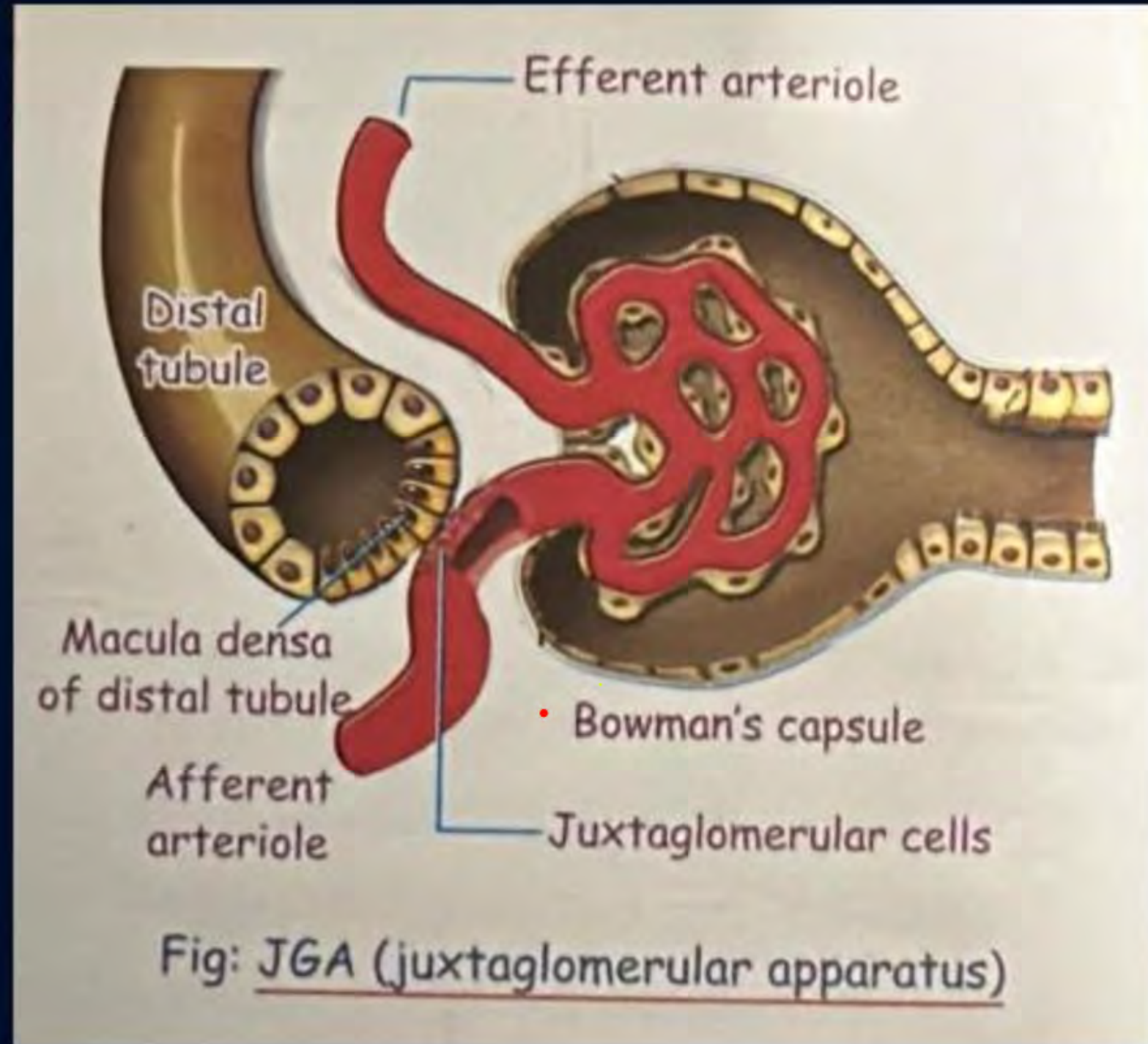
