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Classification of Mammals (Young, 1981)

- Mammal, (class Mammalia), any member of the group of vertebrate animals in which the young are nourished with milk from special mammary glands of the mother. In addition to these characteristic milk glands, mammals are distinguished by several other unique features. Hair is a typical mammalian feature, although in many whales it has disappeared except in the fetal stage.
- Among vertebrates, mammals became most fully suited for life on land. There are many species of mammals in which the process of life are carried on under conditions far remote from those in which life first arose.
- Mammals can be defined as 'highly percipient and mobile animals, with large brains, spiral cochlea, warm blood, left aortic arch, and water-proof, usually hairy skin, whose young are born alive, and are nourished by milk.
- Besides the regulation of tempera-ture, there is also regulation of nearly all components of the blood, which are kept constant within narrow limits. Therefore, the most characteristic features of the modern mammals are seen to be largely in their behaviour and soft structures.
- General Characters :
    i. Mammary glands are present that supply milk for suckling the young and are probably specialised sweat glands. It is well-developed in female adult primates. Nipples or teats are absent in monotremes.
    ii. The body is generally covered with epidermal hairs except whales in which hairs are temporarily present in the embryos. The hairy coat acts as an insulating and thermal regulating material. In spiny anteaters (Tachyglossus), hedgehogs (Erinaceus, Hemiechinus, Paraechinus) and por-cupines (Hystrix) the hair assumes the form of spines or quills which act as defensive organ. Skin is waterproofed.
    iii. The external fleshy pinna is present in most mammals (absent in the Monotremata, Cetacea and Sirenia).
    iv. Integumentary glands are sweat (sudoriferous) glands, sebaceous (oil) glands and scent or odoriferous glands. Sweat glands function is in cooling the body surface by exuding water from the body. Sebaceous glands function is to keep the skin and hair soft and pliable.

v. Eyes with upper and lower eyelids and often eyelashes. The nictitating membrane is hairless and translucent which is vestigial in higher mammals.
vi. They are Endothermal homoeotherms.
vii. The heart is completely four- chambered. Sinus venosus and conus are absent.
viii. Only the left aortic arch is present.
ix. A muscular diaphragm is present in between the thoracic and abdominal cavities and functions chiefly in breathing.
x. Renal portal veins are absent.
xi. Corpus callosum, the transverse band of nerve fibres connecting the two cerebral hemispheres, is present (absent in monotremes and rudimen-tary in marsupials).
xii. Corpora quadrigemina, the four optic lobes on the dorsal side of the mid-brain, is present.
xiii. The skull has double exoccipital condyles.
xiv. The lower jaw/ mandible is made up of one bone called – dentary, which articulates with the upper jaw through the squamosal bone (squamosal articula-tion). Quadrate absent.
xv. Dentition heterodont, thecodont and diphyodont (In toothed whales the teeth are homodont). Heterodont den-tition is marked by the presence of inci-sors, canines, premolars and molars.
xvi. Development through the fertilization (internal fertilization) of eggs or ovum and sperm. Eggs are small, with little or no yolk (except in Monotremata). The eggs of monotremes are macrolecithal and telolecithal.
xvii. Allantoic (Chorio-allantoic) placenta is present in eutherian mammals (absent in monotremes and most mar-supials). Some marsupials possess yolk-sac placenta (Chorio-vitelline). Placenta is the site of transfer of nutrients from maternal tissues to the embryo and of transfer of metabolic wastes from embryo to mother.
xviii. Viviparous, i.e., they give birth to alive youngs except in monotremes which are oviparous.

