Al- Mustaqbal College University
kidney dialysis
Anatomy
2nd stage

BY:-
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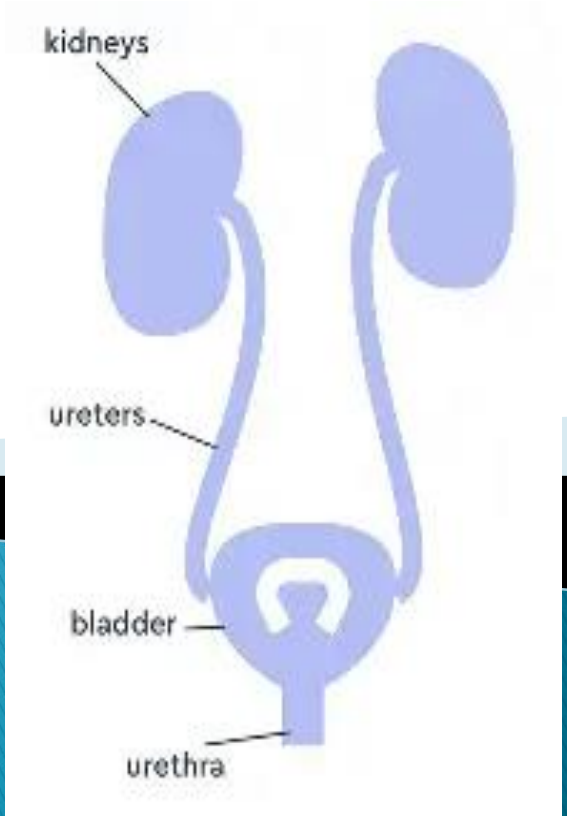
Ureter,Bladder, Urethral anatomy



Ureters

- The ureter is a muscular tube that connects the kidneys to the urinary bladder. Its primary function is to transport urine produced by the kidneys from the renal pelvis to the bladder for storage until it is excreted from the body during urination.
- The ureter is lined with specialized cells that help prevent the backflow of urine and facilitate the smooth passage of urine through peristaltic contractions of its muscular walls.

Position

- The ureters are paired tubes, with one ureter connected to each kidney.
- They extend from the renal pelvis of the kidney to the urinary bladder.
- In terms of anatomical position, the ureters travel down behind the abdominal cavity and enter the pelvis.
- They run alongside the vertebral column and cross the pelvic brim to enter the bladder.

URETERAL SEGMENTATION & NOMENCLATURE :

- **Upper**

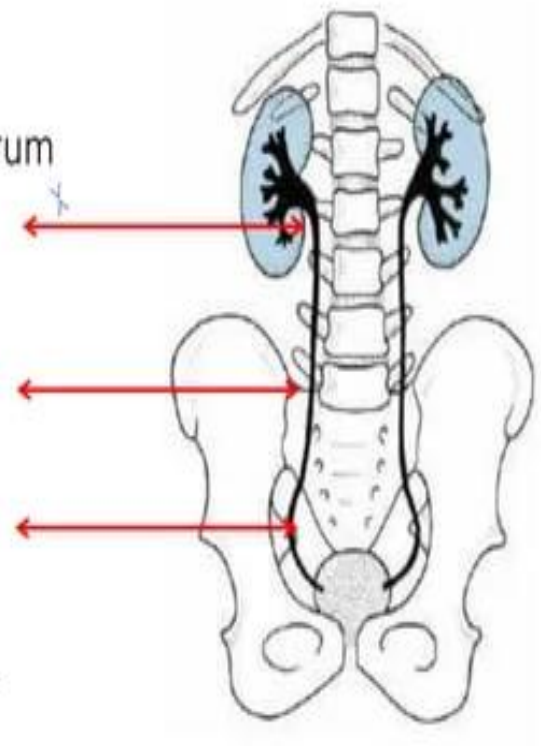
  Renal pelvis to upper border of sacrum

- **Middle**

  Upper to lower border of sacrum

- **Lower**

  Lower border of sacrum till bladder



Structure

- The wall of the ureter is composed of three layers:

- **Inner Mucosa:** This layer is made up of transitional epithelium, which can stretch as the ureter fills with urine. It also has a layer of connective tissue underneath.

- **Middle Muscular Layer:** This layer consists of smooth muscle fibers arranged in an inner longitudinal and outer circular layer. These muscles create peristaltic contractions that help propel urine downward toward the bladder.

- **Outer Adventitia**: This is the outermost layer, made of connective tissue that anchors the ureter in place and connects it to surrounding structures.

