

CLASS – MAMAMALIA



- **Mammals** were evolved in **Triassic period** or Mesozoic era. **Coenozoic** era is **golden era of mammals.**
- Study of mammals is known as **Mammology.**

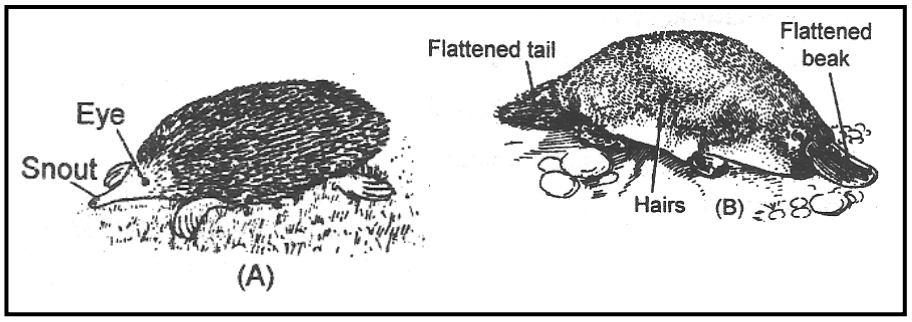
Main Characters :

- the members of this class are **cosmopolitan.**
- These are highly developed animals
- Body is divided into **head, neck, trucnk** and **tail.**
- A horizontal **diaphragm** is present in the body cavity of all the members of this class without any exception.
- This diaphragm is present in between thorax and bdomen.
- Diaphragm helps in **repiration, defaecatio, micturition** and **parturition.**
- Their body is covered by a coat of hair (made or α Keratin), called **plegae.**
- Skin of mammals is thick, water prood, glandular. So many types of glands are present int he skin as **swat glands, oil glands** or **sebaceous glands** and **mammary glands.**
- **Mammary glands** (Modifed sweat glands) are found in females for body feeding, so on the basis of this, the class mammalia was on named.
- Mostly horns are present at head, **nails** at digits, **claws** or **hoof** are found, which provide protection.
- Two paris of limbs are pesent in trunk. Limbs are **pentadactyle** which help in swimming, walking running etc. Hind limbs are absent in Cetasea and Sirenia.
- Alimentary canal is **complete,** its proximal end is caleld **mouth** and distal end is caleld **anus.** anus and
- urinogenitla apertures are separate. Cloaca is absent (Exception-members of **Protoheria** have cloaca)
- Teeth are fixed in scocket in the buccal cavity, so teeth are caleld **Thecodont.**
- Teeth are of four types ie.e. such type fo teeth are called **Heterodont** teeth.
- Teeth comeout two tiems in a life span in most of the animals so these are slaos caleld **diphyodont** teeth.
- Supspensiruyn of their jawas is **craniostylic types.**
- Lowe jaw is made up of dentary bone.
- Respiration is by on pair of lungs (Enclosed in pleural cavity).
- **Larynx** or sound organ is found int eh neck region for the production of sound.
- Heart **four chambered.** Double circulatory system is present. No sinus venosus. Only **left aortic** (sytemic).
- RBCs small, cirular and **non nucleated** except : Family camilidate (Lama) and Camel which has nucleated RBCs.
- Endoskeleton is body, skull is **dicondylic.**
- Vertebrae are **acoelus** or **amphiplatyan type** i.e. centrum is flat at both the side. Cartilagenous plads are found at the edges of centrum that are caleld **epiphysis.**
- Neck si having **7 cerical vertebrae except : Bradypus/Slopt** has 9 or 10 cervical vertebrea and **Sea - cow/** mantees has 6 cervical verte bre.
- Ribs are **bifid.**
- One pair of **Metanephric** kidney are highly developed.
- **Cerebrum** and **Cerebullum** are very complex in strucutre and highly developed.

