Notes

Structure of a nephron

The main components of a nephron are the glomerulus, Bowman's capsule and a long renal tube. The blood enters the kidneys through the renal artery, which branches into many capillaries associated with the glomerulus. Water and solutes are transfered to the nephron at the Bowman's capsule.

In the proximal tubule, some substances such as amnino acids, glucose and salts are selectively reabsorbed and unwanted molecules are added in the urine. The filtrate then moves down into the loop of Henle, in which more water is reabsorbed.

From here, the filtrate moves upwards into the distal tubule, and finally to the collecting duct. This duct collects urine from many nephrons.

The urine formed in each kidney then enters a long tube called the ureter. The ureters move the urine from the kidneys to the urinary bladder. The urinary bladder is under the control of the nervous system. This helps us to control the urge to urinate.

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Artificial kidneys

Healthy kidneys remove excess of fluid, waster and minerals from the body. They also make hormones that keep the bones strong and healthy. If the kidneys fail to function, wastes may accumulate in the body, the body may retain excess fluid, and blood pressure may rise. This can even lead to death.

In such a case, an artifical kidney or hemo dialysis is useful.

In hemodialysis, only a few drops of blood are allowed to flow, through a special filter that removes wastes and extra fluid. The detoxified blood is then returned to the body.

The special filter used in dialysis consists of a number of tubes with semi-permeable lining, suspended in a tank filled with dialysis fluid.

What is dialysis? When is it performed? It performs the function of which organ?

Sometimes, kidneys stop functioning because of an infection or an injury. This leads to the accumulation of harmful wastes in the body, which can even cause death. In such a condition, blood is filtered artificially.

This process is known as dialysis. A dialysis machine performs the function of a normal kidney and thus helps an individual to survive.

Regulation of Urine Output

The volume and concentration of urine is regulated by posterior lobe of pituitary gland with the help of antidiuretic hormone (ADH).

- If ADH secretion is reduced, increased production of urine takes place (Diuresis).
- Some substances can increase the production of urine on consumption, such as liquid diet, tea, coffee etc. They are known as diuretics.

Osmoregulation

The process of regulation of water and salt content in blood by the kidneys is called osm

regulation. In otherwords, osmoregulation regulates osmotic pressure of the blood. To maintain kidney health and osmoregulation, we should ensure proper intake of water, either directly or through blood.

Have you ever noticed that during summers the urine passed is usually thicker? Ever wondered why?

During summers, our body loses a considerable amount of water through sweating. To compensate this loss, our kidneys reabsorb more and more water from urine, thus making it more concentrated. Such conditions can have a negative impact on kidney health. That is why it is advised to drink a lot of water during summers.
In diseases like cholera and diarrhoea a lot of water is lost from the body. To replenish water and maintain osmoregulation, the patient should be given ORS from time to time.

common disorders of the human excretory system

- Presence of blood cells in urine, is an indication of any kind of infection.
- Presence of glucose in urine is the indication of diabetes mellitus. When the level of glucose is high in blood, it is excreted in urine.
- Urinary tract infections are very common among the infections of excretory system. It occurs due to entry of any bacterium in the urinary tract.
- Formation of kidney stones is another common disorder of the human excretory system, where substances like calcium oxalate, calcium phosphate and uric acid form crystals in any part of the excretory system. This blocks the flow of urine and causes extreme pain.