Function

- **Transport of Urine:** The primary function of the ureters is to transport urine from the kidneys to the urinary bladder. Peristaltic contractions of the smooth muscle layers propel urine down the ureters.
- **Prevention of Reflux:** The ureters have valves at their junction with the bladder known as ureterovesical valves, which prevent urine from flowing back into the kidneys when the bladder contracts during urination.
- **Role in Urinary Continence:** While the ureters themselves do not directly contribute to urinary continence (the ability to control urination), their proper function and connection with the bladder are essential for maintaining normal urinary control.

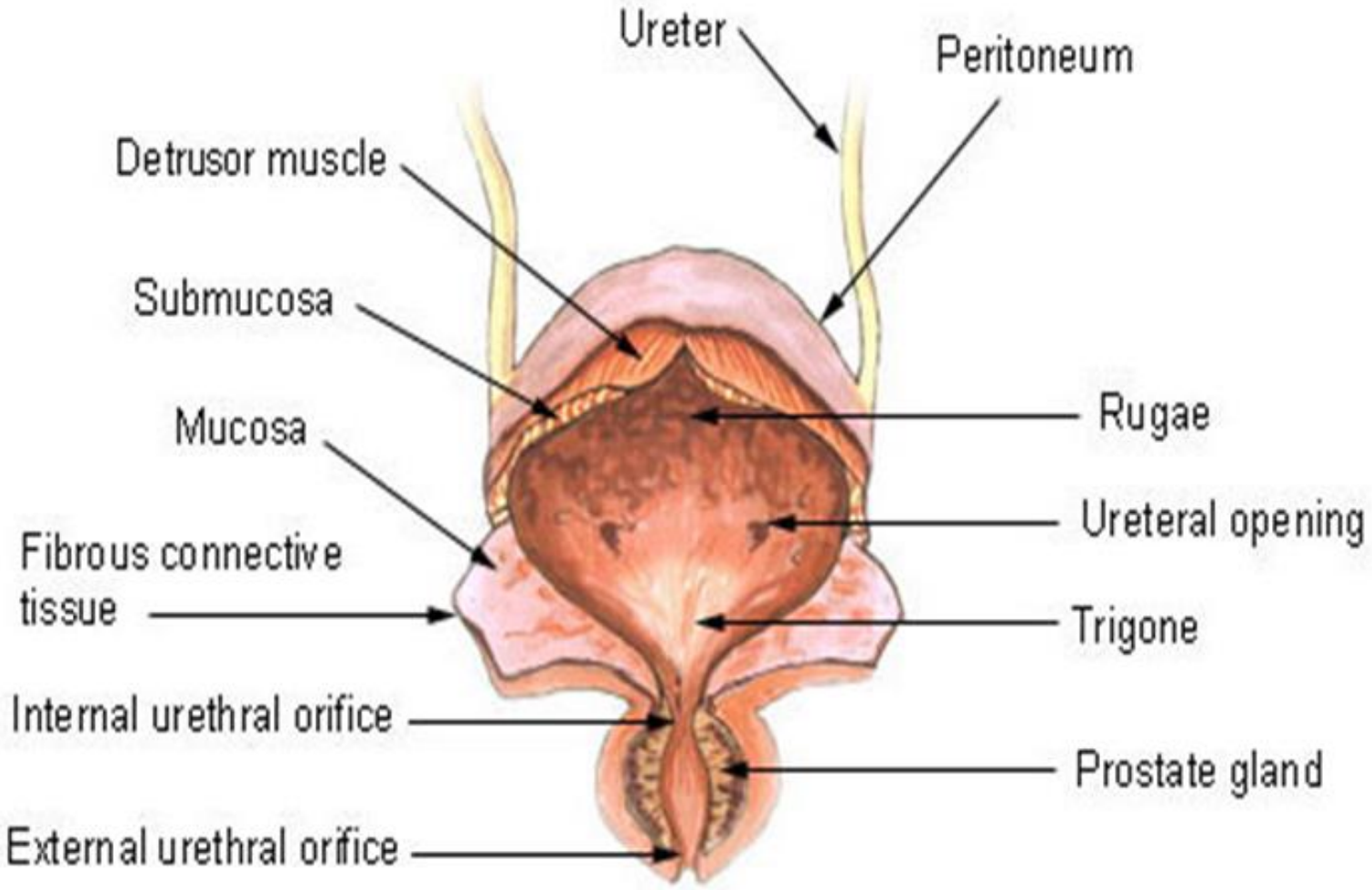
Urinary Bladder

- The urinary bladder is a hollow, muscular organ located in the pelvic cavity of humans and some animals. Its primary function is to store urine produced by the kidneys until it is expelled from the body through the urethra.