- A special strucutre is present for the conenction fo both the cereral hemispheres of brain, that is caleld **corpus - callosum.** (Absent in Monoterms & Marsupial)
- Optic lobes are four in number and are solid. All the 4 optic lobes colelctively known as **corpora quadirgemina.**
- Cranial nerves are 12 - **pairs**
- External ear is present in the form of ear pinna.
- **Malleus, Incus** and **stapes** are the three ear ossicles in middle ear.
- **Cochlea** of internal ear highly colied coiled spirally.
- Mammals are unisexual animals. Testes of males are situated (out side the body) in the **scrotal sacs.**
- A distincit penis is present in males for cop ulation.
- Ovaries and a redued penis clitoris is found in females
- Fertiliztioin is **internal** and it takes palce in **fallopian tubbes.**
- Eggs are developed in uterus. Embyonic membranes amnion, chrion and allantois and yolk sac are found in emryoso these are grouped under group **Ammiota.**
- Eggs are **alecithal** or **microlecithal** & **homolecithel** but eggs of prototherians are **megalecithal.**
- Emgryo is attached through the uterus of mother by placenta, so these animals are also caleld placental animals.
- Placenta helps in teh **nutrition, respiration** and **excretioin** of embryo
- Mostly mammals are viviparous, which give birth to their youn ones. Some mammals are oviparous [Prototherians], some mammals are ovoviviparous [Metatherians]
- Parental care is well marked in mammals. Mother feeds the child by milk secreted by her mammary glands and looks after her child.
- Mammals are warm blooded and hemoethermic or endothermic animals
- Livings mammals are classfied into two subsclasses :

Subclass : Prototheria

- In this subclass primitive egg laying mammals are included.
- Eggs are large, yolky and shelled. (Megalecithal)
- Mammary glands are without nippes.



- **Gynaecomastism** is found in these animals i.e. male and female both feed their child. Mammary glands are functional in makes and females both.
- **Cloaca** is present.
- **Testes** in males are situated inside the body (abdominal cavity)
- Pinnae are absent and cochlea is less boiled.
- **Corpus - Callosum** is **absent** in brain.
- A toothless horny beak is found in adult animals, but teeth are present in child hood.
- These are partially homeothermic animals.
- Members of this sublass are found in **Australia, Newguine** and **Tasmania.**
  Only one order is included in this subclass.

Order – Monotremata

Conective links between **reptiels** and **mammals.**

e.g.

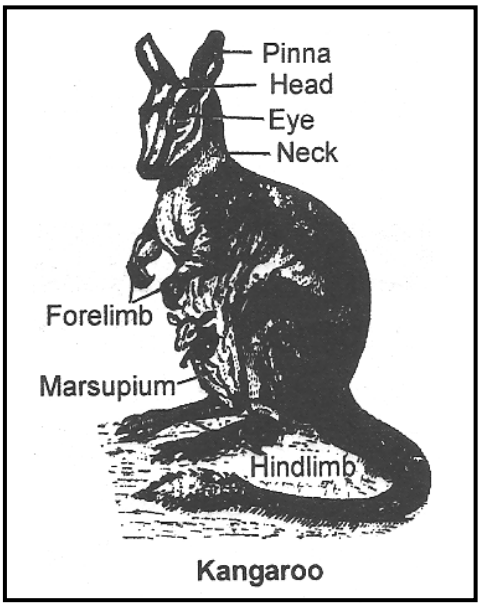
- ***Ornithorhychus*** *or* **Duck billed platypus - poison glands** are found in **male platypus.**
- ***Tachylossus*** or **Echidna** or **spiny anteater.**

Subclss – Theria

- These are **viviparous** animals.
- **Embryo** is attached with uterus of mother by **placenta.**
- Mammery gladns with **Nipple**
- Cloaca absent
- Testes are situated in **scrotal sacs.**
- Pinnae are present and cochlea much coiled
- Corpus callosusm present
- Teeth are present
- Teeth are found in adult and children both.
- **Subclass - Theria** is subdivided into **two infra** classes :

[A] Infraclass - Metatheria or Marsupials

- An abdominal ouch called **marsupium** is found in these animals, in which immatura young ones are developed till maturity.
- Mammary glands are present and **nipples** are also found on these mammary glands, these are sitauted in **marsupium.**
- Penis is **bifid, two vagina, two clitoris** and **two uteri** are prsent in a **female** animal.
- **Yolk sac,** pacenta are found.
- Cochlea is more coiled in internal ear.
- Teeth are present in adult animals, whcih are **monophyodont** are **heterodont** type.
- **Corpus callosum** is also **absent.**
- Only one order is included in this infraclass.



Kangaroo

Order – Marsupialia

Chracters like metatheria
Animals are **ovoviviparous**

e.g.

