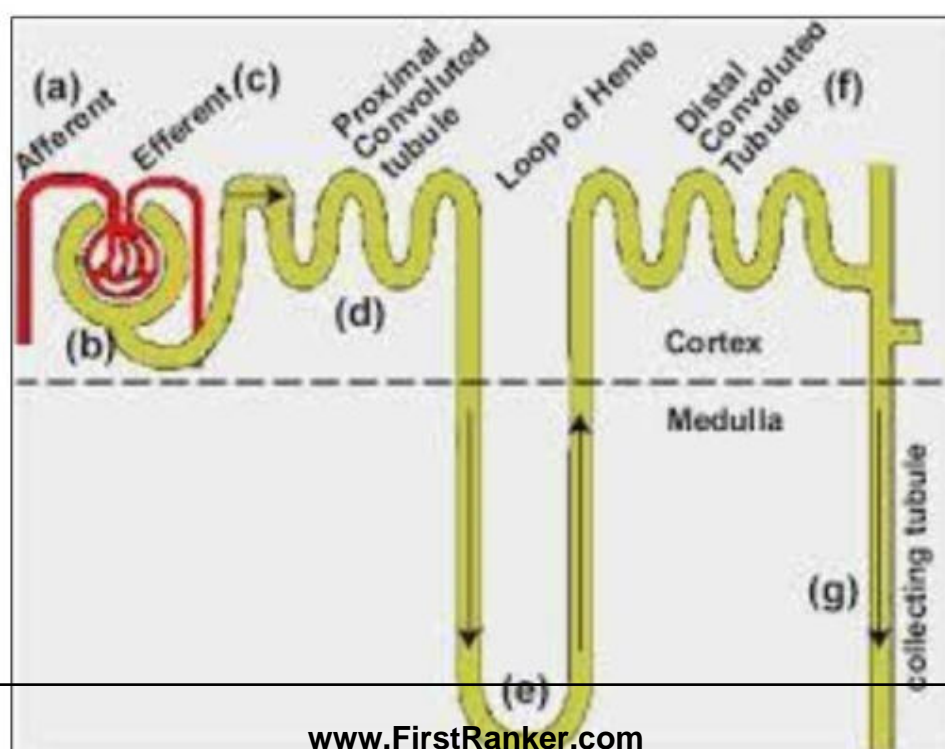


Renal Physiology – Introduction to Nephron

Learning Objectives

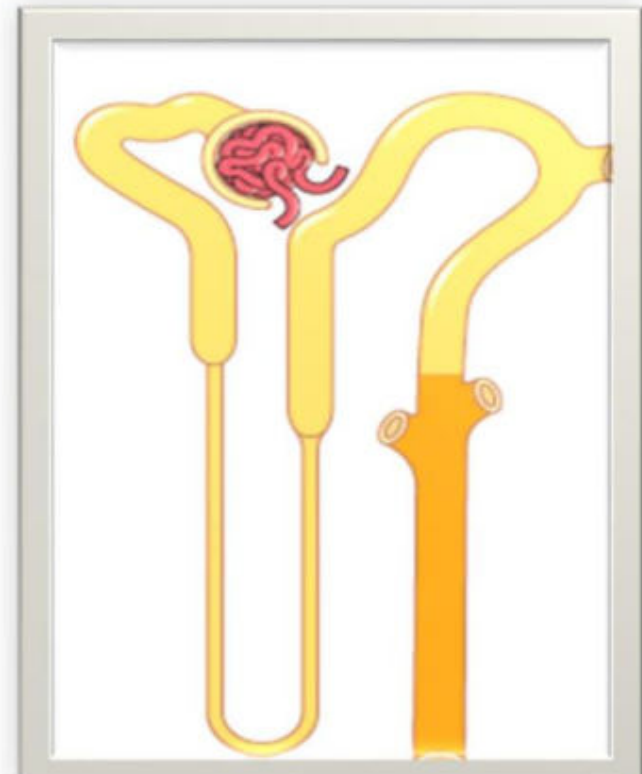
To understand:

- The morphological features of a typical nephron.
- Functions of kidney.



