



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 : JUXTAGLOMERULAR APPARATUS



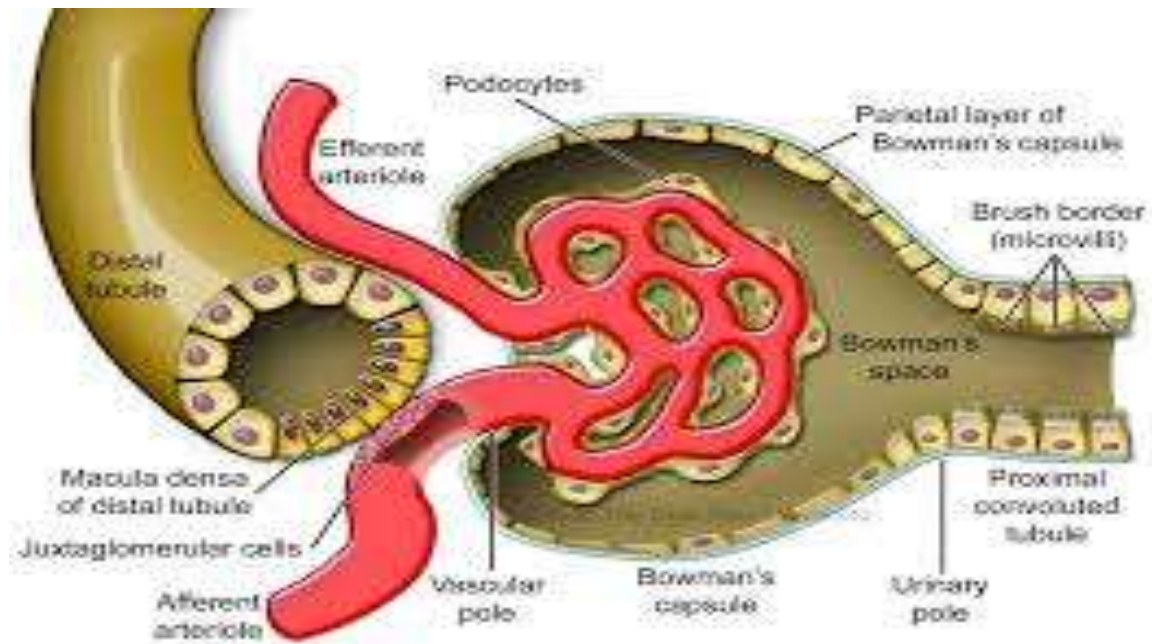
JUXTAGLOMERULAR APPARATUS



- 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.





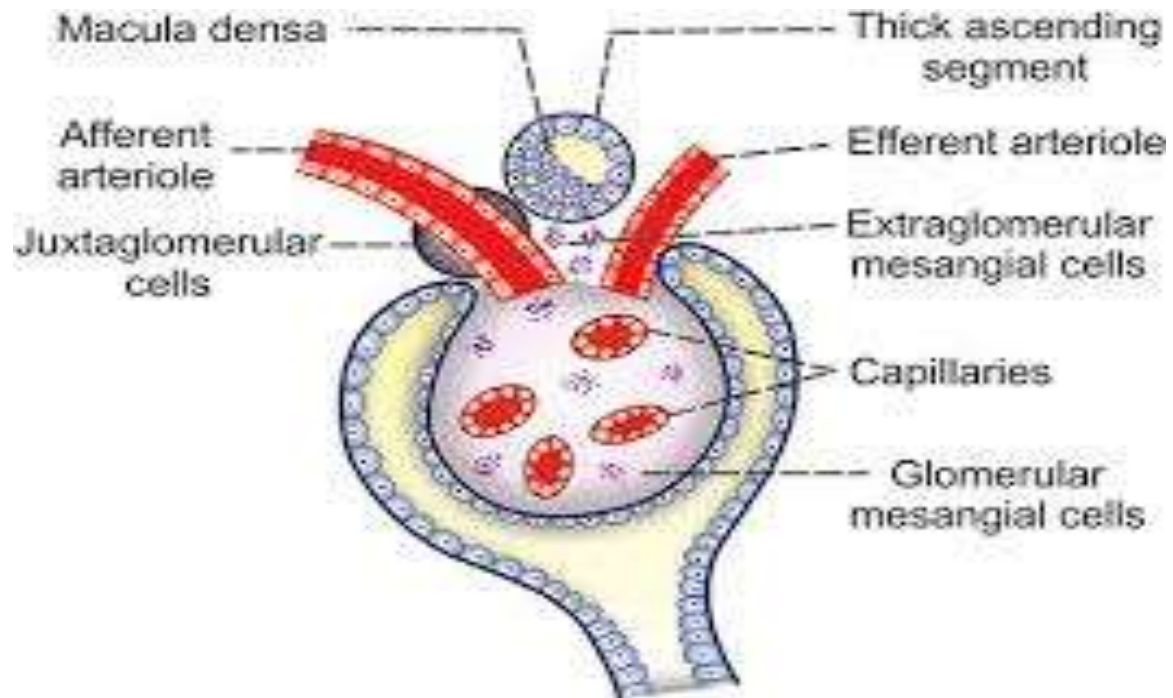
LOCATION AND STRUCTURAL COMPONENTS



- **Location:** Found at the junction of the afferent arteriole and the distal convoluted tubule (DCT) in the kidney's nephrons.
- **Macula Densa:** A specialized region of the DCT composed of tightly packed epithelial cells.



- Juxtaglomerular (JG) Cells: Modified smooth muscle cells located in the wall of the afferent arteriole.
- Extraglomerular Mesangial Cells: Situated between the afferent arteriole and the macula densa, involved in signaling and support.





FUNCTIONS



- Renin-Angiotensin-Aldosterone System (RAAS) Regulation:
The JGA regulates renin secretion from JG cells in response to changes in blood pressure, sodium levels, and sympathetic nervous system activity.



- **Blood Pressure Regulation:** Monitors and maintains blood pressure by adjusting renal blood flow and glomerular filtration rate (GFR) through the release of renin.
- **Tubuloglomerular Feedback (TGF):** Regulates GFR by sensing changes in sodium chloride concentration at the macula densa and adjusting afferent arteriolar resistance accordingly.



ULTRASTRUCTURAL FEATURES



- **Macula Densa Cells:** Tall, closely packed cells with prominent nuclei and mitochondria, facilitating sensing of sodium chloride concentration in the tubular fluid.
- **JG Cells:** Contain granules of renin and are rich in secretory machinery, enabling the release of renin in response to various stimuli.



- Extraglomerular Mesangial Cells: Communicate with both macula densa cells and JG cells, possibly serving as paracrine signaling intermediaries.



CLINICAL SIGNIFICANCE



- Hypertension: Dysregulation of the JGA, such as excessive renin release, can contribute to hypertension.
- Renal Disorders: Alterations in JGA structure or function can occur in renal diseases, affecting blood pressure regulation and electrolyte balance.



ASSESSMENT



- What is Micturition ?
- What all are the Disorders in Micturition ?