



SNS COLLEGE OF ALLIED HEALTH SCIENCES
SNS Kalvi Nagar, Coimbatore - 35
Affiliated to Dr MGR Medical University, Chennai



DEPARTMENT : PHYSICIAN ASSISTANT

COURSE NAME : NEPHROLOGY

UNIT : GENITO URINARY SYSTEM

TOPIC : MICROSCOPIC STRUCTURE OF KIDNEY



NEPHRON



Renal Corpuscle:

- **Glomerulus:** A complex network of fenestrated capillaries with a unique endothelial glycocalyx allowing selective filtration of plasma.
- **Bowman's Capsule:** Comprised of parietal and visceral layers. The visceral layer consists of podocytes with interdigitating foot processes forming filtration slits.

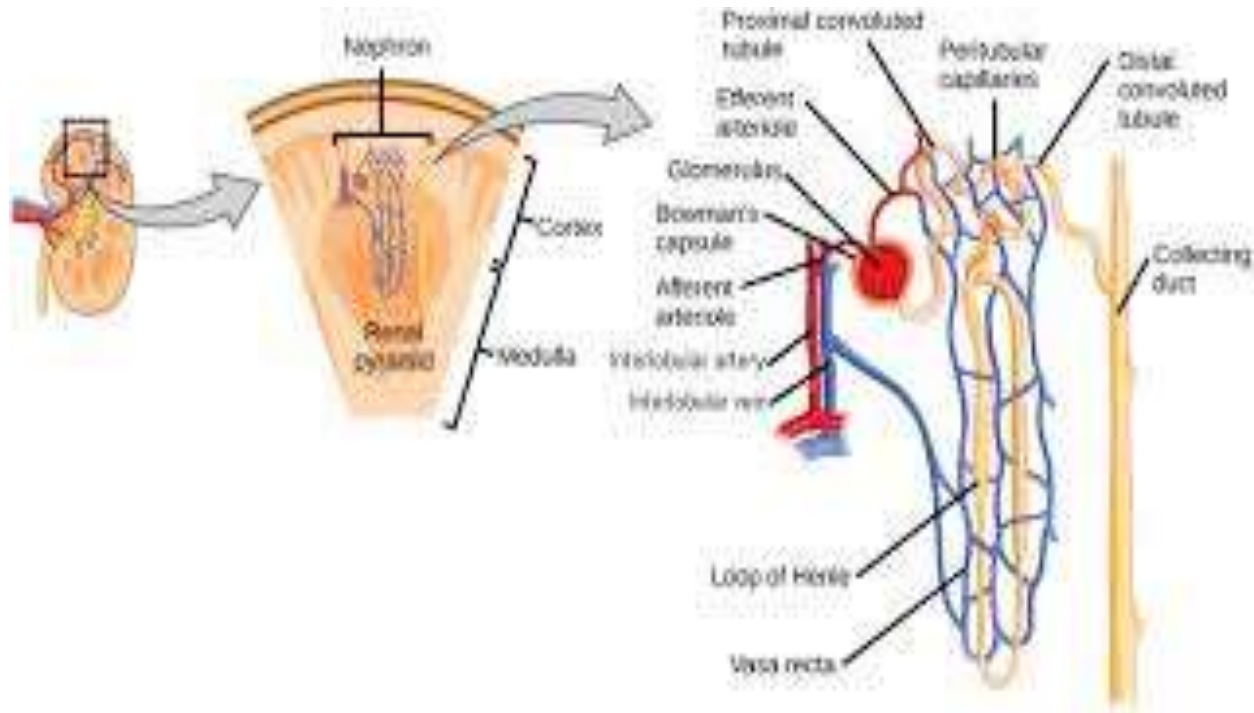


Renal Tubule:

- Proximal Convoluted Tubule (PCT): Lined with cuboidal epithelial cells densely packed with microvilli, facilitating reabsorption of solutes and water.
- Loop of Henle: Composed of descending and ascending limbs. The descending limb is permeable to water, while the ascending limb is involved in ion transport.



- **Distal Convoluted Tubule (DCT):** Lined by cuboidal cells with fewer microvilli. It regulates electrolyte balance and pH through reabsorption and secretion processes.
- **Collecting Duct:** Receives filtrate from multiple nephrons. Principal cells reabsorb water under ADH influence, while intercalated cells maintain acid-base balance.