- The bladder can expand to accommodate varying volumes of urine and contracts to facilitate urination when it's appropriate. It's lined with a specialized epithelium that allows it to stretch and maintain its integrity during filling and emptying.

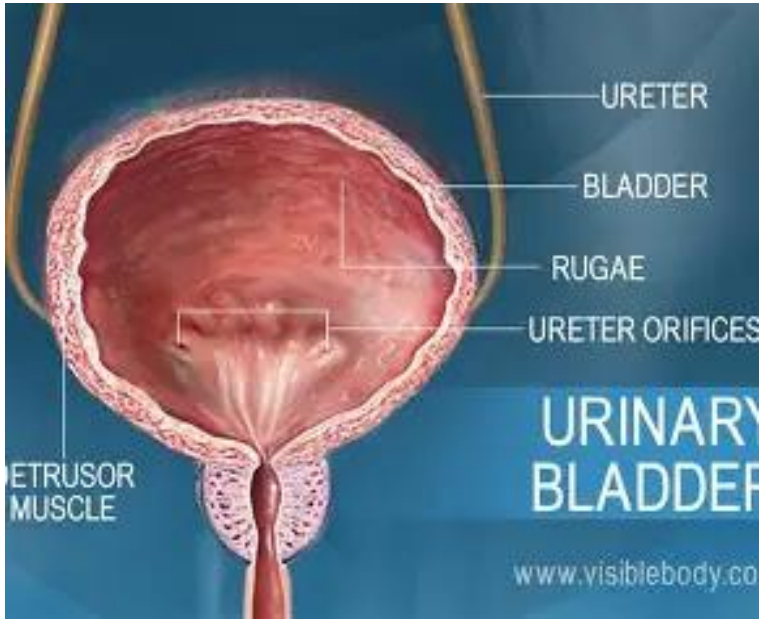
Structure

- **Epithelial lining:** The inner lining of the bladder is made up of transitional epithelium, which allows the bladder to stretch as it fills with urine without rupturing.
- **Muscular layers:** The bladder wall consists of smooth muscle known as the detrusor muscle, which contracts during urination to expel urine.
- **Sphincters:** There are two sphincters that control the flow of urine into and out of the bladder. The internal urethral sphincter is involuntary and made of smooth muscle, while the external urethral sphincter is voluntary and made of skeletal muscle.


Ureter
Peritoneum
Detrusor muscle
Submucosa
Mucosa
Fibrous connective tissue
Internal urethral orifice
External urethral orifice
Rugae
Ureteral opening
Trigone
Prostate gland

Position

- The urinary bladder is a hollow, muscular organ located in the pelvis just behind the pubic bone.
- Its position can vary slightly depending on the individual's anatomy and bladder filling, but it typically lies inferior to the peritoneum and anterior to the rectum in males, and anterior to the vagina and uterus in females.



Function

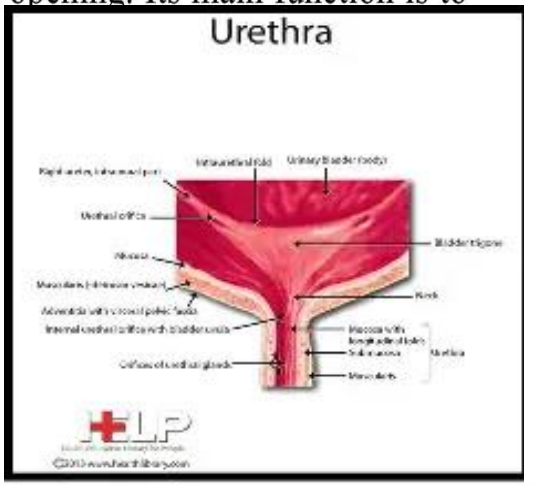
- The main functions of the urinary bladder include:

❖ **Storage:** The bladder stores urine produced by the kidneys until it is convenient to urinate. Its elastic walls expand to accommodate increasing volumes of urine.

❖ **Voiding:** When the bladder is sufficiently filled and there is a signal from the nervous system indicating the need to urinate, the detrusor muscle contracts, and the sphincters relax to allow the expulsion of urine through the urethra.