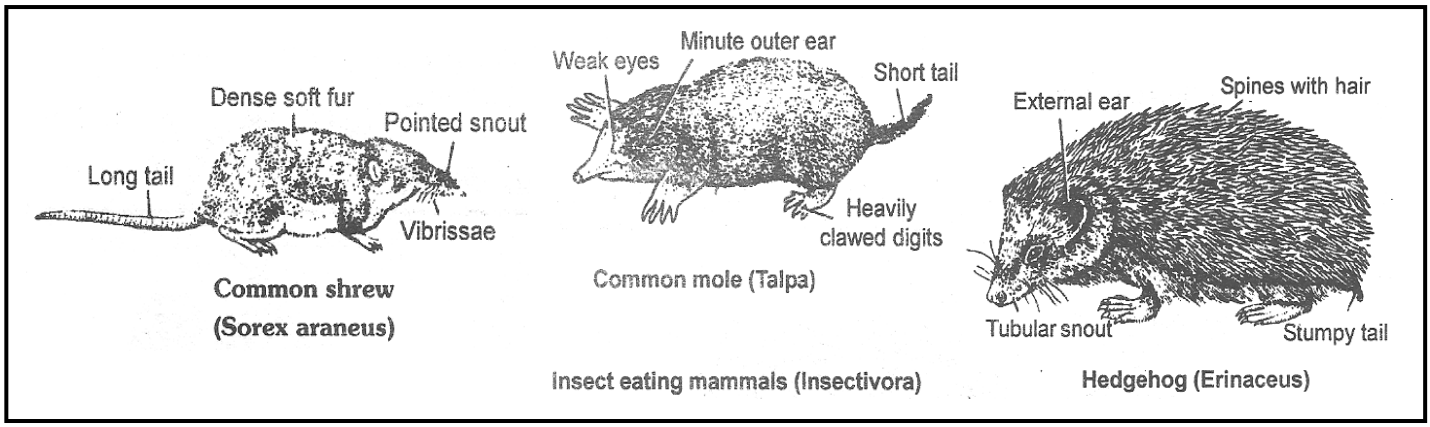
- ***Macropus -*** Kangaroo - Found in Austrialia only. Saltatorial locomotion (Tail to sue as body balance
- ***Didelphys -*** Opossum - Found in North America. Shortest gestation period (12-13 days).
- ***Dasyurus -*** Tiger cat.

Infra class – Eutheria

- These are **true mammals,** that give birth to a mature child. A true placenta is found, which is **Allanto - chorinoic** type.
- Nipples are well marked in mammary glands.
- Uterus and vagina are **single** i.e. only one uterus and only one vagina are present in a female. Penis simple.
- Cochlea is highly coiled.
- **Corpus callosum** is found in brain.
- Completely **endoothermic** animals.
- Infraclass **Eutheria** is divided into **16 orders :**

Order (1) : Insectivora

- These are burrowing nocturnal and insectivorous animals



e.g.

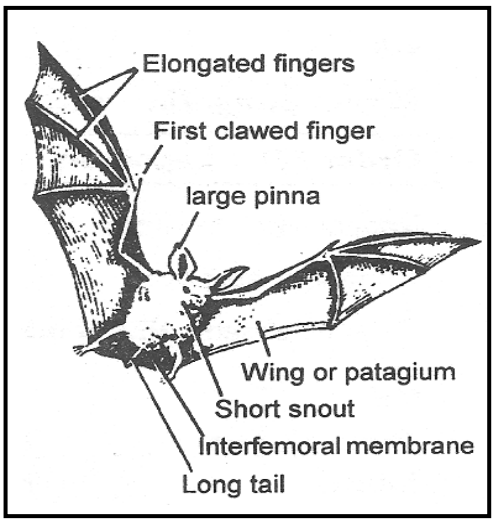
- ***Erinaceous*** **-** Jhau - Chuha/Hedge Hog
- ***Sorex*** **-** Shrews : smallest mammals size is about 3 - inches : Chhachhunder
- ***Talpa*** **-** Mole

Order (2) : Dermoptera/flyig lemus

- In this group, all the **false lemurs** are included, which do not fly
- These are fruit easters (frugivorous)

e.g.

- ***Galeopithecus*** **-** Flying lemur



Order (3) : Chiroptera

- In this group bats are included which can fly in air. These are true **flying mammals.**
- Sking between forelimbs and hindlimbs is expanded in the form of **patagium,** it works as wing, which hels in flying.
- Testes are inside bdomen.
- **Ecolocation** (Radar system) sensory system.

e.g.

