Mammals Study Materials

Mammals are the vertebrates within the class **Mammalia** a clade of endothermic amniotes distinguished from reptiles (including birds) by the possession of a neocortex (a region of the brain), hair, three middle ear bones, and mammary glands. Females of all mammal species nurse their young with milk, secreted from the mammary glands.

Classification

Mammal classification has been through several iterations since Carl Linnaeus initially defined the class. No classification system is universally accepted; McKenna & Bell (1997) and Wilson & Reader (2005) provide useful recent compendiums. George Gaylord Simpson's "Principles of Classification and a Classification of Mammals" (AMNH *Bulletin* v. 85, 1945) provides systematics of mammal origins and relationships that were universally taught until the end of the 20th century. Since Simpson's classification, the paleontological record has been recalibrated, and the intervening years have seen much debate and progress concerning the theoretical underpinnings of systematization itself, partly through the new concept of cladistics. Though field work gradually made Simpson's classification outdated, it remains the closest thing to an official classification of mammals.

Definitions

The word "mammal" is modern, from the scientific name *Mammalia* coined by Carl Linnaeus in 1758, derived from the Latin *mamma* ("teat, pap"). In an influential 1988 paper, Timothy Rowe defined Mammalia phylogenetically as the crown group of mammals, the clade consisting of the most recent common ancestor of living monotremes(echidnas and platypuses) and therian mammals (marsupials and placentals) and all descendants of that ancestor.[6] Since this ancestor lived in the Jurassic period, Rowe's definition excludes all animals from the earlier Triassic, despite the fact that Triassic fossils in the Haramiyida have been referred to the Mammalia since the mid-19th century.

Class Mammalia

- **Subclass Prototheria**: monotremes: echidnas and the platypus
- **Subclass Theriiformes**: live-bearing mammals and their prehistoric relatives
- Infraclass † Allotheria: multituberculates
- Infraclass † Eutriconodonta: eutriconodonts
- Infraclass Holotheria: modern live-bearing mammals and their prehistoric relatives
- Superlegion †Kuehneotheria
- Supercohort Theria: live-bearing mammals
- Cohort Marsupialia: marsupials
- Magnorder Australidelphia: Australian marsupials and the monito del monte
- Magnorder Ameridelphia: New World marsupials. Now considered paraphyletic, with shrew opossums being closer to australidelphians.[13]
- Cohort Placentalia: placentals
- Magnorder Xenarthra: xenarthrans
- Magnorder Epitheria: epitheres
- Superorder †Leptictida
- Superorder Preptotheria
- Grandorder Anagalida: lagomorphs, rodents and elephant shrews
- Grandorder Ferae: carnivorans, pangolins, †creodonts and relatives
- Grandorder Lipotyphla: insectivorans
- Grandorder Archonta: bats, primates, colugos and treeshrews
- Grandorder Ungulata: ungulates
- Order Tubulidentata *incertae sedis*: aardvark
- Mirorder Eparctocyona: †condylarths, whales and artiodactyls (even-toed ungulates)

- Mirorder †Meridiungulata: South American ungulates
- Mirorder Altungulata: perissodactyls (odd-toed ungulates), elephants, manatees and hyraxes.

Reproductive system

The ancestral condition for mammal reproduction is the birthing of relatively undeveloped, either through direct vivipary or a short period as soft-shelled eggs. This is likely due to the fact that the torso could not expand due to the presence of epipubic bones. The oldest demonstration of this reproductive style is with Kayentatherium, which produced undeveloped perinates, but at much higher litter sizes than any modern mammal, 38 specimens.[108] In placental mammals, a radical change happened, the conversion of the epipubic into genital bacculum bones or complete loss; this allowed the torso to be able to expand and thus produce developed offspring.

In male placentals, the penis is used both for urination and copulation. Depending on the species, an erection may be fueled by blood flow into vascular, spongy tissue or by muscular action. A penis may be contained in a sheath when not erect, and some placentals also have a penis bone (baculum). Marsupials typically have forked penises while the monotreme penis generally has four heads with only two functioning. The testes of most mammals descend into the scrotum which is typically posterior to the penis but is often anterior in marsupials. Female mammals generally have a clitoris, labia majora and labia minora on the outside, while the internal system contains paired oviducts, 1-2 uteri, 1-2 cervices and a vagina. Marsupials have two lateral vaginas and a medial vagina. The "vagina" of monotremes is better understood as a "urogenital sinus". The uterine systems of placental mammals can vary between a duplex, were there are two uteri and cervices which open into the vagina, a bipartite, were two uterine horns have a single cervix that connects to the vagina, a bicornuate, which consists where two uterine horns that are connected distally but separate medially creating a Y-shape, and a simplex, which has a single uterus.

Humans and other mammals

In human culture

Non-human mammals play a wide variety of roles in human culture. They are the most popular of pets, with tens of millions of dogs, cats and other animals including rabbits and mice kept by families around the world. Mammals such as mammoths, horses and deer are among the earliest subjects of art, being found in Upper Paleolithic cave paintings such as at Lascaux. Major artists such as Albrecht Dürer, George Stubbs and Edwin Landseer are known for their portraits of mammals. Many species of mammals have been hunted for sport and for food; deer and wild boar are especially popular as game animals. Mammals such as horses and dogs are widely raced for sport, often combined with betting on the outcome. There is a tension between the role of animals as companions to humans, and their existence as individuals with rights of their own. Mammals further play a wide variety of roles in literature, film, mythology, and religion.

Hybrids

Hybrids are offspring resulting from the breeding of two genetically distinct individuals, which usually will result in a high degree of heterozygosity, though hybrid and heterozygous are not synonymous. The deliberate or accidental hybridizing of two or more species of closely related animals through captive breeding is a human activity which has been in existence for millennia and has grown for economic purposes. Hybrids between different subspecies within a species (such as between the Bengal tiger and Siberian tiger) are

known as intra-specific hybrids. Hybrids between different species within the same genus (such as between lions and tigers) are known as interspecific hybrids or crosses. Hybrids between different genera (such as between sheep and goats) are known as intergeneric hybrids. Natural hybrids will occur in hybrid zones, where two populations of species within the same genera or species living in the same or adjacent areas will interbreed with each other. Some hybrids have been recognized as species, such as the red wolf (though this is controversial)

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