

Lec. 6 Theory

Human Biology

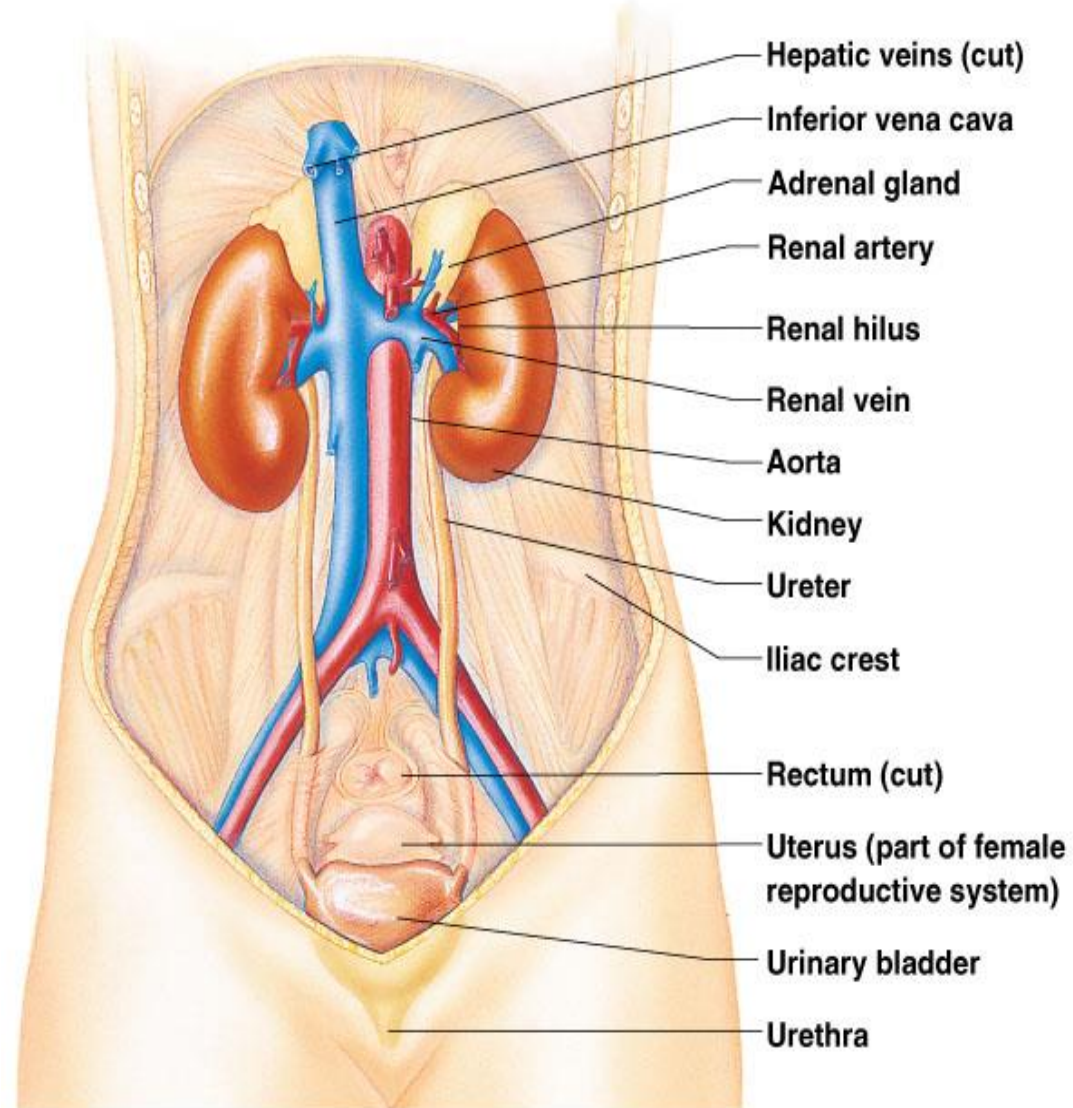
MLA

Human Urinary System

Dr. Kamal M.

Organs of Urinary system

- Kidneys (2)
- Ureters (2)
- Urinary bladder (1)
- Urethra (1)