- ***Pteropus*** **-** Flying fox, It is a fruit eater animal.
- ***Vespertilo*** **-** Insectivorous bat, it is also caleld filtter mice.
- ***Desmodus*** **-** Vampire bat, it is a **sanguivorous** animal

Order (4) : Rodentia

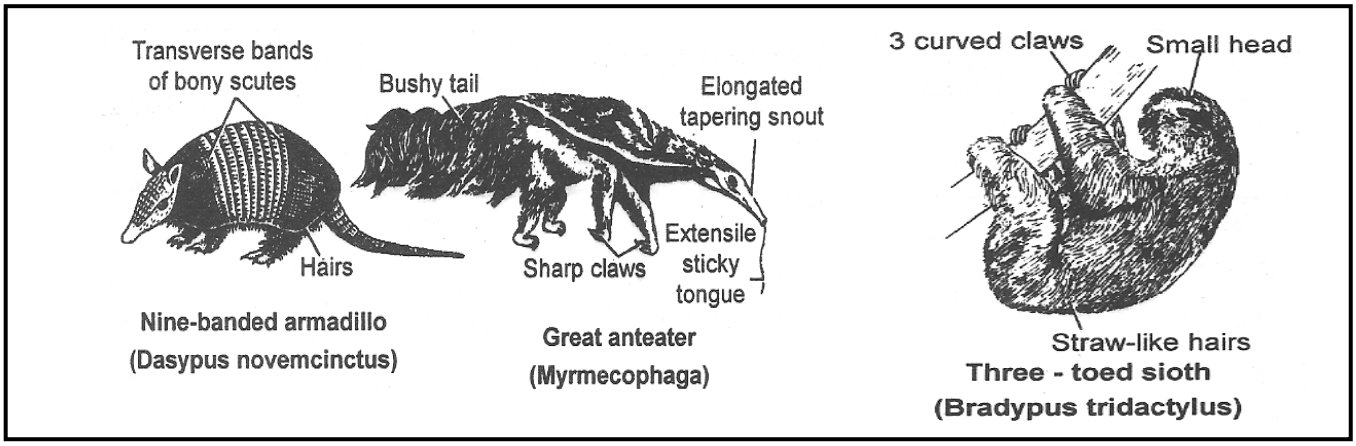
- It is the biggest order in mammals
- Tehse are small, terrestirla, herbivoure or omnivore animals.
- Incisor teeth grow continusouly in these animals and canines are absent, empty space of canine is caleld **diastema.**

e.g.

- ***Funambulus*** - Squireel
- ***Rattus rattus*** - Rat
- ***Hystri*** - Porcupine - = Sehi = Body hair are modified into qauils.
- ***Cavia*** - Guinea Pig
- ***Dipodomys*** - Kangaroot rat - Desert raet (Never drink water)

Order (5) : Edentata (Ant - easters)

- These are **insectivore** animals, tongue of these animals is long, thin and sticky.
- Digits are clawed.
- `Teeth ill developed or absent.
- `It is the only mammal, which has **exoskeleton** of **bonyplates** and **horny scales.**



e.g.

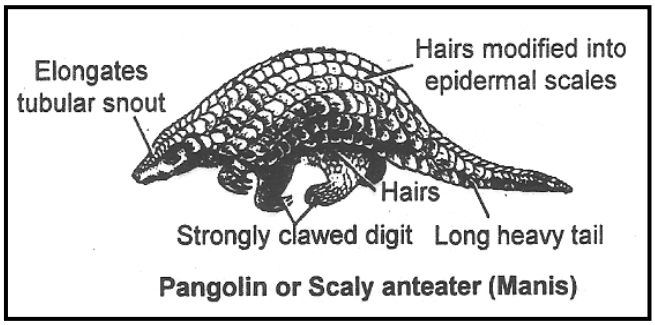
- **Myrmecophaga** - Giant atn eater
- ***Dasypus*** or ***Armadillo*** - It shows **polyembryony** (4 - 8 embryoes)
- ***Bradypus*** - Slowest animals

Order (6) : Pholidota - (Scaly ant - eater)

- Teetch are absent. Toung is long.

e.g.

