

# CHAPTER 19

## EXCRETORY PRODUCTS AND THEIR ELIMINATION

### 19.1 Human Excretory System

### 19.2 Urine Formation

### 19.3 Function of the Tubules

### 19.4 Mechanism of Concentration of the Filtrate

### 19.5 Regulation of Kidney Function

### 19.6 Micturition

### 19.7 Role of other Organs in Excretion

### 19.8 Disorders of the Excretory System

Animals accumulate ammonia, urea, uric acid, carbon dioxide, water and ions like  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Cl}^-$ , phosphate, sulphate, etc., either by metabolic activities or by other means like excess ingestion. These substances have to be removed totally or partially. In this chapter, you will learn the mechanisms of elimination of these substances with special emphasis on common nitrogenous wastes. Ammonia, urea and uric acid are the major forms of nitrogenous wastes excreted by the animals. Ammonia is the most toxic form and requires large amount of water for its elimination, whereas uric acid, being the least toxic, can be removed with a minimum loss of water.

The process of excreting ammonia is *Ammonotelism*. Many bony fishes, aquatic amphibians and aquatic insects are **ammonotelic** in nature. Ammonia, as it is readily soluble, is generally excreted by diffusion across body surfaces or through gill surfaces (in fish) as ammonium ions. Kidneys do not play any significant role in its removal. Terrestrial adaptation necessitated the production of lesser toxic nitrogenous wastes like urea and uric acid for conservation of water. Mammals, many terrestrial amphibians and marine fishes mainly excrete urea and are called **ureotelic** animals. Ammonia produced by metabolism is converted into urea in the liver of these animals and released into the blood which is filtered and excreted out by the kidneys. Some amount of urea may be retained in the kidney matrix of some of these animals to maintain a desired osmolarity. Reptiles, birds, land snails and insects excrete nitrogenous wastes as uric acid in the form of pellet or paste with a minimum loss of water and are called **uricotelic** animals.