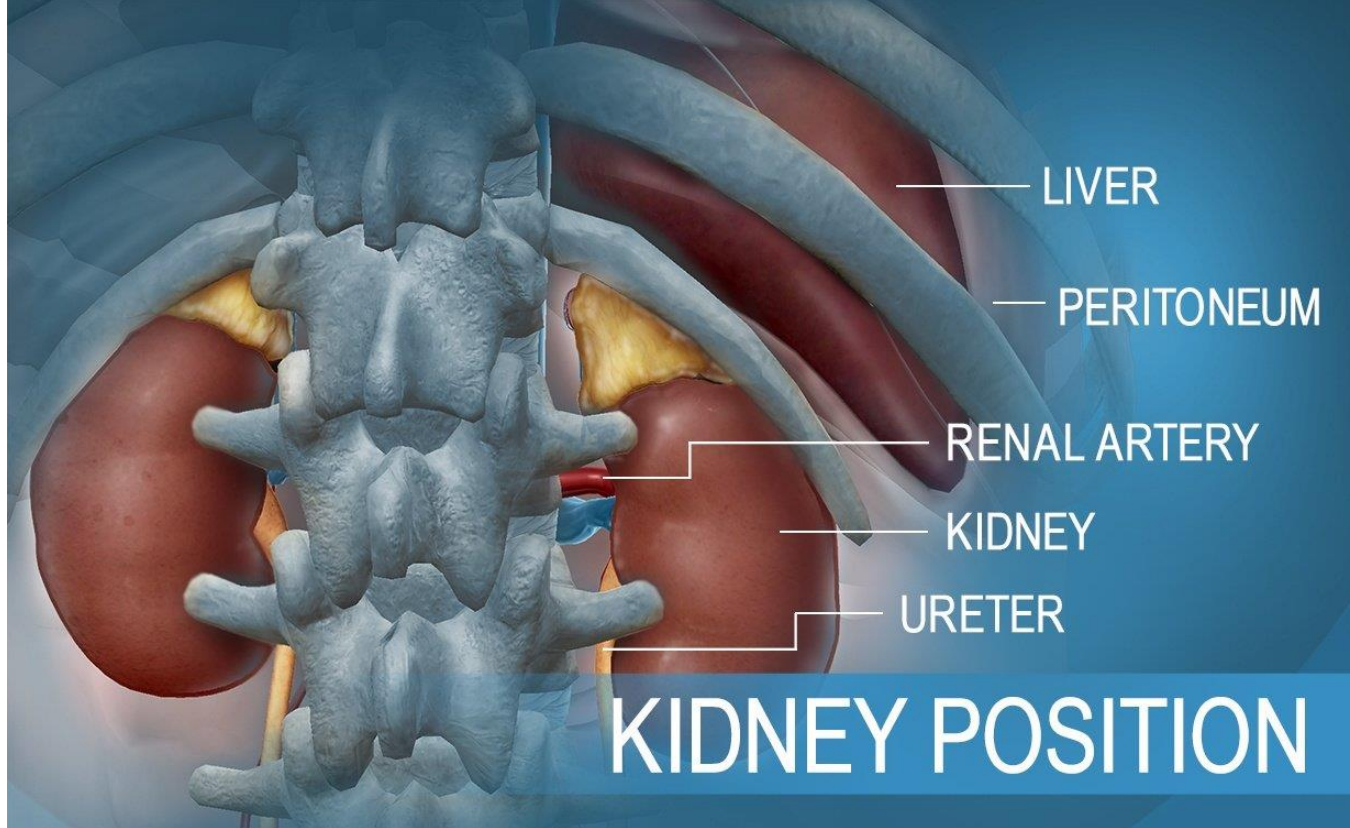
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Function & Structure of the Urinary tract system:

- The **kidneys, ureters, bladder, and urethra** are the primary structures of the urinary system.
- They filter blood and remove waste from the body in the form of urine.
- The **size** and **position** of lower urinary structures vary with male and female anatomy.

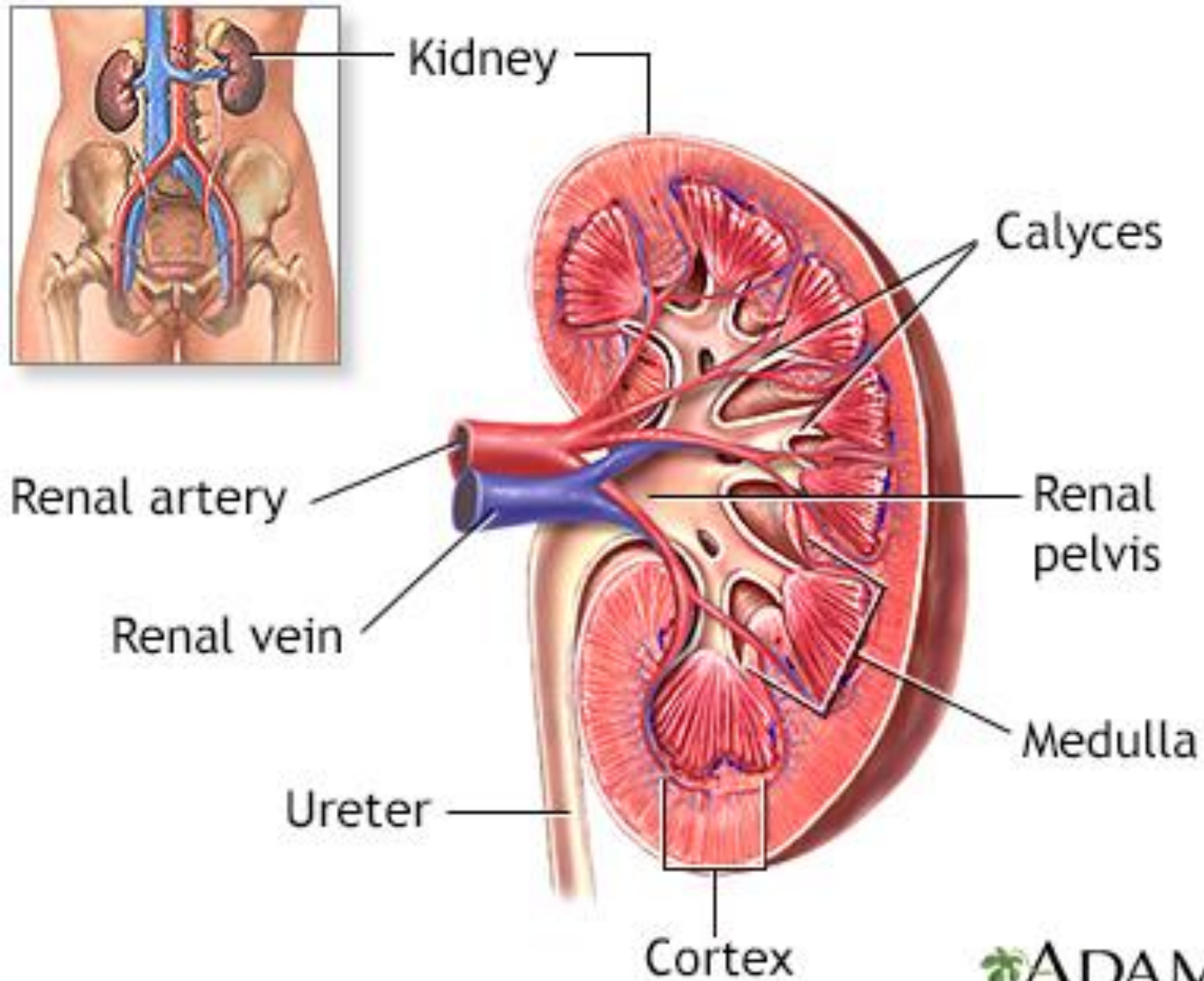
1. Kidneys:

