

Class Mammalia

Mammals are warm-blooded vertebrates that are distinguished by several unique characteristics. They inhabit a variety of ecosystems, ranging from aquatic to terrestrial and arboreal environments. Mammals play a significant role in the ecological balance, serving as predators, herbivores, and omnivores, and are critical to many food chains.

Characteristics of Class Mammalia

1) Mammals have endoskeleton with a well-developed axial and appendicular skeleton. They possess a vertebral column, skull is highly developed, housing a large brain relative to body size,

3) Warm-blooded Nature (Endothermy) - All mammals maintain a constant body temperature regardless of environmental changes. This adaptation allows them to thrive in cold and temperate regions—their hair or fur further helps regulate body temperature.

4) Hair and Skin Glands - A remarkable feature of mammals is hair, which provides insulation, camouflage, and sensory functions. Mammals also possess specialised skin glands, including Sebaceous glands, Sweat glands and Mammary glands

Respiratory System - Mammals have a highly efficient respiratory system with lungs and a diaphragm (aids in ventilation)

Circulatory System - The mammalian heart is four-chambered, consisting of two atria and two ventricles, which prevents mixing of oxygenated and deoxygenated blood.

Nervous System and Senses - Mammals possess a well-developed brain, with an enlarged cerebrum for complex behaviour, learning, and memory. They have advanced sensory organs, including eyes with colour vision (in some species), ears capable of detecting a wide range of sounds, highly sensitive olfactory receptors for smell, tactile whiskers (vibrissae) for spatial sensing

Excretion and Nitrogenous Waste - Mammals excrete urea through the kidneys, a less toxic form of nitrogenous waste, which requires minimal water for elimination.

Kidneys are metanephric and highly efficient at conserving water and maintaining osmotic balance.

Reproduction and Development - Most mammals are viviparous, giving birth to live young. Fertilisation is internal, and embryonic development occurs within the uterus, where the placenta facilitates nutrient and gas exchange. Mammals exhibit parental care, which increases offspring survival.

Digestive System - Mammals show diverse feeding habits: herbivores, carnivores, omnivores, and insectivores. Their digestive system is specialised according to diet like Herbivores have long intestines, complex stomachs (e.g., ruminants) for cellulose digestion, Carnivores have short digestive tract strong stomach acids.

Classification of Class Mammalia

The class Mammalia classification primarily divides living mammals into three subclasses based on their reproductive methods.

Subclass Prototheria (Monotremes): This is the most primitive and smallest group of mammals. Unlike other mammals, they are oviparous, meaning they lay eggs. After hatching, the young are nourished with milk produced by mammary glands that lack nipples—e.g., the platypus and echidna.

Subclass Theria: This subclass includes all mammals that give birth to live young. It is further divided into two infraclasses:

Infraclass Metatheria (Marsupials): Marsupials give birth to immature, poorly developed young. The young then crawl into a special pouch, called a marsupium, on the mother's abdomen, where they attach to a nipple and complete their development. Examples: Kangaroos, koalas, opossums, and wallabies.

Infraclass Eutheria (Placentals): This is the most widespread group of mammals. They are characterised by the development of the fetus inside the mother's uterus, with nourishment provided through a complex organ called the placenta. The young are born at a more advanced stage of development. Examples: whales, elephants, shrews, and armadillos.