- ***Manis/pangolin*** - Scaly ant eater

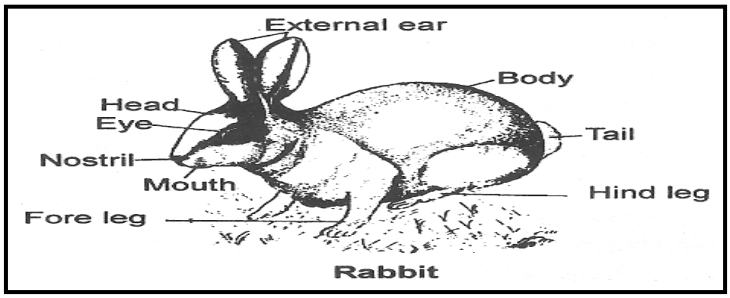


Order (7) : Lagomorpha

- Rodent like mammals
- Complete herbivore
- Canines absent, **diastema** is present

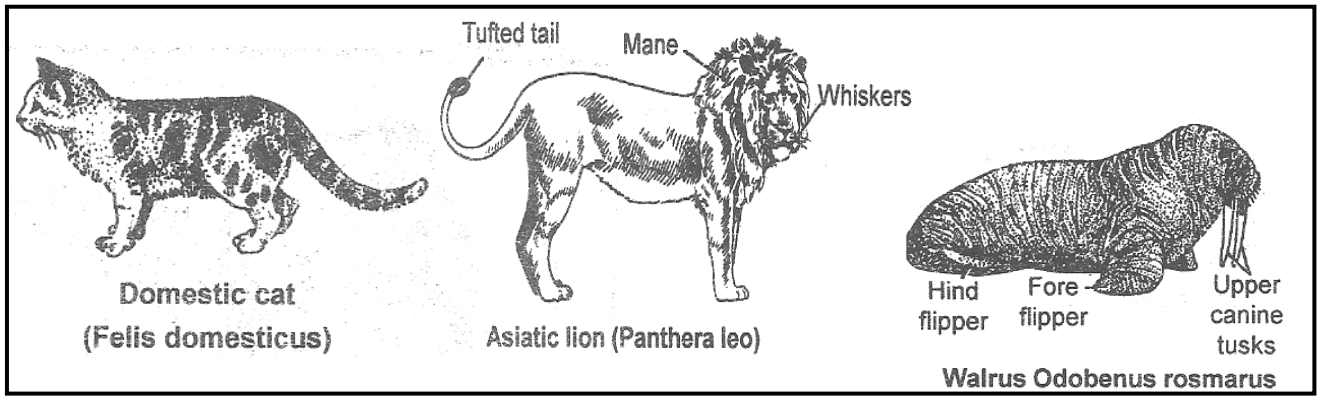
.e.g

- ***Oryctolagus*** - Rabbit
- ***Lepus*** - Hare
- ***Octhotona*** - Pika (Tail less)



Order (8) : Carnivora

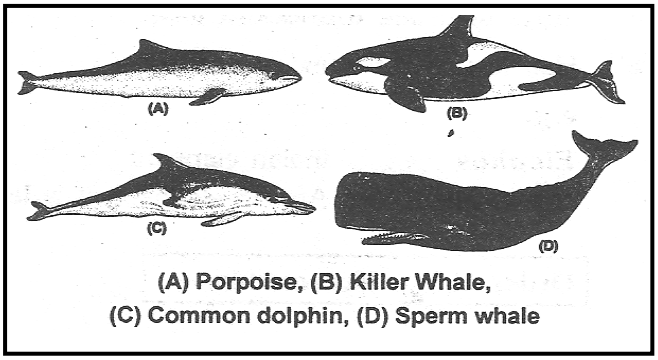
- Canines well developed.
- Smart, strong and carnivore, animals.
- Upper **last premolar** and lower first molar are meant for tearing the flesh these are called **carnassial teeth.**
- **Digitigrade** locomotion.
- Terrestrial carnivores animals are caleld **Fissipedia** & Marine carivores are caleld **Pinnipedia.**
- Digitigrade animals



e.g.