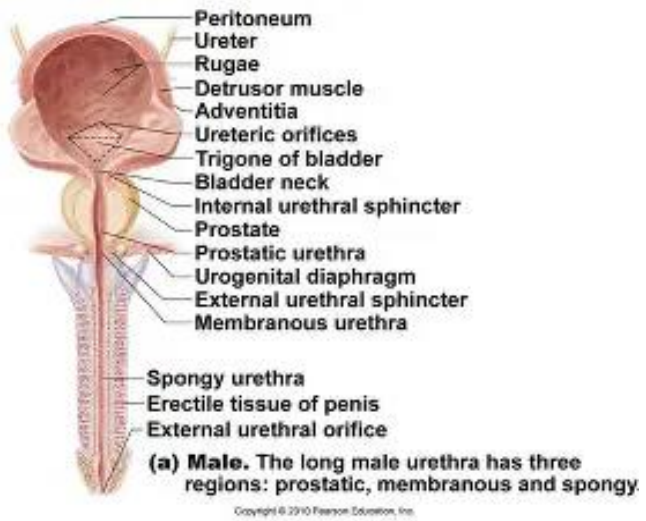
Urethra

- The urethra is a tube-like structure in the body that serves as a passageway for urine to exit the bladder and be expelled from the body. In males, the urethra also functions as a passage for semen during ejaculation.
- It extends from the bladder to the external opening of the genitals. In females, the urethra is shorter compared to males and is located between the clitoris and the vaginal opening. Its main function is to transport urine from the bladder to the outside of the body.



Position

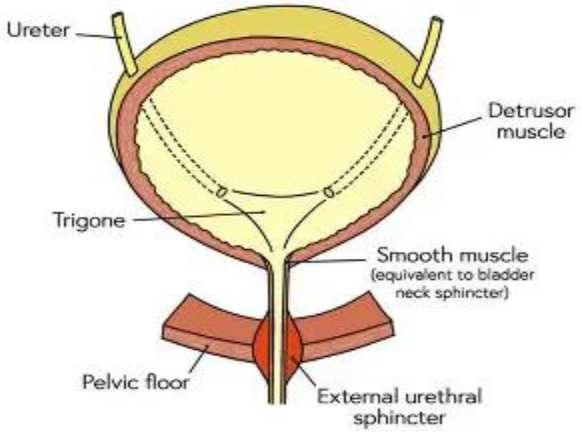
- Male Urethra:
- **Position:** In males, the urethra runs through the penis. It extends from the internal urethral orifice, where it connects to the urinary bladder, to the external urethral orifice at the tip of the penis.



