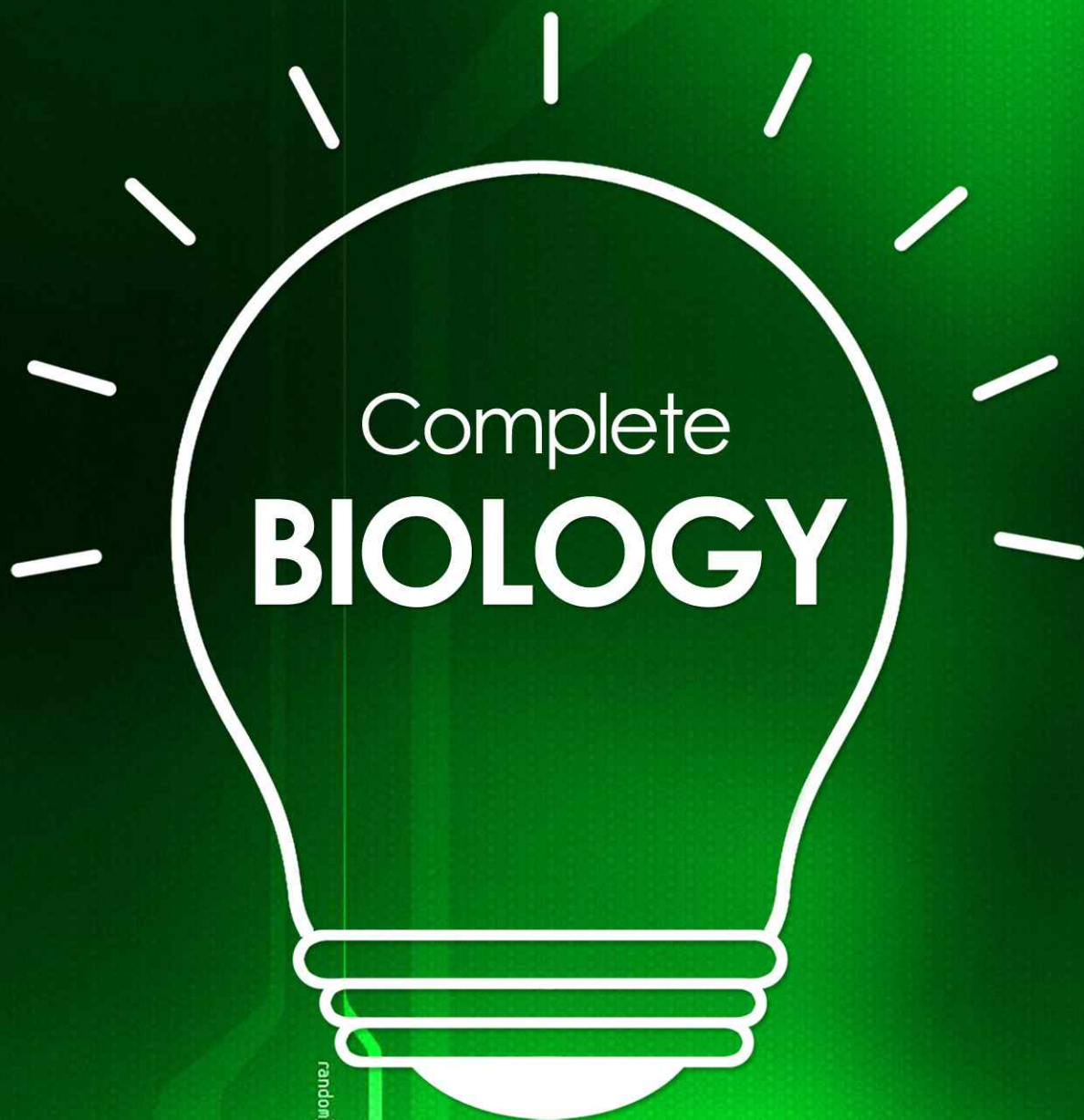




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CLASS 11 & 12th



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CLASS 11th

**Excretory Products
Elimination**

misostudy



01. Introduction

Animals produce different types of nitrogenous wastes as a result of various cellular reactions taking place in their body. These waste materials, if allowed to accumulate in the body, may become toxic. Therefore, they must be removed from the body. The process of removal of these waste materials from the body is called **excretion**.