- ***Canis familiaris*** - Domestic dog.
- ***Felis domesticus*** - Domestic cat
- ***Panthera leo persica*** - Lion - Lions in India are found only in **Gir forests** in kathiawar of Gujrat state.
- ***Panthera pardus*** - Tendua - Panther
- ***Panthera tigris*** - Tiger - It si the **Naional animals** of India.
- ***Acnonyx*** - Cheetah - it is the **extinct** animal of **India**
- ***Vulpes - bengalnensis*** - Fox
- ***Zolopus*** - Sea lion
- ***Phoca*** - Seal
- ***Herpestes*** - Mangoose
- ***Ursus*** - Bear
- ***Canis lupus*** - Wolf.

Order (9) : Cetacea



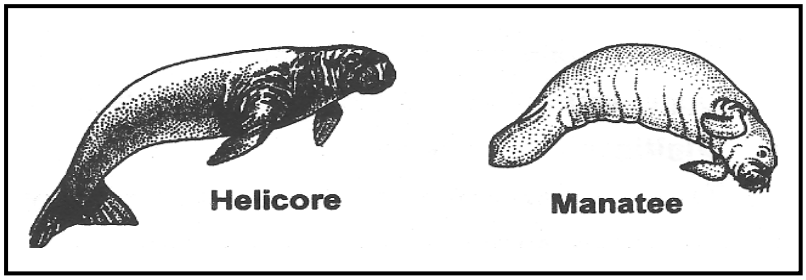
- These animals are fish like amrine mammals
- **Hind limbs** absent
- **Hairs & Pinnae** are absent.
- Tested found in abdomen.
- A thick heat resistance layer of adipose tissue if present just beneath the skin, that is called **blubber.**

e.g.

- ***Balaenoptera musculus*** - Blue whale - Found in **Antarctic ocean.** A Horny sheet caleld **Ballen** plate (for filration) is found in upper jaw instead of teeth. Milk is squirited to through of baby by the muscle conraction of mother. **Retea mirabile** is found in thoracic region which helps in **respiration** in under ater.
- ***Phocaena proposie*** - Small whale
- ***Orcinus*** - Kille whale.
- ***Caparea*** - Pigmy whale.
- ***Physeter*** - Sperm whel - From its intestine **Ambergris** is secreted which is used in making perfumes.

- ***Platnista gangatica*** - Dolphin - It si found in Ganga river.
- ***Delphinus*** - Common Dolfin

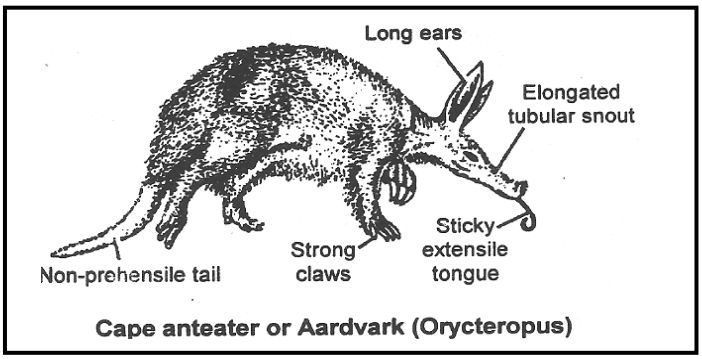
Order (10) : Sirenia



- Herbivorous auatic animals
- Hind limgs absent.
- Pinnae absent.
- A **ransverse fin** on tail
- Big **tusk** in male.

e.g.

- ***Ryhytina*** - Sea cow.
- ***Trichechus*** - Manatee
- ***Halicore*** - Dugong



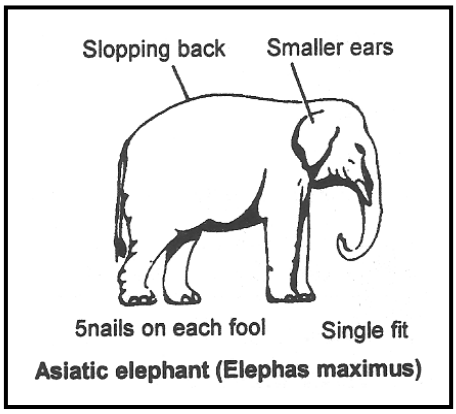
Order (11) : Tubulidentata

- Tubulr mouth, Tongue Slender & Protrusible.