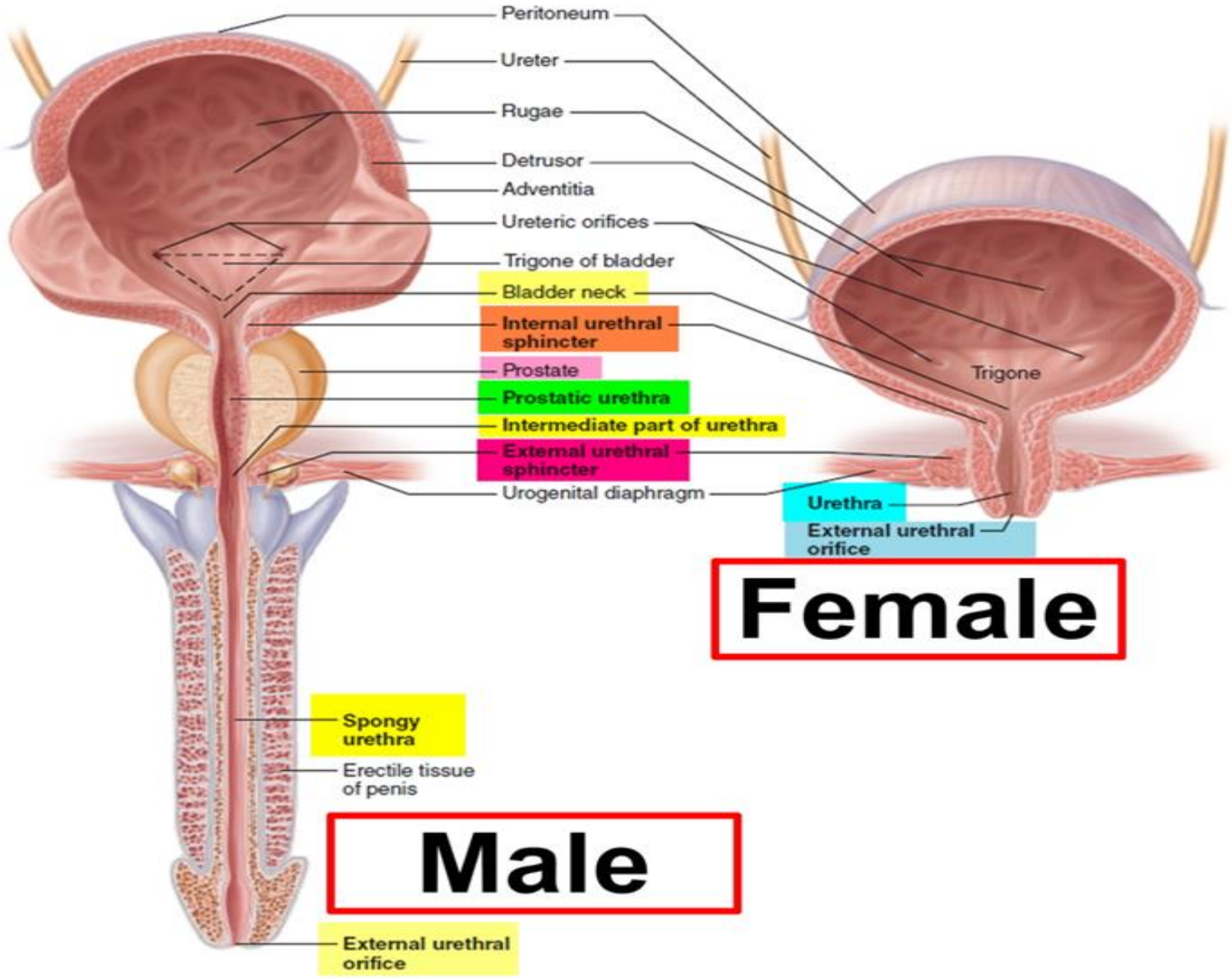
Structure

- **Structure:** The male urethra can be divided into three parts: the prostatic urethra, the membranous urethra, and the spongy or penile urethra. The prostatic urethra passes through the prostate gland, the membranous urethra passes through the urogenital diaphragm, and the spongy urethra runs through the length of the penis.
- **Functions:** In males, the urethra serves both urinary and reproductive functions. It allows for the passage of urine from the bladder during urination and also serves as the conduit for semen during ejaculation.

Position



- **Female Urethra:**
- Position: In females, the urethra is shorter compared to males and is located anterior to the vaginal opening.
- **Structure**: The female urethra is relatively simple compared to the male urethra. It is a short tube that extends from the bladder to the external urethral orifice.
- **Functions:** The primary function of the female urethra is to allow the passage of urine from the bladder to the outside of the body during urination.


Peritoneum
Ureter
Rugae
Detrusor
Adventitia
Ureteric orifices
Trigone of bladder
Bladder neck
Internal urethral sphincter
Prostate
Prostatic urethra
Intermediate part of urethra
External urethral sphincter
Urogenital diaphragm
Trigone
Urethra
External urethral orifice
Female
Spongy urethra
Erectile tissue of penis
Male
External urethral orifice

Common Functions of Both Male and Female Urethras

- **Urinary Excretion:** Both male and female urethras serve as the final pathway for urine excretion from the body.
- **Sphincter Control:** Both genders have internal and external urethral sphincters that help control the flow of urine and prevent leakage between urinations.
- **Mucosal Lubrication**: The urethra is lined with mucous membranes that help lubricate the passage of urine and protect the lining from irritation.

Key terms

- **Kidneys**: Bean-shaped organs responsible for filtering waste products from the blood to form urine.
- **Ureters**: Tubes that carry urine from the kidneys to the bladder.
- **Bladder**: Hollow muscular organ that stores urine until it's ready to be expelled from the body.
- **Urethra**: Tube that carries urine from the bladder to the outside of the body during urination.
- **Nephron**: Functional unit of the kidney responsible for filtering blood and forming urine.
- **Renal Pelvis**: Funnel-shaped structure in the kidney that collects urine before it flows into the ureters.
- **Renal Cortex**: Outer region of the kidney where most of the nephrons are located.

- **Renal Medulla**: Inner region of the kidney containing structures like renal pyramids and renal columns.
- **Glomerulus**: A cluster of capillaries within the nephron where blood filtration takes place.
- **Filtration**: The process by which blood is filtered in the kidneys, removing waste products and excess substances to form urine.
- **Reabsorption**: Process by which useful substances such as water, electrolytes, and nutrients are reabsorbed from the filtrate back into the bloodstream.
- **Secretion**: Process by which substances are actively transported from the bloodstream into the renal tubules to be excreted in urine.
- **Micturition**: Another term for urination, the process of expelling urine from the bladder.

- **Renin**: Enzyme secreted by the kidneys that plays a role in regulating blood pressure and electrolyte balance.

- **Aldosterone**: Hormone produced by the adrenal glands that helps regulate sodium and potassium levels in the body by acting on the kidneys.


Thank
you