Functional Units of the kidney - **The Nephron**

- Each kidney contains 1-1.2 million **nephrons**.
- The kidney cannot regenerate new nephrons.
- Total length of a nephron (including C_LD) - 45 to 65 mm

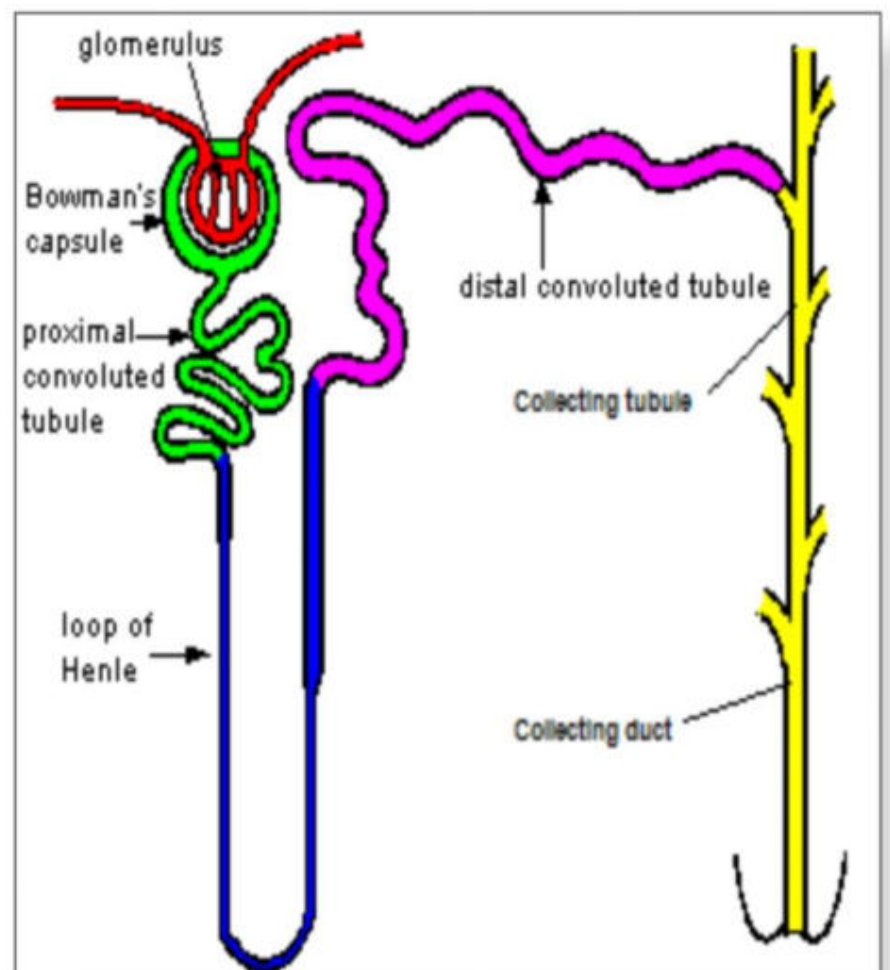


Structure of functional units of the kidney - **Nephron**

A nephron consists of :

