CLASS X/ BIOLOGY
EXCRETION

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Excretion is defined as a process of removable of nitrogenous waste products like ammonia, urea, uric acid, along with excess of water, salts and pigments out of the body.

EXCRETION IN PLANTS

There are three forms of waste produced by plants:
1.Solid Waste: Raphide and Rubber
2. Liquid Waste: Sandalwood Oil and eucalyptus Oil
3. Gaseous Waste: Carbon Dioxide and Oxygen

Plants also stores some of the waste products in their body parts in the leaves, bark and fruits of the plants.

EXCRETION IN ANIMALS

Different animals have different process of excretion:

i) In unicellular organisms (amoeba, paramecium) waste material is removed by diffusion through general surface, nitrogenous waste and excess water removed through their contractile vacuole.

ii) In sponges (porifera) waste materials go out with the current of water through and opening called osculum .

iii) In coelenterates (hydra) waste substances are excreted through the terminal mouth.

iv) In annelid (earthworm) excretory organs are nephiridia.

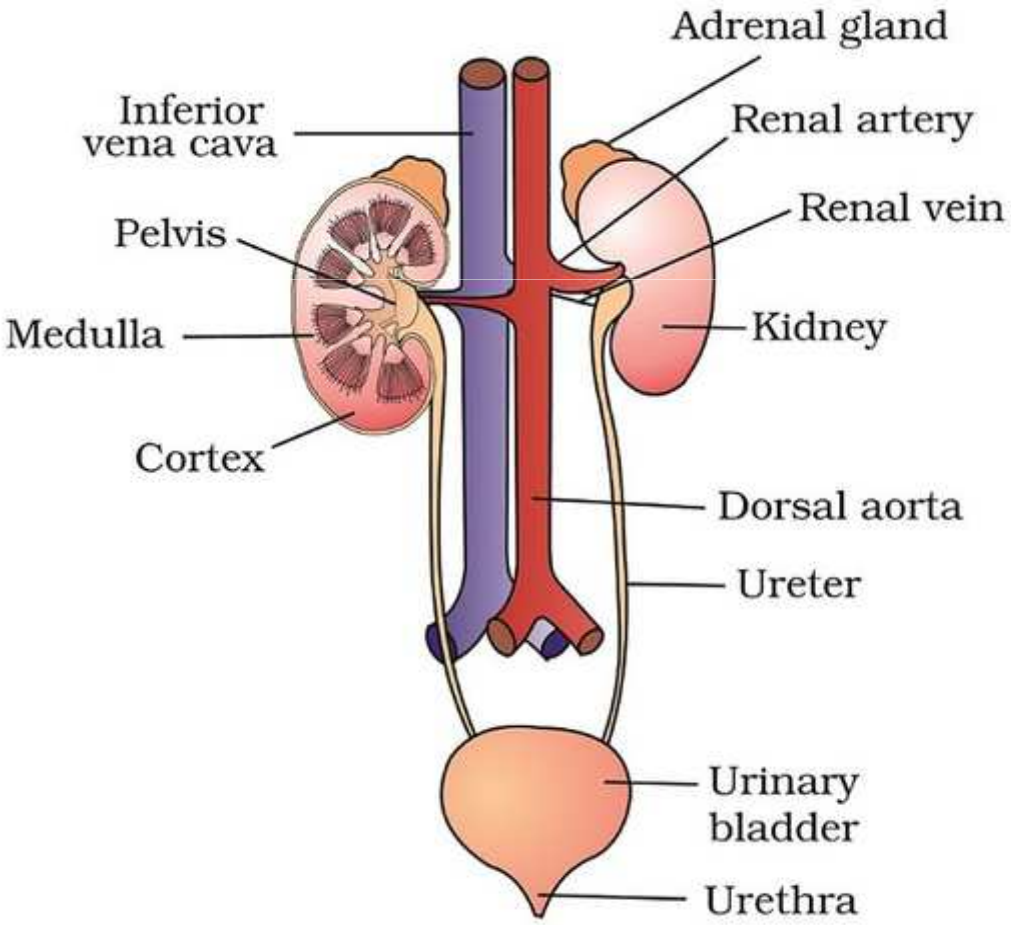
v) In human main organs of excretion and maintenance of water balance are the kidneys.

EXCRETION IN HUMAN

- **Skin:** Skin has sweat glands, through which it excretes small amount of water, urea and salts.
- **Liver:** It excretes bile, which contain bile pigments. These are produced by the breaks down old red blood cells in the liver. As haemoglobin breaks down its iron is retained while pigment is excreted by it also excrete cholesterol.
- **Lungs:** The lungs remove respiratory waste CO_2.

EXCRETORY SYSTEM IN MAN

The excretory system of human contains a pair of Kidney, Ureter, Urinary bladder and Urethra



EXTERNAL STRUCTURE OF KIDNEY

- Kidney are bean shaped structures located at the back of the abdomen – One on either side of the vertebral column.
- These are attached with the back wall of the abdomen.
- The right kidney is placed slightly lower than the left kidney because liver in present on the right side.
- Each kidney has a concave surface on the inner side and its convex on the outer side.
- The inner concave face having a depression is called hilus or hilum.
- It is the site where renal artery enters and renal vain and ureter leaves the kidney.