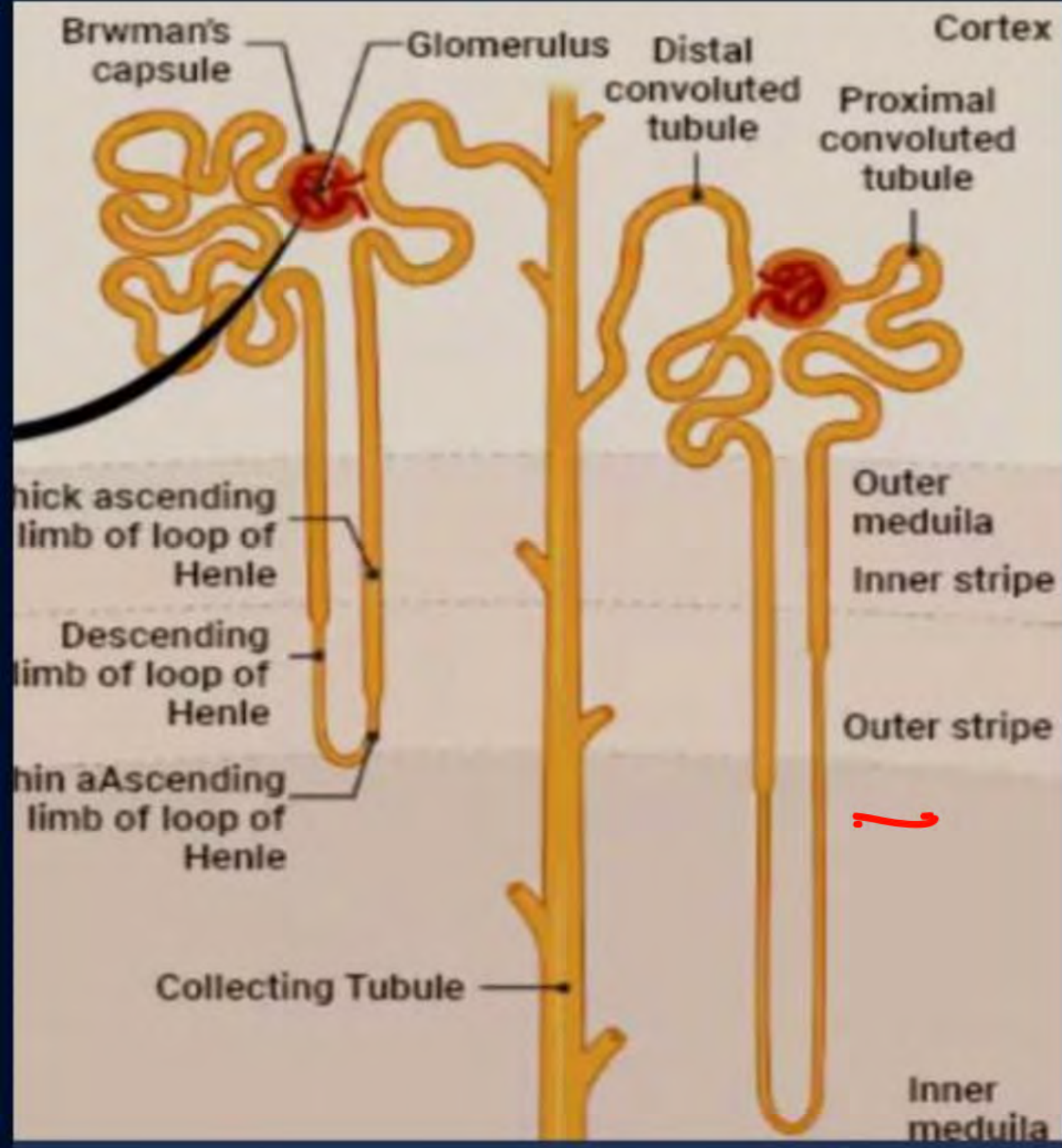
## ii) DCT