I. Renal Corpuscles

II. Renal tubules



Milestones in the discoveries of Structure and functions of Nephron

Malpighi spotted glomeruli, 1666-

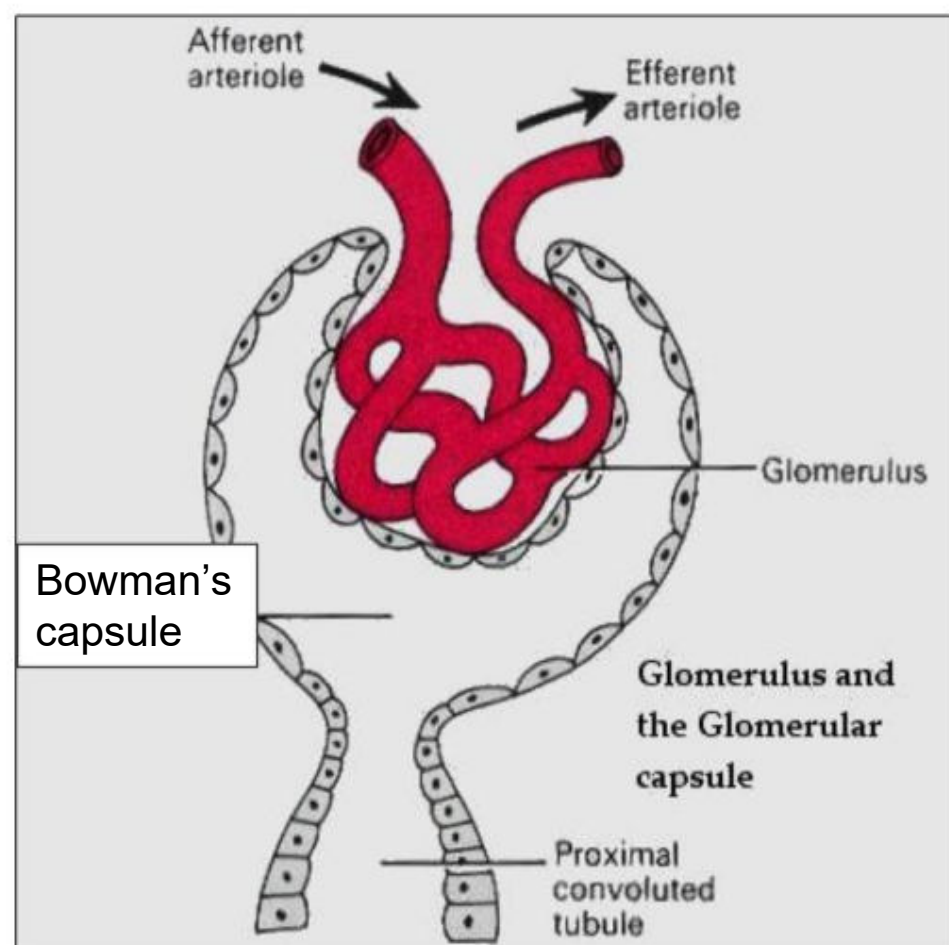
Bowman described glomeruli, 1842 –

Ludwig, 1842-

Wearn and Richard, 1924 –