- The kidneys filter blood and remove waste from the body in the form of urine through tiny filtering units called **nephrons**.
- Urea, creatinine, uric acid together with water and other waste substances, forms the urine as it passes through the **nephrons** and down the **renal tubules** of the kidney.
- Atop each kidney is an **adrenal gland**: Release hormones to regulate blood pressure.



- The kidneys are bean-shaped organs situated on the back of the abdominal wall, behind the peritoneum.
- The right kidney sits slightly lower than the left to accommodate the liver.
- **Adipose capsule:** Surrounds the kidney to provides protection to the kidney

Ultrastructure of Kidney

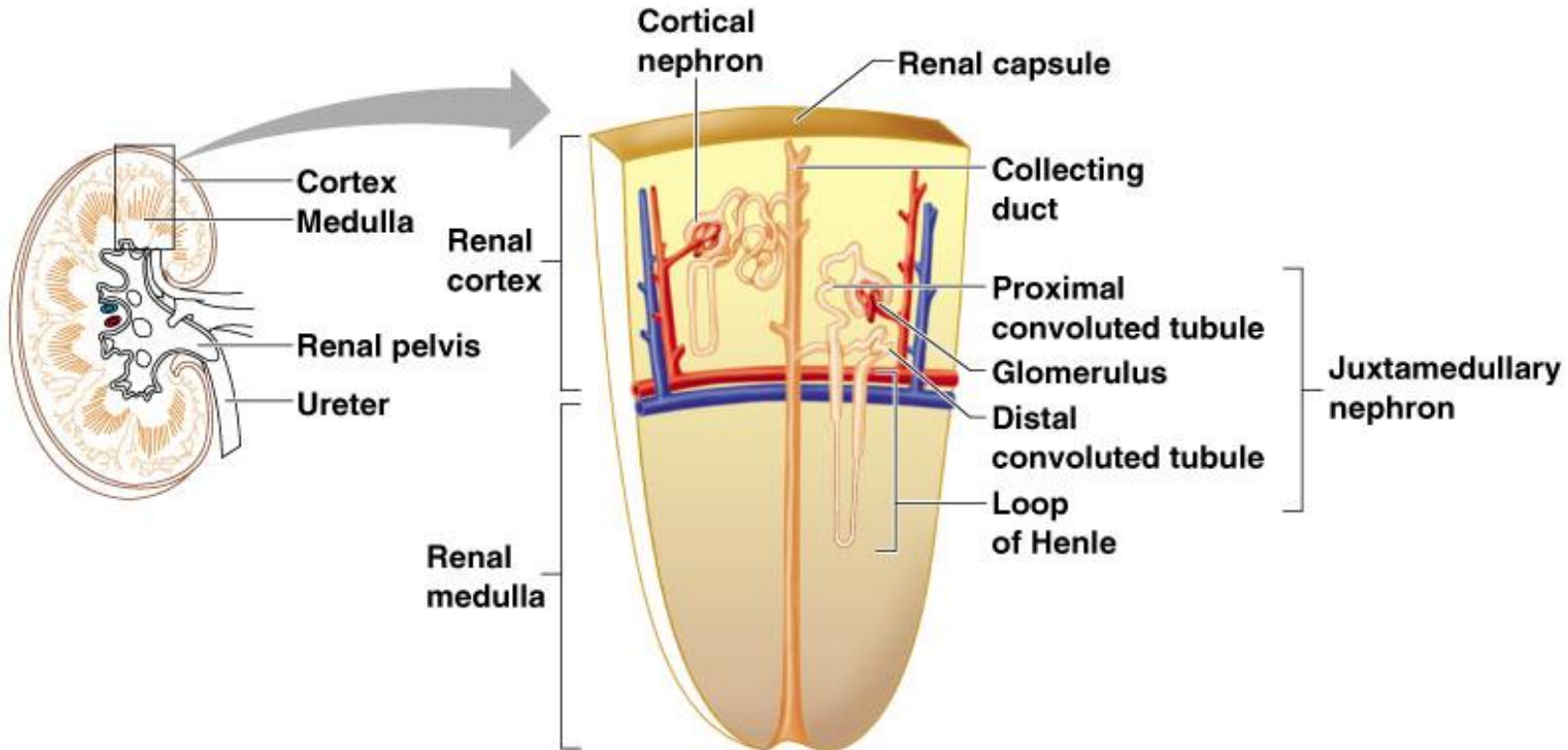


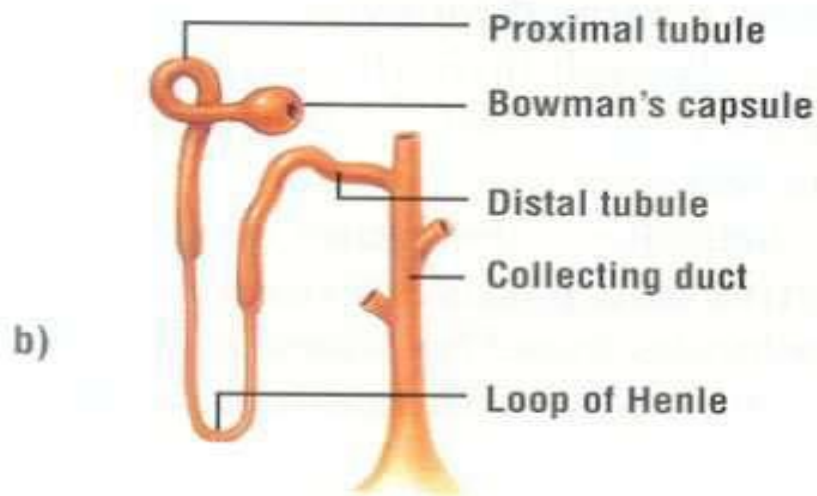
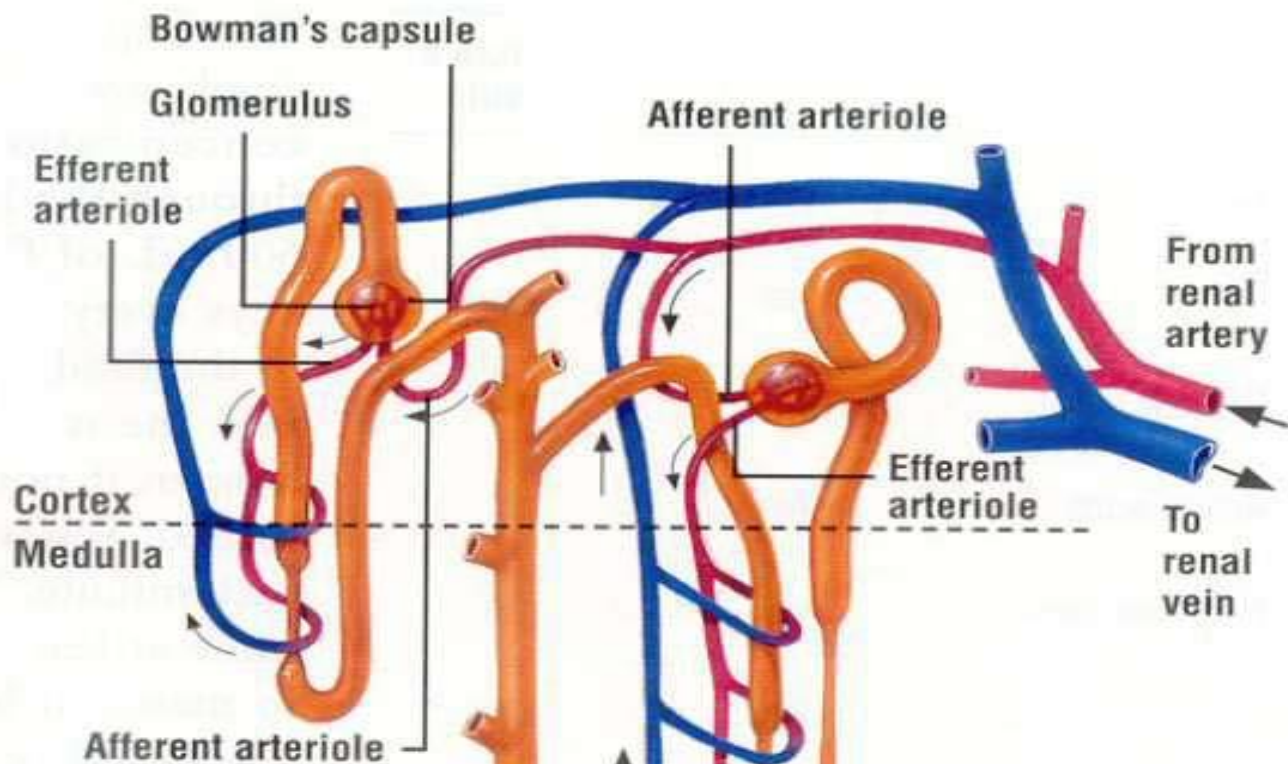
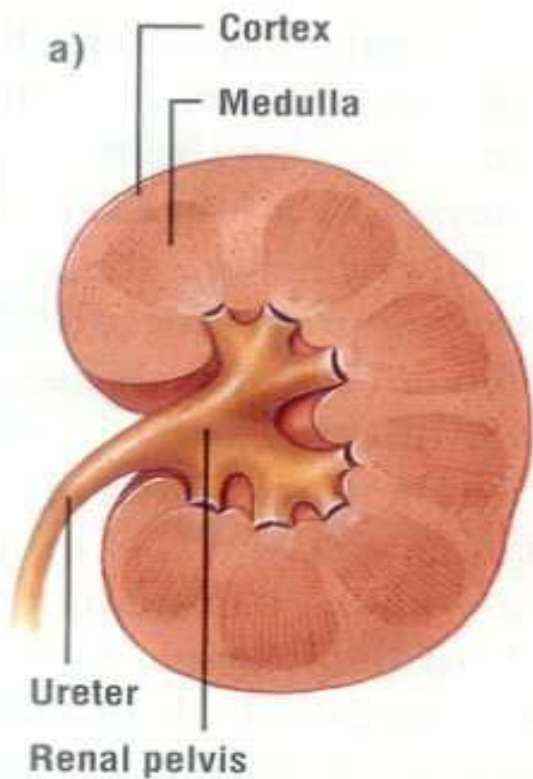
Types of Nephrons