- At contact point, cuboidal cells are more densely packed c/a

MACULA DENSE

together  
JGA





## \* Mechanism of Urine Formation: 3 Steps

- i) Ultrafiltration
- ii) Reabsorption
- iii) Tubular Secretion

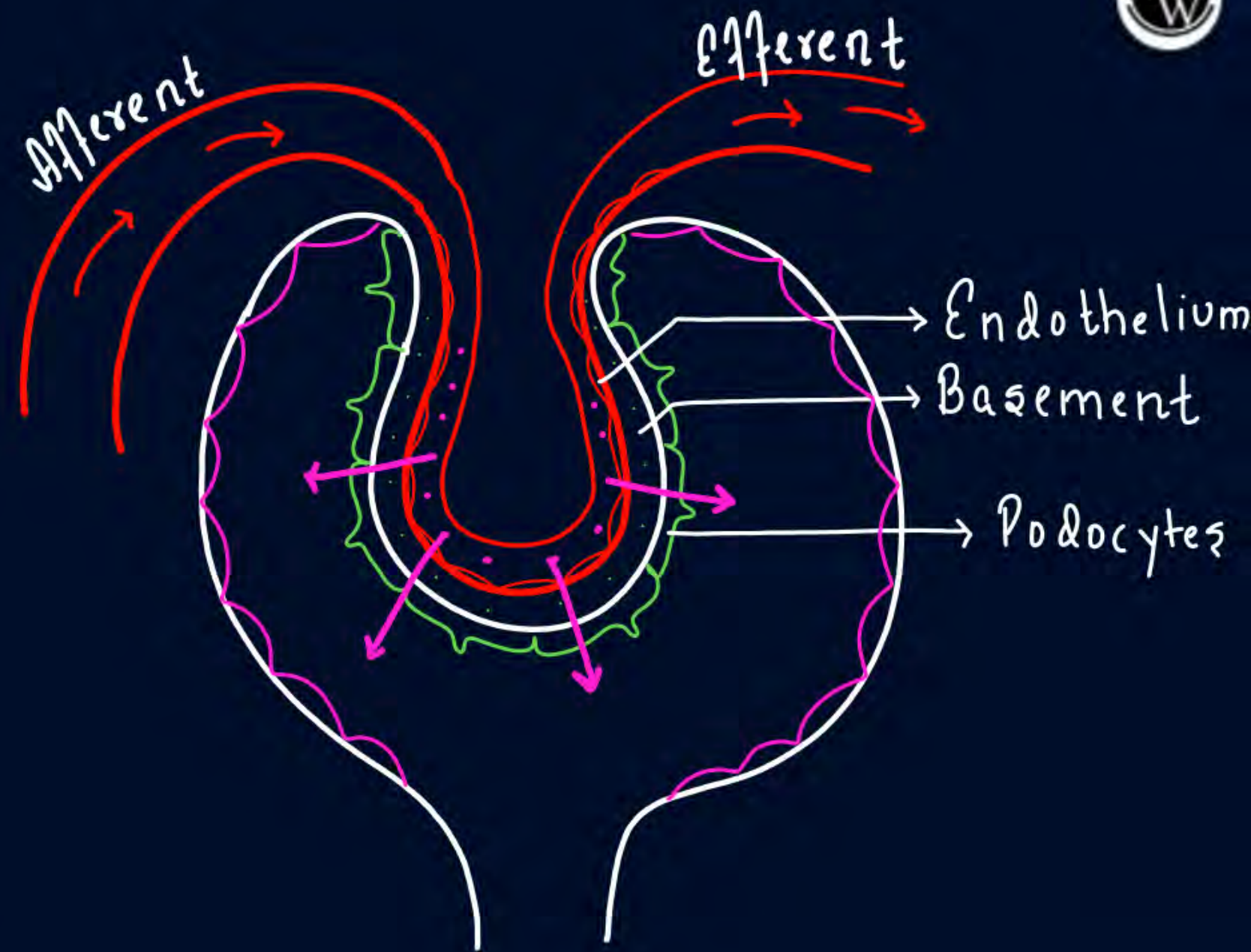


## ① Ultrafiltration:

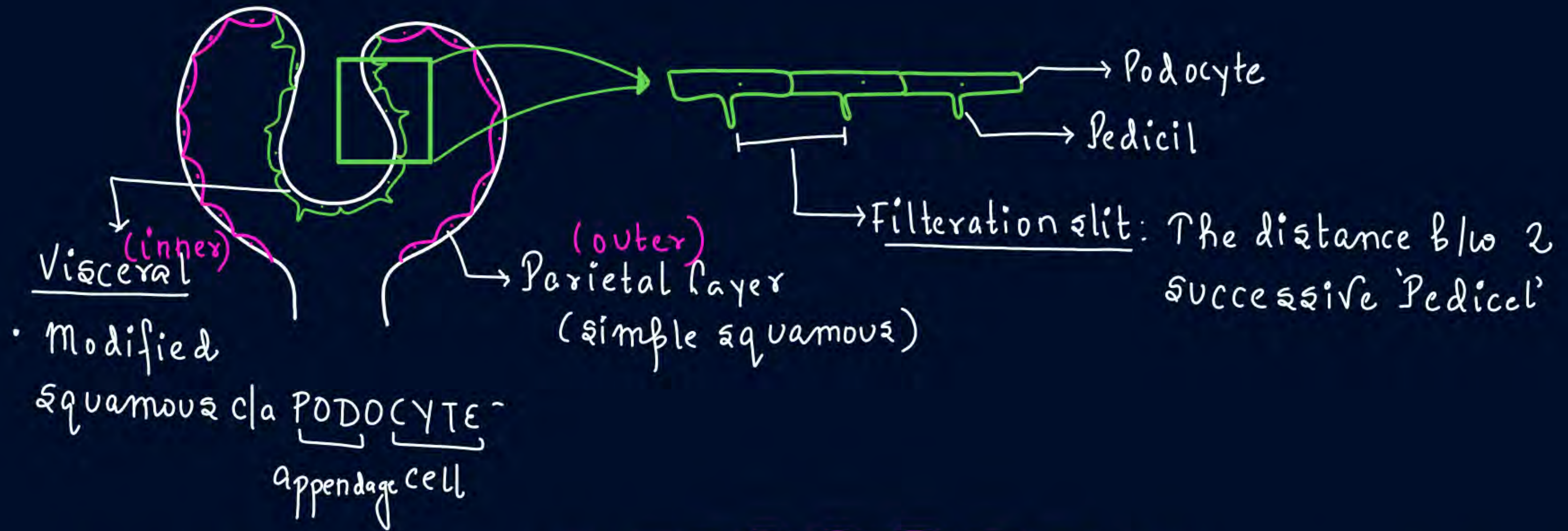
- Blood is filtered through the filtration Membrane formed by:

- i) Endothelium of Glomerulus
- ii) Basement membrane
- iii) Podocytes of Bowman's Capsule

- Glomerulus is 'tuft' of Capillary
- Bowman's capsule: double walled layer
  - outer parietal
  - inner visceral







→ Ultrafiltration: About  $\frac{1}{5}^{\text{th}}$  of Blood pumped by heart/min reaches kidney for ultrafiltration

→  $\approx 1100 - 1200 \text{ ml}$  ( $\text{CO} = 5040 \text{ ml}$ )