INTERNAL STRUCTURE OF KIDNEY

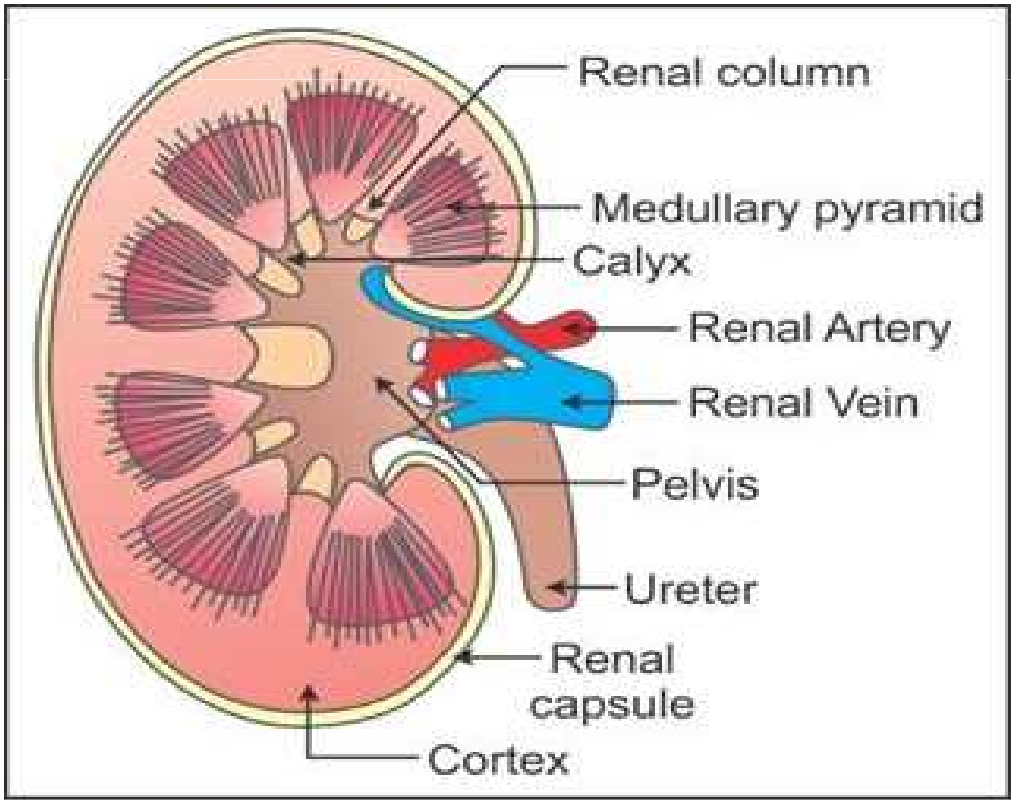
- Kidney is divisible into outer cortex region and inner medulla.
- Cortex contains millions of cup-shaped Malpighian corpuscles of nephron having Bowman's capsule, Glomerulus, Proximal and distal parts of nephric tubule and loop of Henle which extends to medulla.
- Renal tubules open into colleting tubule, and collecting tubule open into collecting duct.
- A number of collecting duct open into the cavity of kidney called Pelvis. It is upper extended part of the ureter.
- Form the inner side of the each kidney e.i hilus arises a ureter the upper part of which is swollen. It runs downward and opens obliquely in the urinary bladder.

INTERNAL STRUCTURE OF KIDNEY

❖ Urinary bladder is a hollow musculo – membranous structure for the temporary storage of urine.

❖It is locate in the pelvic region.

❖Form Urinary bladder arises the urethra which is longer in male then females.