- **Cortical nephrons**
 - Located entirely in the cortex
 - Includes most nephrons

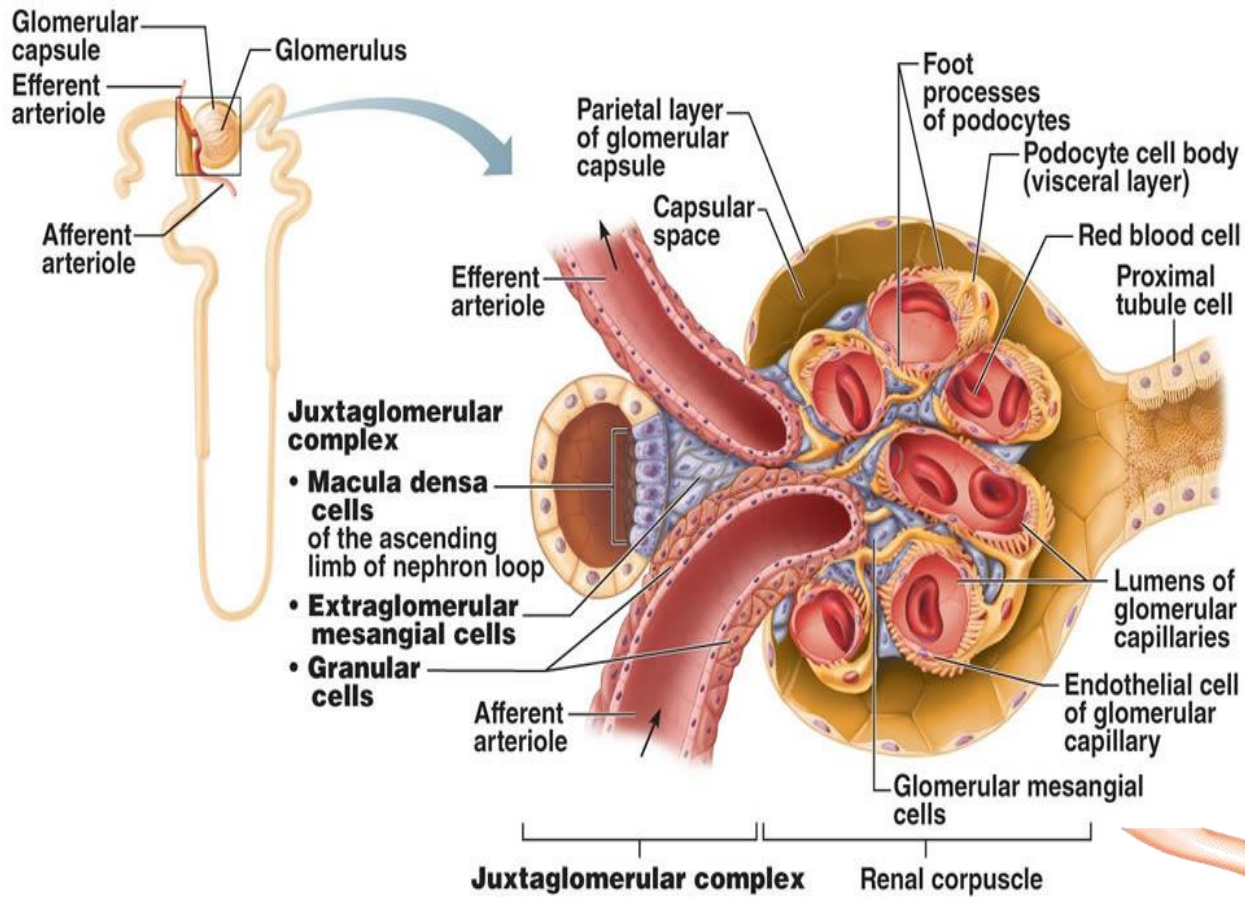
- **Juxtamedullary**

- Fou
- LOH

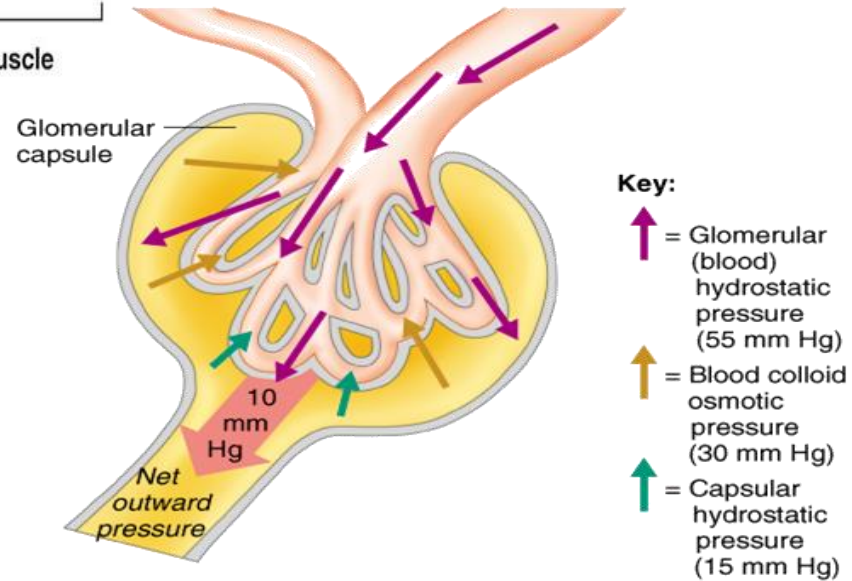




c) www.kidneystreatment.com