↳  $\frac{1}{5}^{\text{th}} \approx 1100 - 1200$



- GFR (Glomerular Filtration Rate): Amt. of filtrate formed/unit time



$$GFR = 125 \text{ ml/min OR } 180 \text{ L/Day}$$

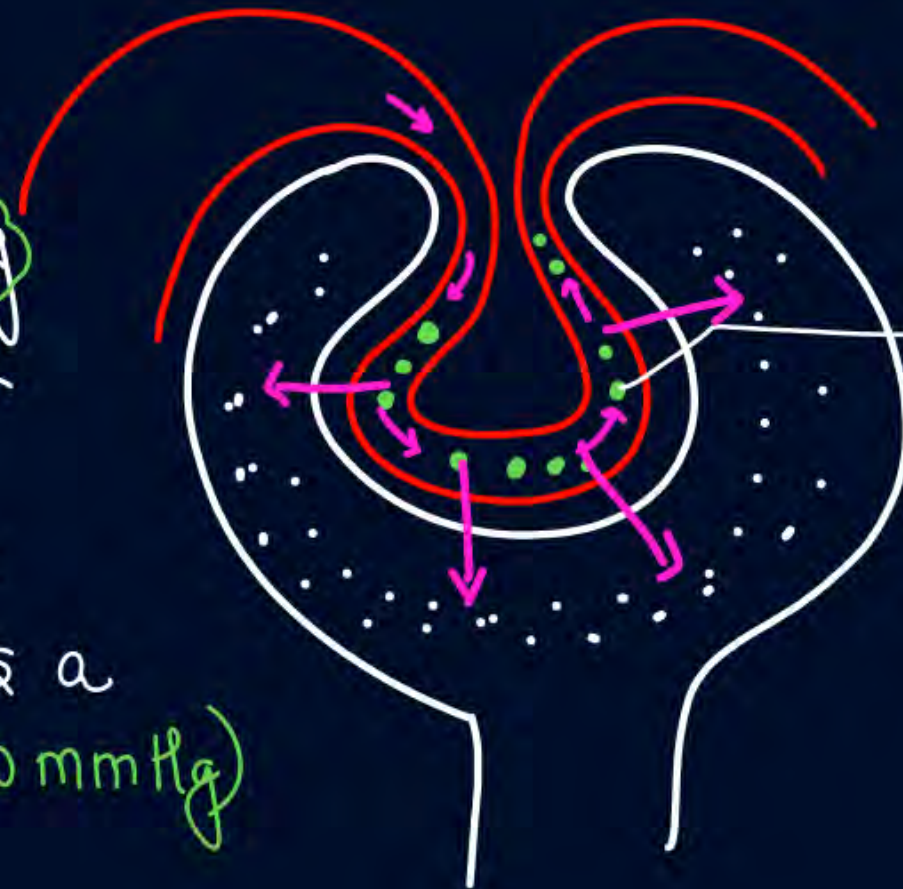
↓  
Urine formed: 1 to 1.5 L/Day; 99% is reabsorbed.

- Ultrafiltration: PASSIVE PROCESS, mainly occurs due to ↑ Pressure in Glomeruli.

\* Note अधिप्राप्त  
Gyaan

\* GHP: Glomerular Hydrostatic Pressure  $\approx 60 \text{ mmHg}$   
Pressure of Blood in Glomerulus (favourable)

\* BCOP: Blood colloidal Osmotic Pressure  
Solute/Proteins dissolved in Blood exerts a negative/unfavourable Pressure ( $\approx 30 \text{ mmHg}$ )



\* CHP: Capsular Hydrostatic Press.  
↓  
filtrate of Bowman Capsule exerts an opposing Pressure  $\approx 20 \text{ mmHg}$



$$NFP = GHP - (BCOP + CHP)$$

$$\begin{aligned}\text{Net Filtration Pressure} &= 60 - (30 + 20) \\ &= 10 \text{ mm Hg}\end{aligned}$$

\* Only Plasma part gets filtered leaving proteins: **FILTERATE**



## 16.2 URINE FORMATION

Urine formation involves three main processes namely, glomerular filtration, reabsorption and secretion, that takes place in different parts of the nephron.

The first step in urine formation is the filtration of blood, which is carried out by the glomerulus and is called **glomerular filtration**. On an average, 1100-1200 ml of blood is filtered by the kidneys per minute which constitute roughly  $1/5^{\text{th}}$  of the blood pumped out by each ventricle of the heart in a minute. The glomerular capillary blood pressure causes filtration of blood through 3 layers, i.e., the endothelium of glomerular blood vessels, the epithelium of Bowman's capsule and a basement membrane between these two layers. The epithelial cells of Bowman's capsule called podocytes are arranged in an intricate manner so as to leave some minute spaces called filtration slits or slit pores. Blood is filtered so finely through these membranes, that almost all the constituents of the plasma except the proteins pass onto the lumen of the Bowman's capsule. Therefore, it is considered as a process of **ultra filtration**.

GHP





The amount of the filtrate formed by the kidneys per minute is called **glomerular filtration rate** (GFR). GFR in a healthy individual is approximately 125 ml/minute i.e., 180 litres per day.

