

Subtopics

- 15.1 Excretion and Excretory Products
- 15.2 Excretory System in Human being
- 15.3 Urine Formation
- 15.4 Concentration of Urine
- 15.5 Composition of Urine
- 15.6 Role of Other Organs in Excretion
- 15.7 Disorders and Diseases

Kidneys

Kidneys are bean-shaped organs that maintain a constant internal environment. They help in elimination of nitrogenous waste products from the body and regulate the acid base balance.



Quick Review

Regulation of Kidney Function

- **Renin** (proteolytic enzyme) → Converts Angiotensinogen to Angiotensin.
- **Angiotensin II** → Stimulates PCT to reabsorb more Na^+ and H_2O . Stimulates adrenal cortex to release Aldosterone.
- **Aldosterone** → Stimulates DCT to reabsorb more Na^+ and H_2O .
- **Antidiuretic Hormone (ADH)** → Facilitates reabsorption of water from renal tubules.
- **Atrial Natriuretic Factor (ANF)** → Promotes salt and water excretion in urine.

Kidney Disorders

- **Renal failure** → Inability of kidney to filter toxic substances from blood.
- **Uremia** → Increased levels of urea ($> 0.05\%$) in blood.
- **Nephritis** → Inflammation of glomeruli of both kidneys.
- **Kidney stones** → Blockage of kidney tubules and urinary passage due to renal calculi (insoluble mass of crystallized salts).

EXCRETION AND OSMOREGULATION

- **Excretion** → Elimination of nitrogenous waste products from the body.
- **Osmoregulation** → Maintenance of optimal concentration of water and salts in tissues and body fluids.

Modes of Excretion

Ammonotelism

- Excretion of Ammonia.
- Very toxic and requires plenty of water for excretion.
- eg. Bony fishes, aquatic invertebrates, etc.

Ureotelism

- Excretion of urea.
- Less toxic and needs moderate amount of water for excretion.
- eg. Frogs, mammals, marine fishes, etc.

Uricotelism

- Excretion of uric acid.
- Least toxic and requires negligible amount of water.
- eg. Reptiles, birds and insects.

Guanotelism

- Excretion of mostly guanine.
- These organisms are known as guanotelic.
- eg. Arachids (spiders, scorpions), penguins.

Human Excretory System