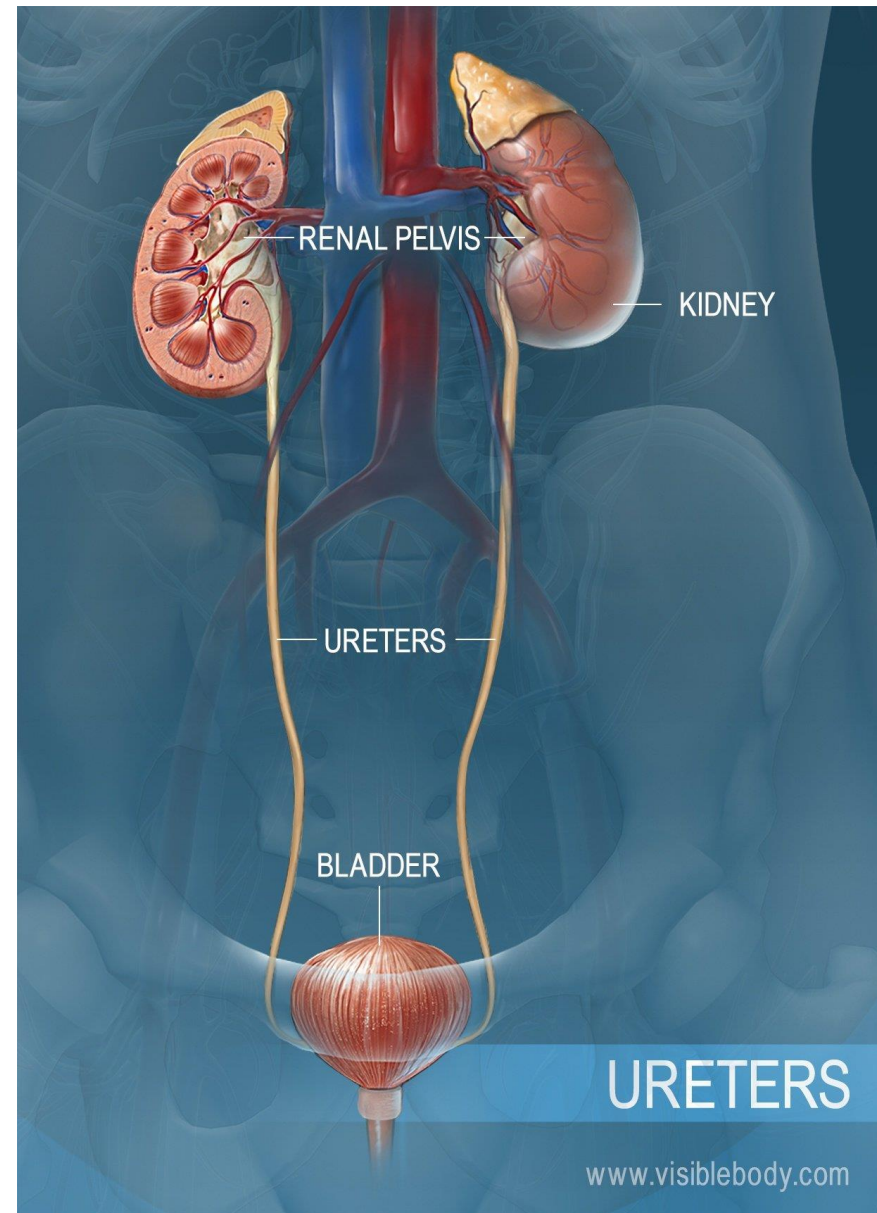
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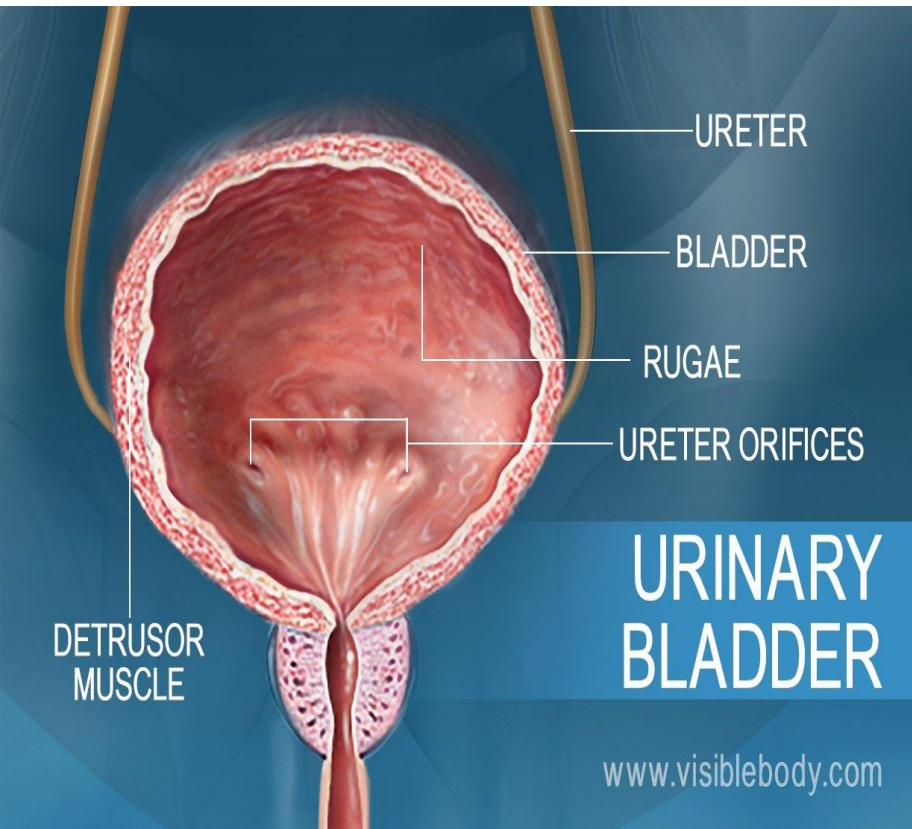
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2. The Ureters Move Urine from the Kidneys to the Bladder