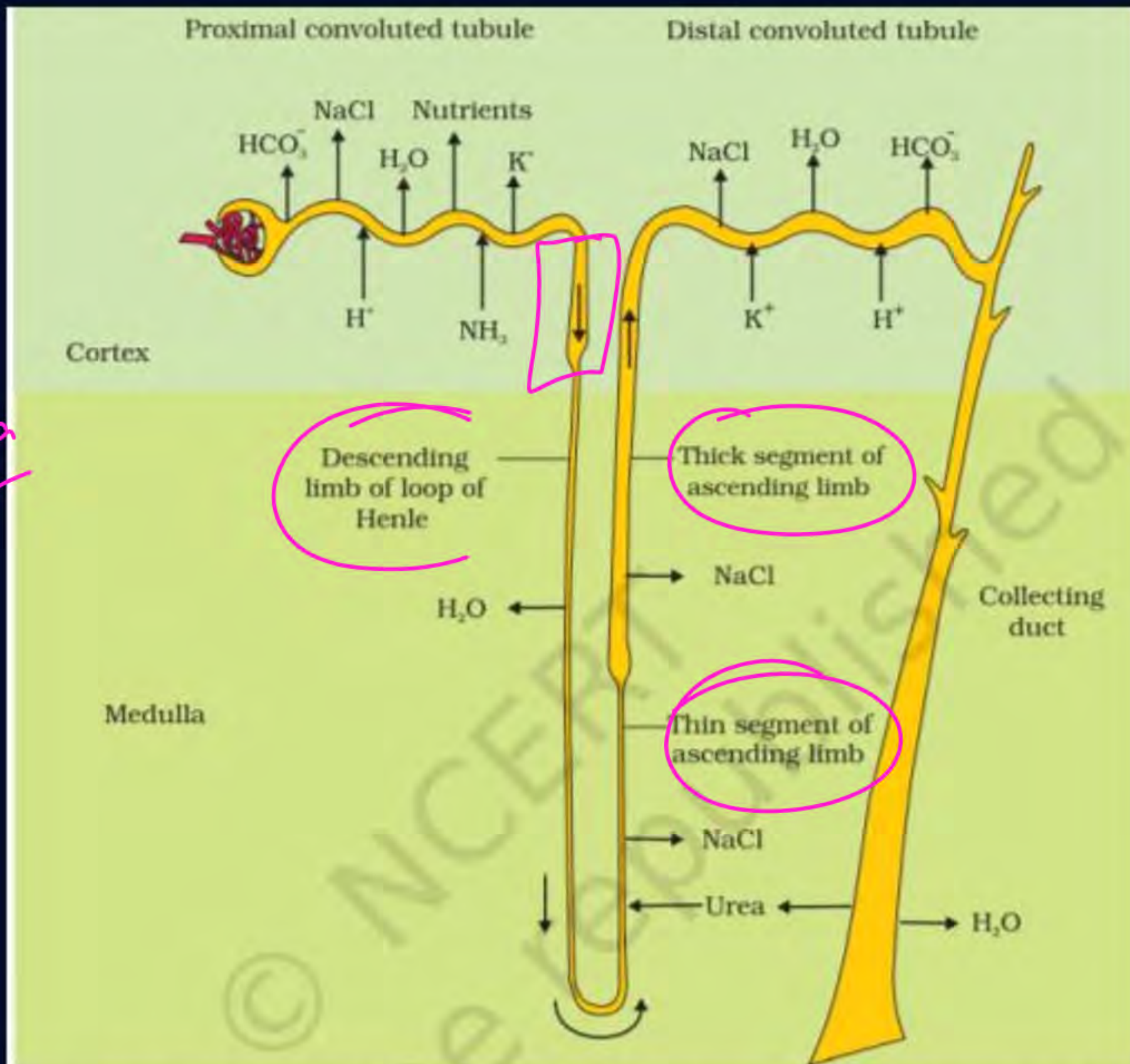
The kidneys have built-in mechanisms for the regulation of glomerular filtration rate. One such efficient mechanism is carried out by juxta glomerular apparatus (JGA). JGA is a special sensitive region formed by cellular modifications in the distal convoluted tubule and the afferent arteriole at the location of their contact. A fall in GFR can activate the JG cells to release renin which can stimulate the glomerular blood flow and thereby the GFR back to normal.

