

Lesson One

Filtering Blood and Forming Urine

- As shown in **Figure** above, each nephron is like a tiny filtering plant. It filters blood and forms urine in the following steps:
 - a) Blood enters the kidney through the renal artery, which branches into capillaries. When blood passes through capillaries of the glomerulus of a nephron, blood pressure forces some of the water and dissolved substances in the blood to cross the capillary walls into Bowman's capsule.
 - b) The filtered substances pass to the renal tubule of the nephron. In the renal tubule, some of the filtered substances are reabsorbed and returned to the bloodstream. Other substances are secreted into the fluid.
 - c) The fluid passes to a collecting duct, which reabsorbs some of the water and returns it to the bloodstream. The fluid that remains in the collecting duct is urine.

Excretion of Urine

- From the collecting ducts of the kidneys, urine enters the ureters; two muscular tubes that move the urine by peristalsis to the bladder (see Figure above).
- The bladder is a hollow, sac-like organ that stores urine. When the bladder is about half full, it sends a nerve impulse

to a sphincter to relax and let urine flow out of the bladder and into the urethra.

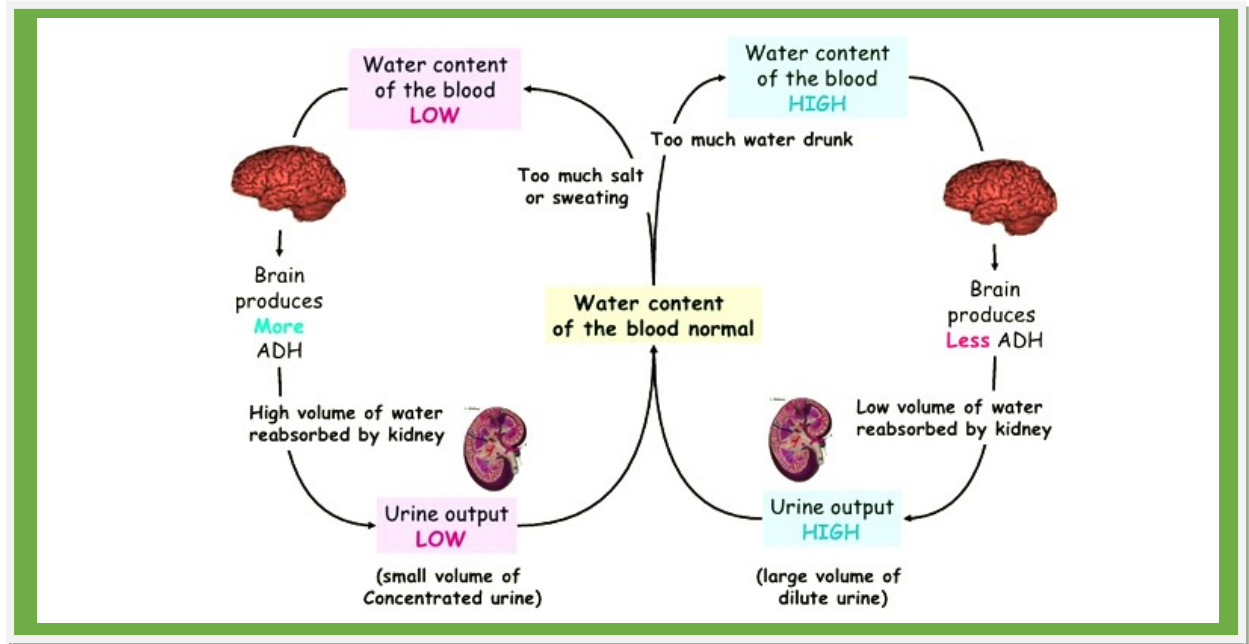
- The urethra is a muscular tube that carries urine out of the body. Urine leaves the body through another sphincter in the process of urination. This sphincter and the process of urination are normally under conscious control.

Lesson Two

Osmoregulation

- Osmoregulation is the process of maintaining salt and water balance (osmotic balance) across membranes within the body. The fluids inside and surrounding cells are composed of water, electrolytes, and nonelectrolytes.
- The body does not exist in isolation. There is a constant input of water and electrolytes into the system.
- Excess water, electrolytes, and wastes are transported to the kidneys and excreted, helping to maintain osmotic balance.
- Insufficient fluid intake results in fluid conservation by the kidneys. Biological systems constantly interact and exchange water and nutrients with the environment by way of consumption of food and water and through excretion in the form of sweat, urine, and feces.
- Without a mechanism to regulate osmotic pressure, or when a disease damages this mechanism, there is a

tendency to accumulate toxic waste and water, which can have dire consequences.



Recall

1. What is excretion?

2. List organs of the excretory system and their functions.

3. Describe how nephrons filter blood and form urine.

4. State the functions of the ureters, bladder, and urethra.