- Urine drains from the renal pelvis of each kidney into the ureters (**Two ureters**).
- The ureters are long, thin tubes made of smooth muscle.
- Contractions of the smooth muscle push urine down through the ureters and into the bladder.
- If urine backs up, or is allowed to stand still, a kidney infection can develop.
- About every 10 to 15 seconds, small amounts of urine are emptied into the bladder from the ureters.



3. The Urinary Bladder Is a Reservoir for Urine



- This triangle-shaped, hollow organ is located in the lower abdomen. It is held in place by **ligaments** that are attached to other organs and the pelvic bones.
- The bladder's walls relax and expand to store urine, and contract and flatten to empty urine through the urethra. The typical healthy adult bladder can store up to two cups of urine for two to five hours.

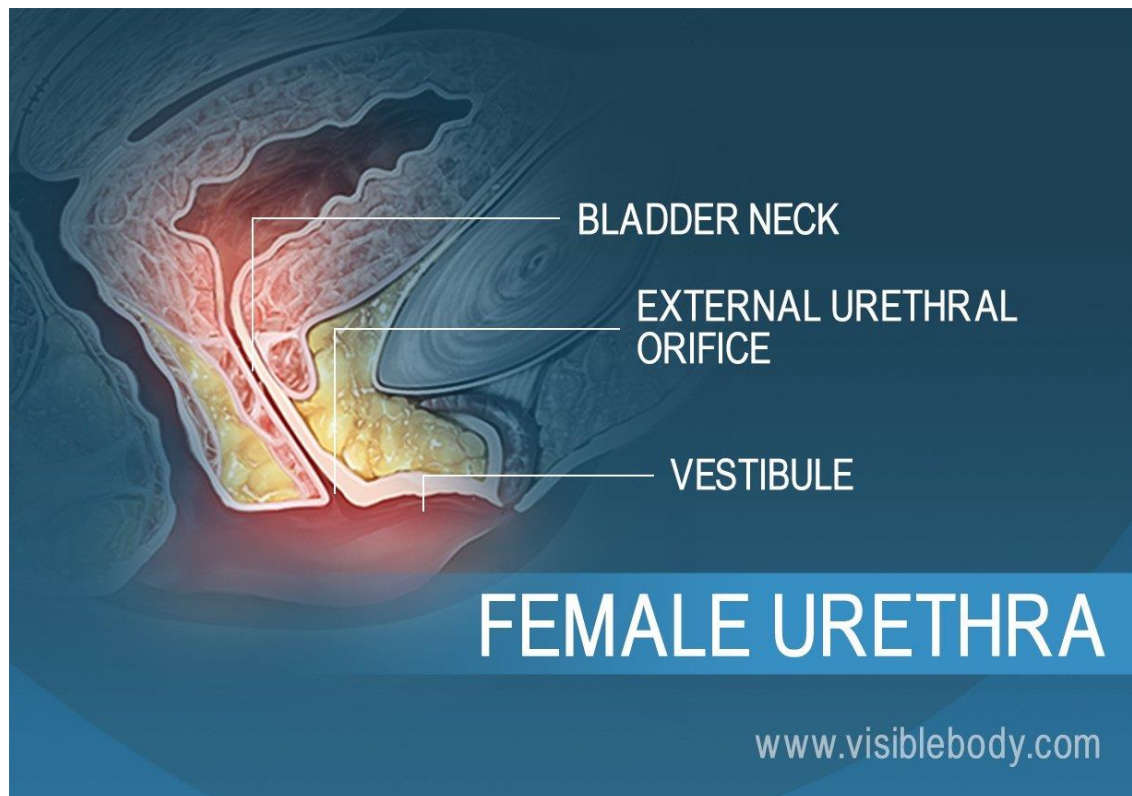
POSITIONS:

- **In women**, the bladder is located in front of the vagina and below the uterus.
- **In men**, the bladder sits in front of the rectum and above the prostate gland.

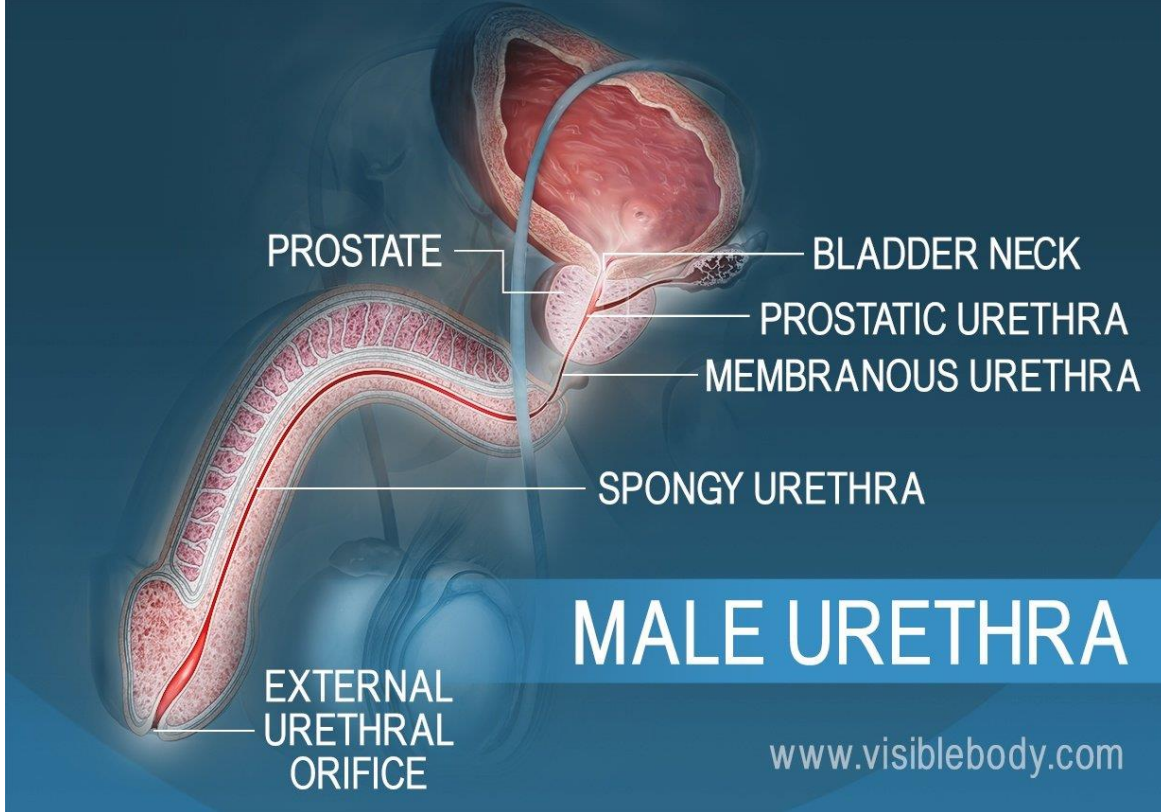
- **Two sphincter muscles.** These circular muscles help keep urine from leaking by closing tightly like a rubber band around the opening of the bladder.
- **Nerves in the bladder.** The nerves alert a person when it is time to urinate, or empty the bladder.

4. The Female Urethra Is Shorter Than the Male Urethra

Urethra. This tube allows urine to pass outside the body. The brain signals the **bladder muscles to tighten**, which squeezes urine out of the bladder. At the same time, the brain signals the **sphincter muscles to relax** to let urine exit the bladder through the urethra. When all the signals occur in the correct order, normal urination occurs.



In females, the urethra is narrow and about 4 cm long, significantly shorter than in males. It extends from the bladder neck to the external urethral orifice in the vestibule of the vagina.



In males, the urethra is about four or five times as long as in females. The male urethra is divided into three sections:

1. The prostatic urethra (the widest portion)
2. The membranous urethra (the narrowest portion)
3. The spongy urethra (the longest portion).

It extends from the bladder neck through the prostate and the penis to the external urethral orifice. In men, both urine and semen pass out of the body through the urethra.