A comparison of the volume of the filtrate formed per day (180 litres per day) with that of the urine released (1.5 litres), suggest that nearly 99 per cent of the filtrate has to be reabsorbed by the renal tubules. This process is called **reabsorption**. The tubular epithelial cells in different segments of nephron perform this either by active or passive mechanisms. For example, substances like glucose, amino acids,  $\text{Na}^+$ , etc., in the filtrate are reabsorbed actively whereas the nitrogenous wastes are absorbed by passive transport. Reabsorption of water also occurs passively in the initial segments of the nephron (Figure 16.5).

During urine formation, the tubular cells secrete substances like  $\text{H}^+$ ,  $\text{K}^+$  and ammonia into the filtrate. Tubular secretion is also an important step in urine formation as it helps in the maintenance of ionic and acid base balance of body fluids.



*Part  
Recta*



**Figure 16.5** Reabsorption and secretion of major substances at different parts of the nephron (Arrows indicate direction of movement of materials.)

Next Catalyst



Q-1. READ THE FOLLOWING STATEMENT AND CHOOSE THE CORRECT ANSWER

STATEMENT 1- <sup>Liver</sup> In humans ammonia produced by metabolism is converted into urea by ~~kidneys~~ and eliminated by them (F)

STATEMENT 2- The extension of medulla between cortex is called column of bertini ~~X~~  
<sub>Corley</sub>

- 1 Statement I is correct but Statement II is incorrect.
- 2 Statement I is incorrect but Statement II is correct.
- 3 Both Statement I and Statement II are correct.
- 4 Both Statement I and Statement II are incorrect.

Q-1  
4



ASSERTION-The main differentiating factor between cortical and juxtamedullary nephron is the length of loop of henle (T)

REASON -Majority of the nephrons in our body has long loop of henle (F)

- A) Both Assertion (A) and Reason (R) are true, and Reason (R) is a correct explanation of Assertion (A).
- B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not a correct explanation of Assertion (A).
- C) Assertion (A) is true, and Reason (R) is false.
- D) Assertion (A) is false, and Reason (R) is true.

Q.2  
3



Q-1. READ THE FOLLOWING STATEMENT AND CHOOSE THE CORRECT ANSWER

STATEMENT 1- Bony fishes eliminate out ammonia ✓

STATEMENT 2- kidneys donot play a significant role in removal of ammonia in fish ✓

1 Statement I is correct but Statement II is incorrect.

2 Statement I is incorrect but Statement II is correct.

✓ 3 Both Statement I and Statement II are correct.

4 Both Statement I and Statement II are incorrect.

Q-3  
3



Q-1. READ THE FOLLOWING STATEMENT AND CHOOSE THE CORRECT ANSWER

STATEMENT 1- nephridia are tubular excretory structure in annelids

(T)

STATEMENT 2- nephridia help in excretion and maintaining fluid and ionic balance

(T)

1 Statement I is correct but Statement II is incorrect.

2 Statement I is incorrect but Statement II is correct.

3 Both Statement I and Statement II are correct.

4 Both Statement I and Statement II are incorrect.

Q-1  
3



ASSERTION- Animal can accumulate the wastes like  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Cl}^-$ , etc via excess of ingestion too

REASON - ammonia is the most toxic nitrogenous waste and requires less water for its removal

- A) Both Assertion (A) and Reason (R) are true, and Reason (R) is a correct explanation of Assertion (A).
- B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not a correct explanation of Assertion (A).
- ☒ C) Assertion (A) is true, and Reason (R) is false.
- D) Assertion (A) is false, and Reason (R) is true.

Q.5  
3



Q-1. READ THE FOLLOWING STATEMENT AND CHOOSE THE CORRECT ANSWER

STATEMENT 1- Renal tubule begins with bowmans capsule

STATEMENT 2- malpighian corpuscle is situated in cortical region of kidney

G + BC

- 1 Statement I is correct but Statement II is incorrect.
- 2 Statement I is incorrect but Statement II is correct.
- 3 Both Statement I and Statement II are correct.
- 4 Both Statement I and Statement II are incorrect.