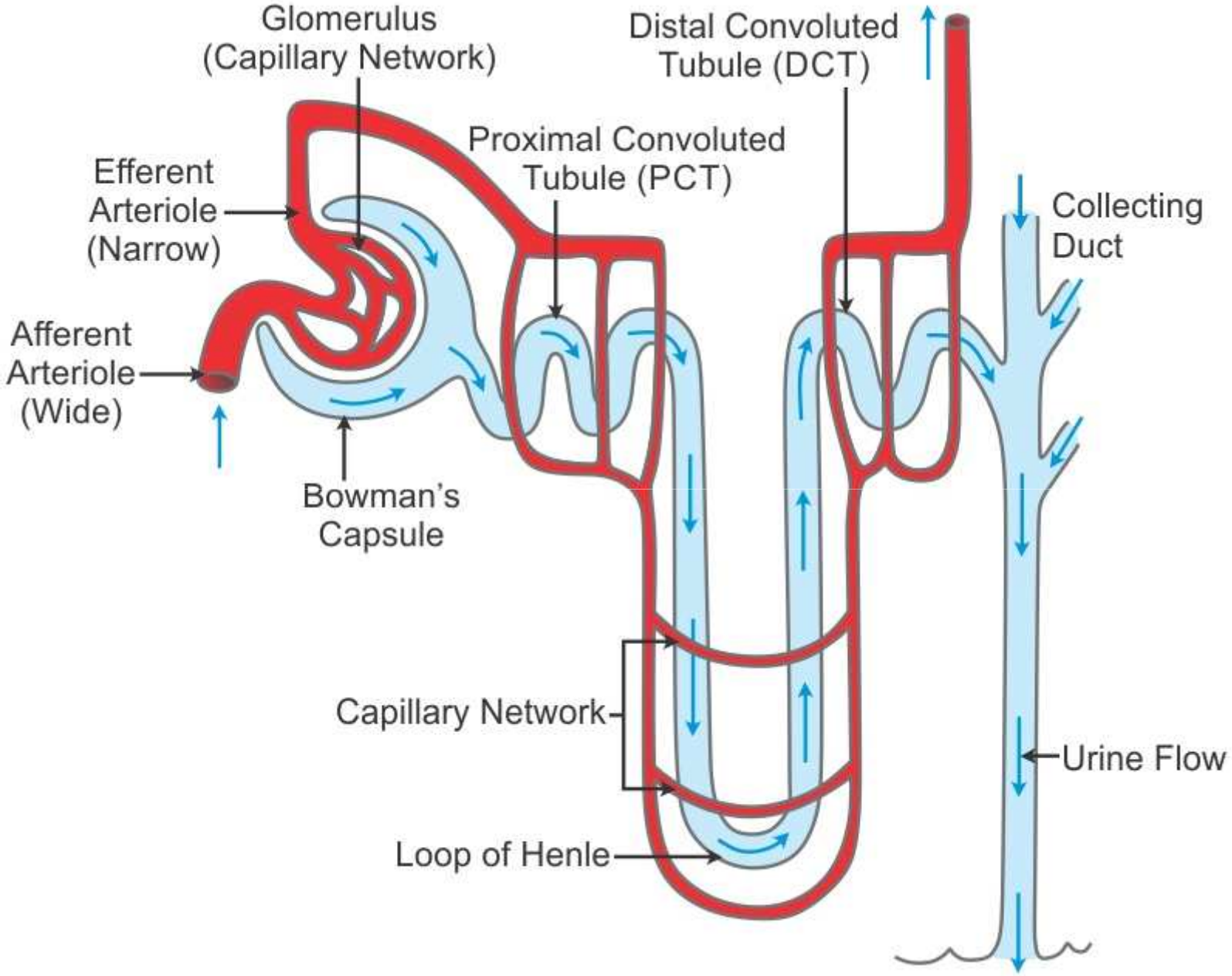
URINE FORMATION PROCESS

❖ Urea is formed in the liver and than transported to the kidneys by blood circulation for excretion.

❖ Urine formation takes place in functional unit of kidney i.e. nephrons or kidney tubules or uriniferous tubules. The **nephron** is the microscopic **structural** and functional unit of the kidney. It is composed of a renal corpuscle and a renal tubule. The renal corpuscle consists of a tuft of capillaries called a glomerulus and an encompassing Bowman's capsule. The renal tubule extends from the capsule.

❖ Urine formation takes place in three process

- ❖ **Ultra Filtration**
- ❖ **Selective Absorption**
- ❖ **Tubular Secretion**


Glomerulus
(Capillary Network)
Distal Convoluted
Tubule (DCT)
Proximal Convoluted
Tubule (PCT)
Efferent
Arteriole
(Narrow)
Collecting
Duct
Afferent
Arteriole
(Wide)
Bowman's
Capsule
Capillary Network
Urine Flow
Loop of Henle

ULTRA FILTRATION

- It occurs in Malpighian corpuscles of uriniferous tubules.
- The glomerular capillaries of Malpighian corpuscles receive blood through afferent renal artery under high pressure, and leave through afferent renal artery.
- The wall of glomerulus and Bowman's capsule are thin and permeable and in close contact with each other.
- Thus the blood is filtered here.
- Water, Urea and other salts like glucose are filtered out in renal tubules.
- The filtered fluid is called glomerular filtrate.
- The flows down the nephrons by the bit of cilia.

SELECTIVE ABSORPTION

- Glomerular filtrate flowing downward in the uriniferous tubules contain certain useful substances such as amino acid, glucose, salt like NaCl.
- These are reabsorbed or selectively absorbed by the cell of the tubule and entre blood of capillaries surrounding the tubule.
- About 99% of the filtrate is reabsorbed into the blood from the tubule.
- Certain substances which are harmful and not needed by the body like ammonia, potassium, creatinine

TUBULAR SECRETION

- Certain substances which are harmful and not needed by the body like ammonia, potassium, creatinine and hydrogen iron are secreted from the capillary blood into the lumen of distal tubule this is called tubular secretion.
- The fluid entering the colleting tubule is called urine.
- It flows through pelvis and ureters into the urinary bladder where it is stored and discharged from time to time.

COMPOSITION OF URINE

Human urine contains 96% of water, inorganic irons such as chlorides, sodium, potassium, phosphorus, sulphur, calcium, magnesium, iodine, arsenic and lead and organic constituents like urea, uric acid, ammonia, creatinine etc.