Structure of functional units of the kidney - **Nephron**

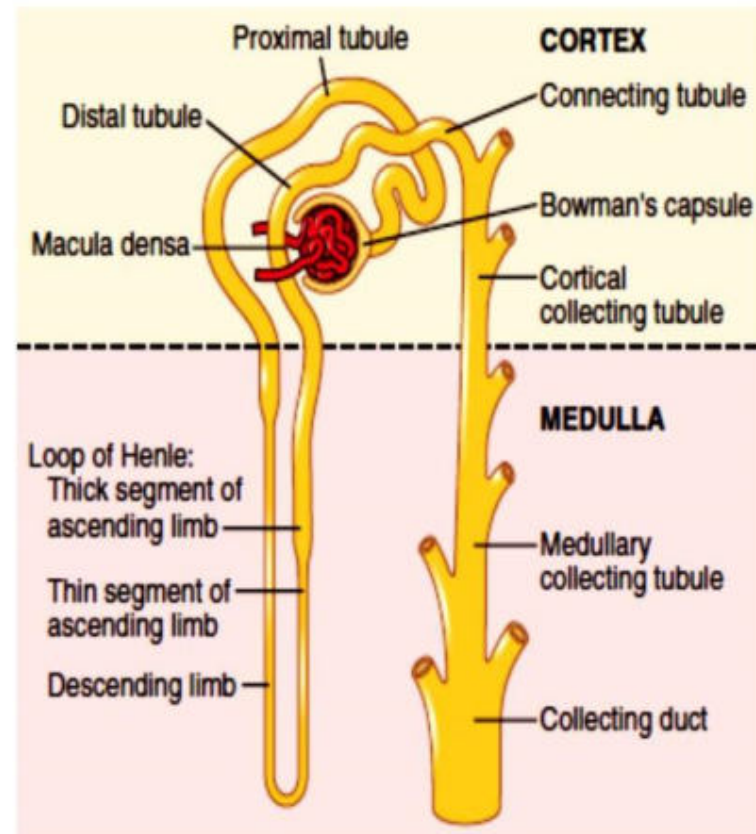
Glomerulus



Structure of functional units of the kidney - **Nephron**

Proximal Convoluted Tubule (PxCT) –

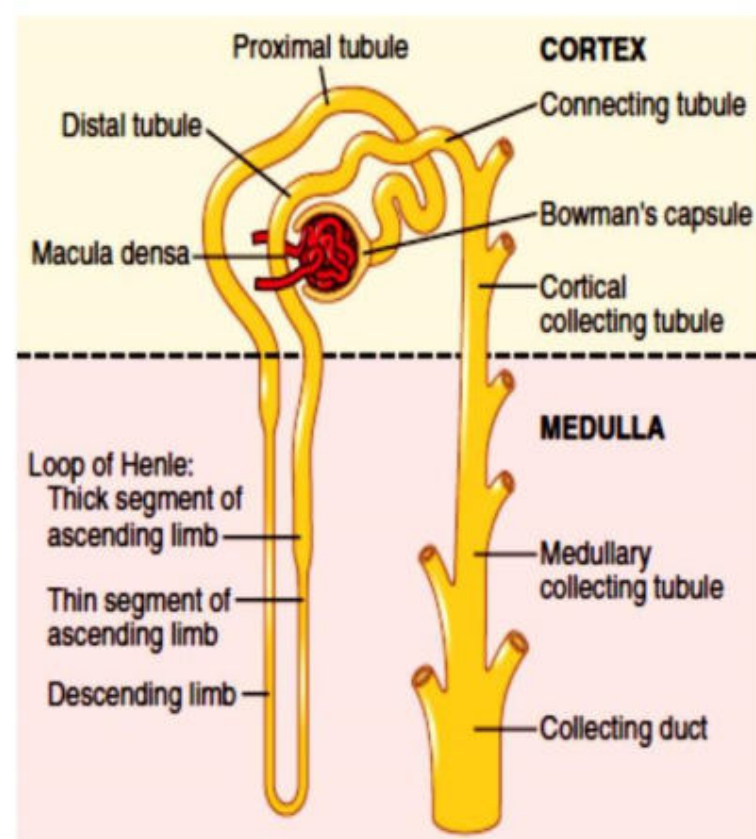
- early (pars convoluta)
- late (pars recta)