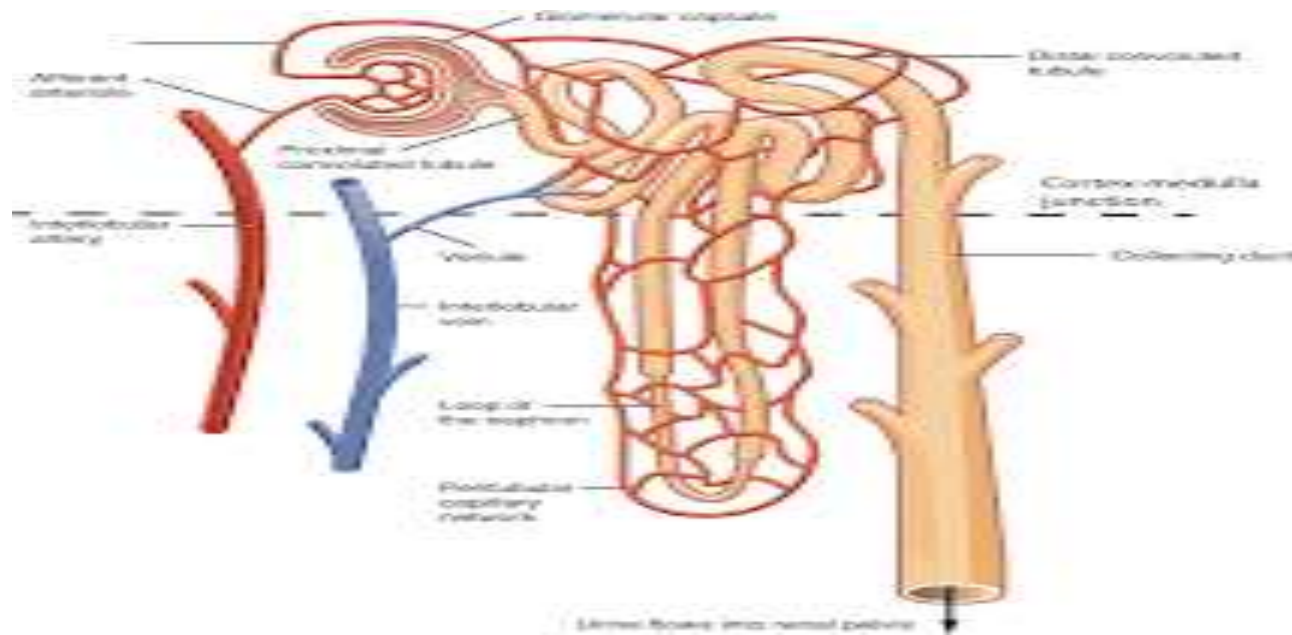
RENAL VASCULATURE



- Afferent Arteriole: Supplies blood to the glomerulus, regulating GFR.
- Efferent Arteriole: Drains blood from the glomerulus, influencing renal blood flow and GFR.



- **Peritubular Capillaries:** Form an intricate network around renal tubules, facilitating reabsorption and secretion processes.
- **Vasa Recta:** Specialized capillaries surrounding the loop of Henle, vital for establishing and maintaining the medullary osmotic gradient.





JUXTAGLOMERULAR APPARATUS



- The juxtaglomerular apparatus is an anatomical unit located at the hilus of the glomerulus and is believed to be involved in feedback control of renal blood flow and glomerular filtration rate.



- The juxtaglomerular apparatus functions to maintain blood pressure and to act as a quality control mechanism to ensure proper glomerular flow rate and efficient sodium reabsorption.
- The urethra extends from the bladder to the surface of the body.



INTERSTITIAL TISSUE



- **Fibroblasts:** Synthesize and maintain the extracellular matrix, providing structural support.
- **Pericytes:** Ensheath capillaries, contributing to vascular stability and regulation.
- **Interstitial Cells:** Include immune cells like macrophages, playing a role in immune responses and tissue repair.



ULTRASTRUCTURAL FEATURES



- Podocytes: Elaborate epithelial cells with foot processes interconnected by slit diaphragms, forming the final filtration barrier.
- Endothelial Cells: Line the capillaries, exhibiting fenestrations in the glomerular endothelium.
- Mesangial Cells: Contractile cells within the glomerulus, involved in structural support and modulation of glomerular filtration surface area.



ASSESSMENT



- What is Nephron ?
- What is Juxtaglomerular apparatus ?