Q. 1. 3



Samapti Sinha Mahapatra

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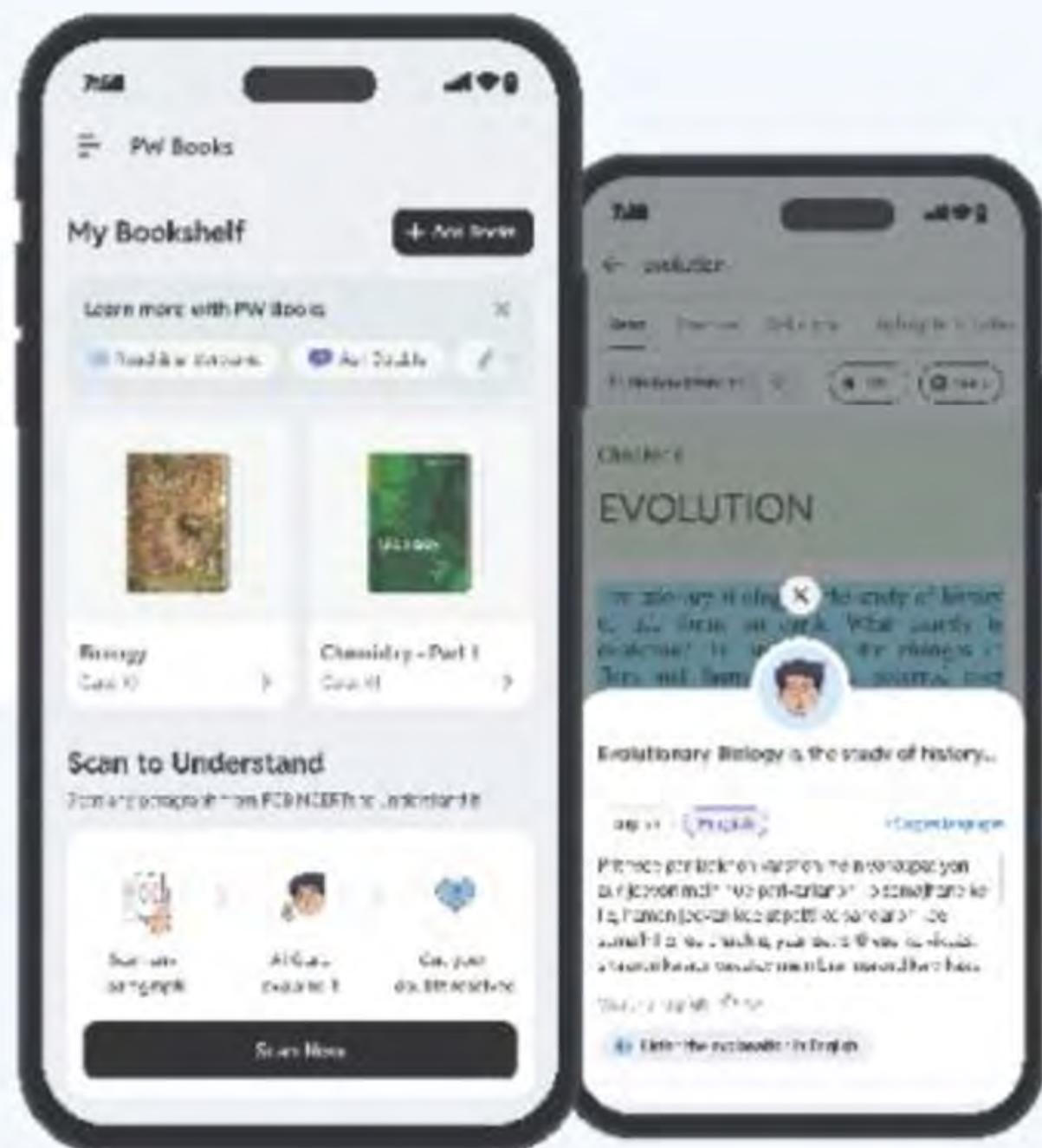
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Questions & Solutions



Video Explanations







## Homework

- REVISE CLAASNOTES / ZOOLOGY MED EASY



**THANK**  
**YOU**