Structure of functional units of the kidney - **Nephron**

Loop of Henle (LOH)–

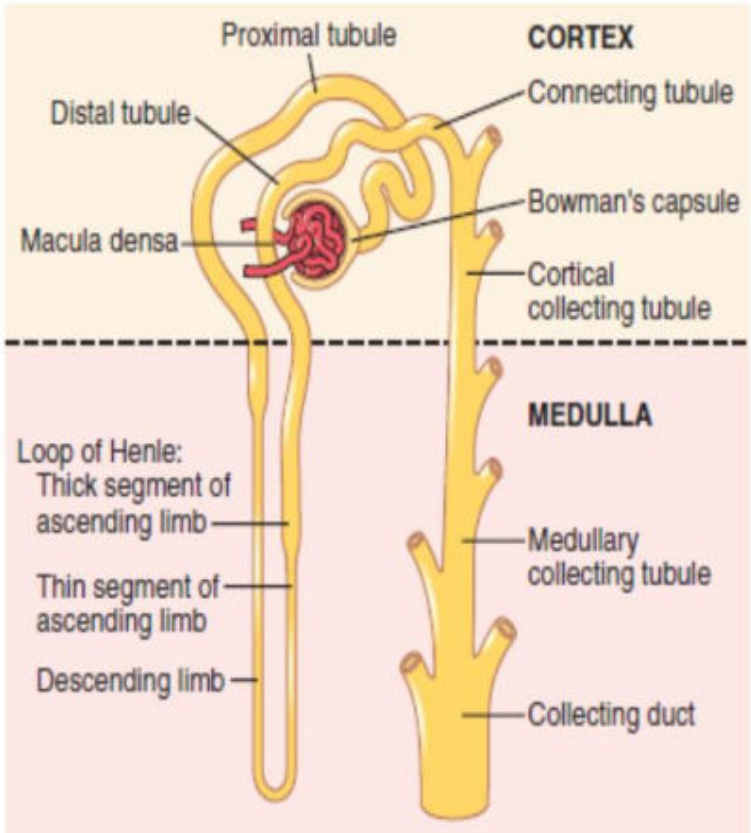
- The descending LOLOH
- Ascending LOLOH – Thin & Thick segments



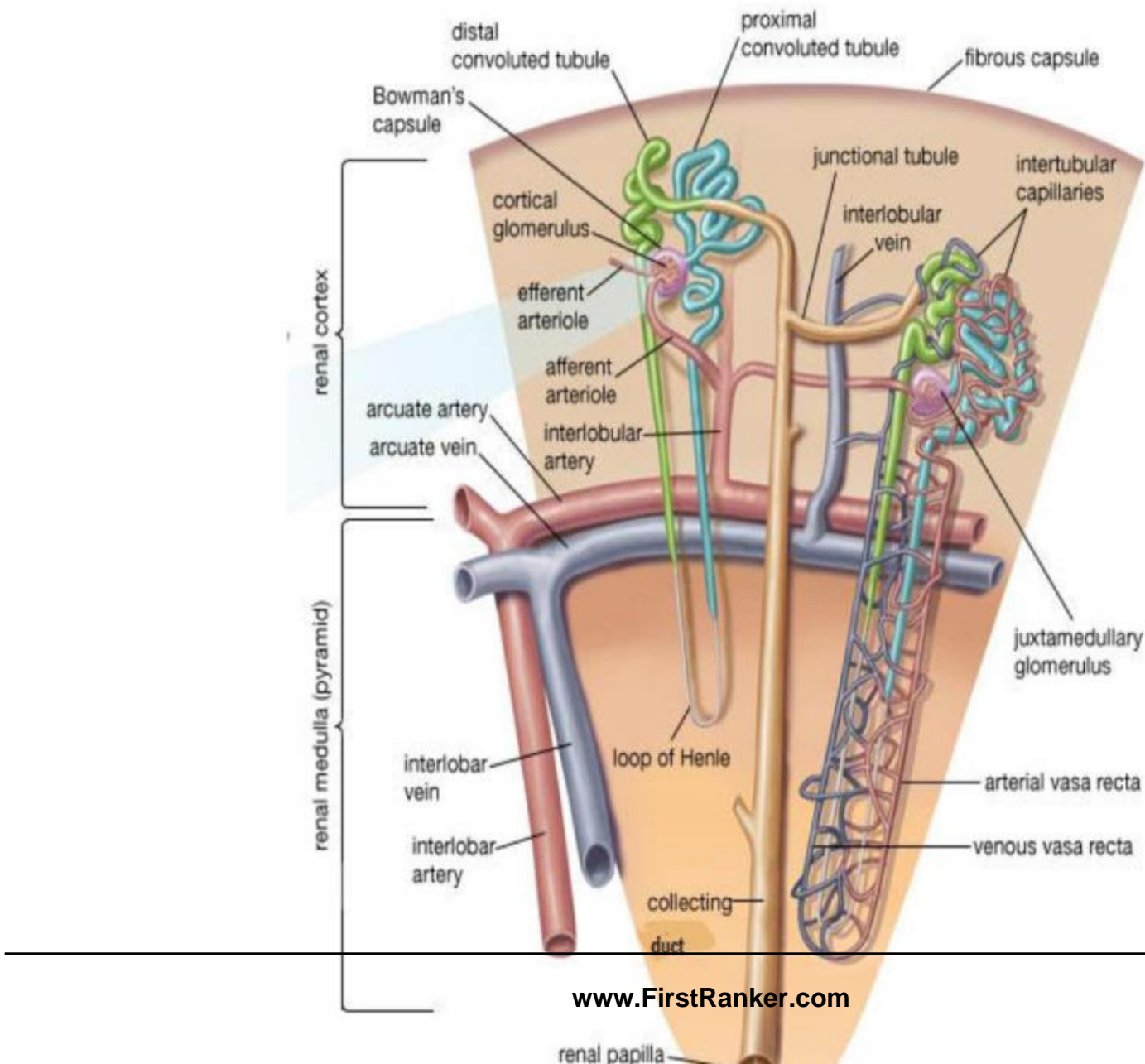
Structure of functional units of the kidney - **Nephron**

