

BIOLOGY

CLASS NOTES FOR CBSE

Chapter 19. Excretory Products Elimination

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.



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(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 System of Human

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

04. Kidneys

Human kidneys are mesodermal in origin. They are situated in the abdominal cavity on either side of the levels of last thoracic and third lumbar vertebra. Human kidneys are present outside the coelomic cavity and only their ventral surface is covered by visceral peritoneum.

This arrangement is called **retroperitoneal**. Last two pairs of ribs, i.e floating ribs protect the kidneys from backside.

05. External Structure

Human kidneys are bean-shaped, reddish-brown, paired structures. An average sized kidney is about 10-12 cm in length, 5-7 cm in width and 3-4 cm in thickness. Their weight is about 150 gm in males and about 135 gm in females.

Usually, the right kidney is smaller than the left one and positioned a bit lower as compared to the left kidney. Such a difference is seen because most of the portion of right side of the body is occupied by liver.

Towards the centre of the inner concave surface of the kidney is a notch called as **hilus renalis** or **hilum**. It is the region through which the blood vessels and nerves pass. Hilum leads to a funnel-shaped space called **renal pelvis**. The projection of renal pelvis are called **calyces**.