Excretion and osmoregulation together act to maintain a steady state in the body. This phenomenon of maintaining a constant favourable internal environment despite of fluctuations in outer environment of the body/cell is termed as **homeostasis**.

02. Types of Excretory Products

(i) Ammonia

It is a highly toxic excretory product eliminated in the form of NH_4^+ ion. It requires more water for its dissolution. The process of excreting ammonia is called **ammonotelism**. The animals performing this process are called **ammonotelic animals** e.g. aquatic amphibians, many bony fishes, aquatic insects, etc.

(ii) Urea

It is less irritant and less soluble than ammonia. It is produced in liver from ammonia and CO_2 . The process of excreting urea is called **ureotelism**. The animals performing this process are called **ureotelic animals**. These animals inhabit both terrestrial and aquatic area, e.g. elasmobranch fishes (shark and their relatives), adult amphibians and mammals.

(iii) Uric acid

It is least toxic and almost insoluble in water. It is excreted in semi-solid form. The process of excreting uric acid is called **uricotelism**. The animals performing this process are called **uricotelic animals**. These inhabit terrestrial areas, e.g. land reptiles, land gastropods, most insects, birds, etc.

(iv) Trimethylamine oxide

Few animals instead of excreting ammonia convert it into Trimethylamine (TMA) and excrete the oxidised form of TMA, i.e. Trimethylamine Oxide (TMO). These animals are marine molluscs, crustaceans, fishes (lung fishes, teleost), etc.

(v) Guanine and xanthines

These are byproducts of nucleotide metabolism. These are excreted in semi-solid form in spiders and penguins.

(vi) Creatine

It is produced from creatine phosphates in muscle cells. Creatine excretion can be seen in foetus, pregnant and lactating women.

(vii) Creatinine

It is produced as a result of creatine metabolism.

(viii) Hippuric acid

This appears in excretory product only when benzoic acid is present in diet. It is present in traces in human urine. In birds, it combines with ornithine and changes into ornithuric acid for excretion.

(ix) **Allantoin**

This got its name from the fact that it is excreted through the extraembryonic membrane allantois in birds and reptiles. Allantoin is formed by the oxidation of uric acid.

(x) **Amino acid**

Certain animals like-*Unio*, *Limnaea* and *Asterias* excrete amino acids. These are called **aminotelic animals** and the process is called **aminotelism**.

03. Excretory Organs in Different Animals

Excretory organs in different animals are listed below

Table Excretory organs in different animals groups

Animal group	Excretory organ/Surface
Protozoa	Plasmalemma or Body surface (e.g. <i>Amoeba</i>)
Porifera	General body surface (e.g. <i>Sycon</i>)
Coelenterata	General body surface (e.g. <i>Hydra</i>)
Platyhelminthes	Protonephridia (flame cells) (e.g. <i>Planaria</i>)
Aschelminthes	Renette cells (e.g. <i>Ascaris</i>)
Annelida	Nephridia/Metanephridia-Oligochaetes (e.g. earthworm)
	Protonephridia and Metanephridia-Polychaetes (e.g. <i>Nereis</i>)
	Ciliated body- <i>Hirudinaria</i> (e.g. leech)
Arthropoda	Antennary or Green glands-Crustaceans (e.g. prawns)
	Coxal glands-Arachnids (e.g. Spiders) and <i>Limulus</i>
	Malpighian tubules-Insecta (e.g. honeybee), Chilopods (scolopendra or centipede) and Diplopods (e.g. julus or millipede)
Mollusca	Metanephridia-General
	Organs of Bojanus (kidneys), Keber's organs (e.g. <i>Unio</i>)
Echinodermata	Dermal branchiae and tube feet (e.g. starfish)
Hemichordata	Proboscis gland (e.g. <i>Balanoglossus</i>)
	Single glomerulus (e.g. Acornworm)
Chordata	Neural glands-Urochordata (e.g. <i>Herdmania</i>)
	Pharyngeal and Hatschek's nephridia with solenocytes-Cephalochordata (e.g. <i>Amphioxus</i>)
	Kidneys-Vertebrata (e.g. fishes, amphibians, reptiles, birds and mammals)

04. Excretory System of Human

The excretory system of human consists of two kidneys, two ureters, one urinary bladder and one urethra.