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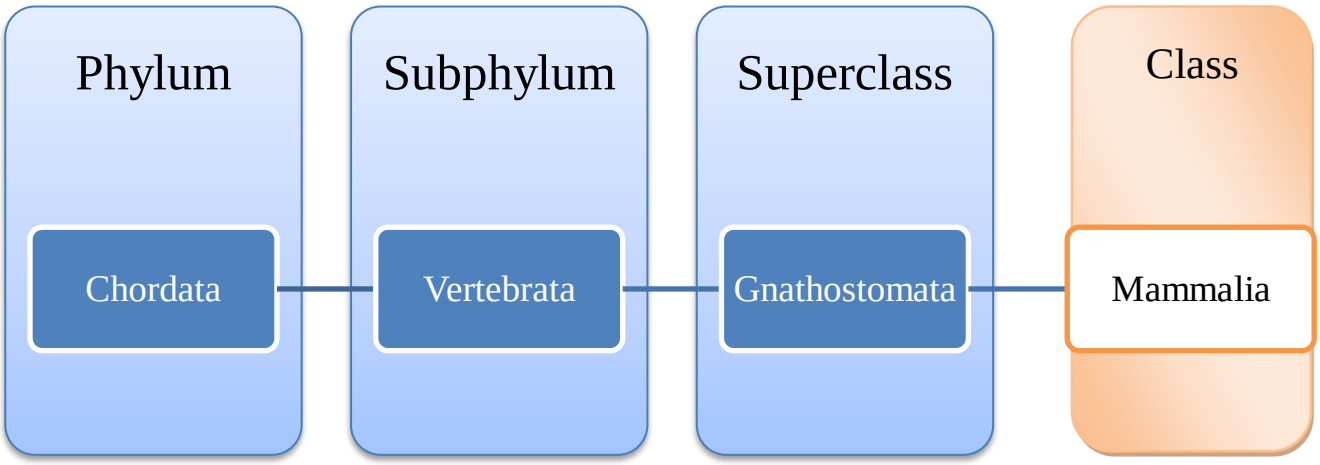
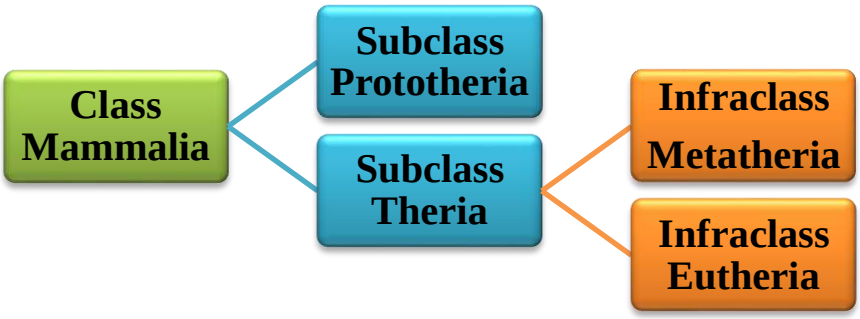
Classification of Class Mammalia (according to Young, 1981)

The classificatory scheme of mammals as proposed by J. Z. Young (1981) is followed here (only living groups are considered).





According to Young , 1981

Class Mammalia

Subclass I Prototheria [Gr. *Protos* – first, *therios* – beast]

General characters :

i. Primitive, reptile like, oviparous or egg-laying mammals.
ii. Cloacal opening present.
iii. The mammary glands lack teats
iv. External pinna absent.
v. In childhood, teeth are present but adults lack teeth
vi. Mostly confined to Australian region.

Example : Monotremes – Platypus (*Ornithorhynchus)*, Spiny anteater (*Tachyglossus* = *Echidna*)

Subclass II Theria [Gr. *ther* : animal / *therion* : beast]

i. Modern or typical viviparous mammals that give birth to living young.
ii. Mammary glands are provided with teats.
iii. Pinna or external ear is present.
iv. Teeth are present throughout the life period.
v. Ribs possess two heads for articulation with vertebrae.

- This subclass – Theria is further subdivided into 2 living infraclasses :

Infraclass I Metatheria [Gr. *meta* – between / after]

i. Pouched and viviparous mammals without or with a rudimentary yolksac placenta.
ii. The youngs are born in an immature con-dition and undergo further development in the marsupium of females.
iii. Mammary gland with teats opens into the marsupium [Latin *marsupium :* a sac].
iv. Epipubic bone of the pelvic girdle pro-tects the marsupial sac.
v. Chorioviteline type placenta.
vi. Confined mostly to Australian region.

Example : Marsupials – Opposum (*Diderlphis sp.),* kangaroo (*Macropus sp.*) , Koala (*Phascolarctos sp.)*

Infraclass II Eutheria [Gr. *eu* – true , *therios – beast*]

i. Higher vivipoarous placental mammals, without marsupium.
ii. The young are born as miniature adult and go through a considerable period of prenatal growth.
iii. A highly-organised allantoic placenta attaches firmly with the uterine wall during developmental period.
iv. Young born in a relatively advanced stage.
v. Brain is highly-developed, cerebral hemispheres have well-developed neo- pallial region. The two hemispheres are connected by corpus callosum.
vi. The anal and urinogenital apertures are separate.
vii. The tympanic bone is ring-like and forms a tympanic bulla.
viii. Epipubic bone in the pelvis is absent.
ix. Dentition never exceeds 3.14.3/3.14.3 = 44.

Example : Mole (*Talpa sp.* Insectivore), bat (*Mega*/*Microchiroptera sp.*), Primates (*Macaca sp.* – Monkeys, Lemur – *Lemur sp.* , Chimpanzee - *Pan sp.*), tiger (*Panthera sp.*- all carnivores), odd –toed (Horse- *Equus sp.- Perrissodactyles*), even-toed (Camel – *Camelus sp.*- artiodactyles) , elephant (*Elephas sp.*), cetaceans (Dolphin – *Platanista sp.*), Sirenians (*Trichechus sp.* - Manatee), humans (*Homo sapiens sapiens*) etc.

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