The excretory system is a system that removes excess, unnecessary or dangerous materials from an organism, so as to help maintain homeostasis within the organism and prevent damage to the body

Excretory Organs

1) Accessory Excretory Organs:

i) **Lungs**: They remove or excrete CO2 as a waste product from the body.
ii) **Skin**: Skin functions in excretion by sweating out waste products from the sweat glands
iii) **Liver**: The liver excretes cholesterol, steroid hormones, certain vitamins and drugs through the bile and also urea, ammonia, amino acids etc.

2) Main Excretory Organ

i) Kidneys: Excretes waste products in the form of urine

Structure & Working Of Kidney:

External Structure:

i) Renal Artery: The renal artery enters the kidney and brings oxygenated blood carrying toxic nitrogenous wastes into the kidneys.
ii) Renal Vein: The renal vein drains away deoxygenated blood which is free of toxic substances
iii) Ureter: The ureter, a tube, runs from each kidney downwards into the lower part of the abdomen connecting each kidney to the urinary bladder. Its function is to transport the urine from the kidneys to the urinary bladder.
iv) Urinary Bladder: This is a large muscular storage sac that collects urine from both the kidneys through the ureters.
v) Urethra: This is a short muscular tube that carries urine at intervals from the urinary bladder to the outside.

Internal Structure

i) Renal Cortex: This is the outer pale red colored layer.
ii) Renal Medulla: This forms the inner dark red zone
iii) Renal Pelvis: This is a large funnel-shaped region behind the renal medulla.
iv) Nephrons: These are structural and functional microscopic filtering units of the kidney. There are more than 1,250,000 nephrons in each kidney.

Microscopic Structure of a Nephron

i) Malpighian Corpuscle: This consists of two parts:
a) Bowman's Capsule: This is a cup - shaped structure which is double walled in the hollow of which is a network of capillaries called the glomerulus
b) Glomerulus: This is a knotted mass of blood capillaries formed by the afferent arteriole (incoming) and the efferent arteriole (outgoing).
ii) Renal Tubule: This further consists of
a) Proximal Convoluted Tubule: This is the region behind the Bowman's capsule and consists of a coiled tube that descends to form the Henle's loop.
b) Henle's loop: This is continuous with the proximal convoluted tubule and is U-shaped having a narrow descending limb and a thick ascending limb
c) Distal Convoluted Tubule: This is another coiled and twisted tubule that continues from the ascending limb of loop of Henle found in the renal cortex.
iii) Collecting Tubule: The distal convoluted tubule continues to form the collecting tubule.
iv) Collecting Ducts: Several collecting tubules fuse to form large collecting ducts which pass downwards from the cortex to the medulla region.

Working Of The Kidney:

- The nephron is the kidney's functional unit.
- In its first section renal corpuscles filtration occurs.
- As fluid, small molecules and blood are filtered from glomerulus capillaries.
- The filtered material called filtrate is captured in Bowman's capsules.
- Filtrate then enters the proximal convoluted tubule.
- Reabsorption of important molecules and ions from the filtrate into the blood occurs here.
- These include glucose, amino acids, vitamins, water, sodium, potassium, chloride and bicarbonates.
- Filtrate then enters into Loop of Henle which consists of descending limb and ascending limb.
- In descending limb only water is reabsorbed and in ascending limb only salt is reabsorbed.

• In distal convoluted tubule secretion occurs. Ammonia, hydrogen ions, uric acid are secreted from blood vessels into the distal tubule.
• As result concentrated fluid called urine is produced which enters into collecting.

Composition Of Urine:

The urine is composed of following substances:

i) Water: 95%
ii) Dissolved Substances: 5%
a. Urea: 2%
b. Uric Acid and other ammonium compound: 1%
c. Organic and inorganic salts: 2%
iii) Inorganic constituents
iv) Nitrogenous Constituents
v) Other Constituents.

Functions Of Kidney:

1) Excretory
• Excrete waste products especially nitrogenous substances
• Eliminates drugs and toxic substances
2) Synthetic
• Synthesis ammonia and Hippuric acid
3) Endocrine
• Secretes Renin
4) Regulatory
• Maintains
- pH balance
- Sodium ion, potassium ion and electrolyte balance
- Osmotic pressure in blood
- Water balance, extra fluid volume
- Blood pressure