Distal segment

Distal Convoluted Tubules (DxCT)
Collecting tubules
Papillary C_LDuct /duct of Bellini

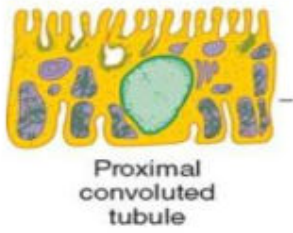


Cortical and Juxta medullary nephrons

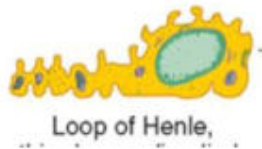


Nephron –Tubular cells morphology

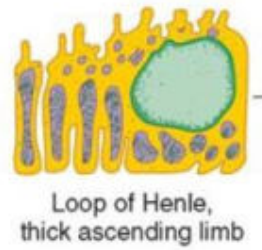
Proximal Convoluted Tubule



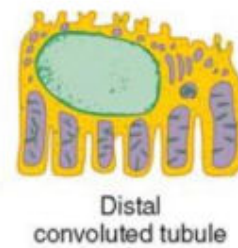
LOH-Thin
Descending &
Ascending Limbs



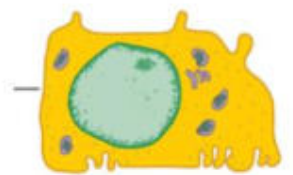
LOH-Thick
Ascending Limb



Distal
Convoluted T



Collecting Tubule



Functions of KIDNEY

Functions of KIDNEY

- **Water, electrolytes and acid–base homeostasis**
- **Waste products handling**
- **Endocrine organs**
- **Regulate calcium and phosphate.**
- **Gluconeogenesis**

Salient features of the lecture

Each kidney contains:

Total length of a nephron (including C_LD):

Renal Corpuscles:

Renal tubules:

Cortical nephrons :

Juxta-medullary nephrons :

Tubular cell morphology at different regions:

Self Assessment

•What percentage of total nephrons is present as Juxta-medullary nephrons in kidney?

1. 15
2. 30
3. 60
4. 80

Brush borders in the form of tall microvilli are present in tubular epithelial cells of:

1. PxCT
2. PxCT and thick asc LOLOH
3. PxCT and thin asc LOLOH
4. PxCT and Collecting tubules

•Total length of a nephron ranges from:

1. 5-10 mm
2. 25-45 mm
3. 45-65 mm
4. 65-100 mm

Micropuncture technique to understand renal–nephron specific physiology was carried out by:

1. Malpighi
2. Bowman
3. Bellini and Ludwig
4. Wearn and Richard

Thank you