.e.g

- ***Orycteropus -*** Aardvrark - It is found in Aftica

Orde (12) : Proboscidia

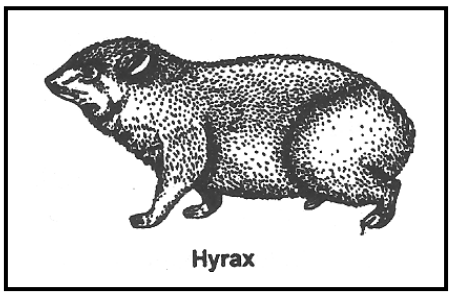


- This order included **largest** and **heaviset** modern **terrestiral** animals.
- **Upper incisors** long, tubular from **tusks.** Canine absent.
- Molar teeth are **lophodont** type.
- `Hair less, Testis found in abdomen.

e.g.

- ***Elephas*** - Indian elephant
- ***Loxodonta*** - Aftican elephant, it is **lrgest living land animals.**

Order (13) : Hyracoidea



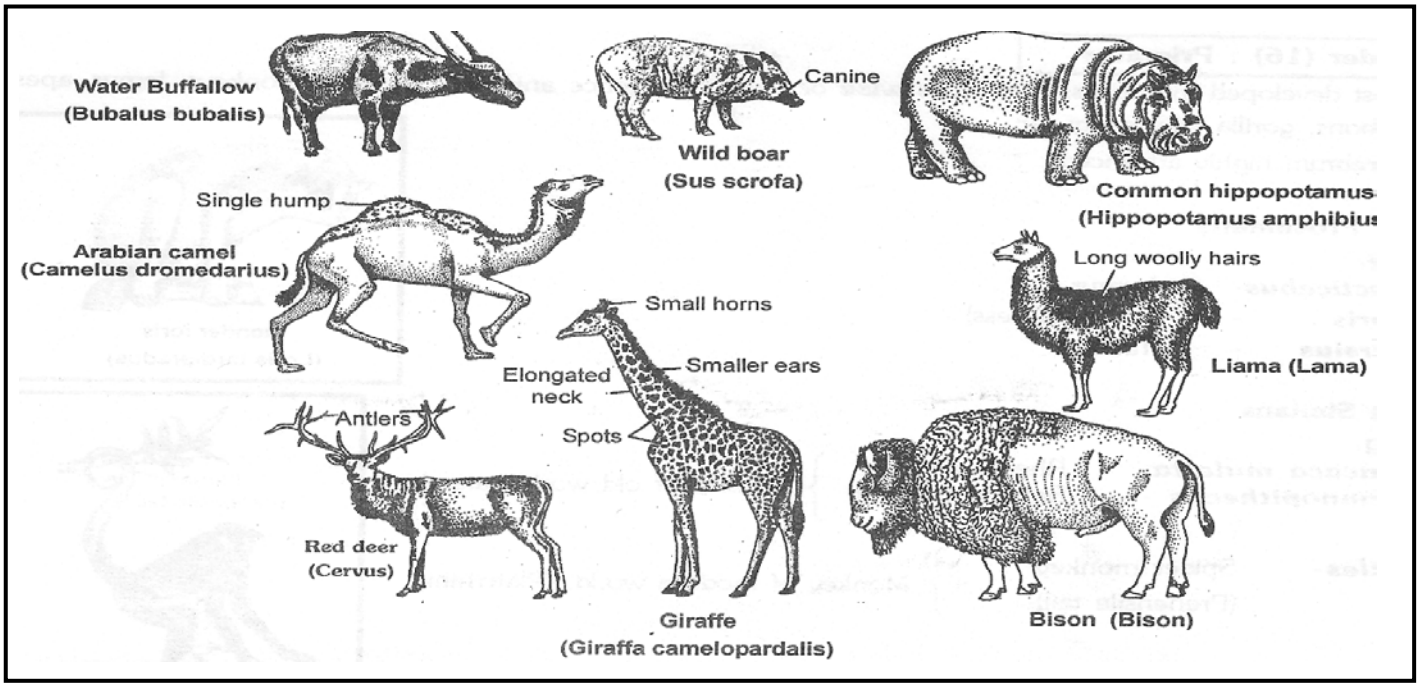
- Small herbivore animals like rabbit
- **Plantigrade** animals

e.g.

- ***Hyra*** - It is found in Asia and Africa.

Order (14) : Artiodactyla

- Stomach is four chambered, it helps these animals in **rumination** (Cud-chewing). All animals are Ruminent except pig and Hippopotmus [Nonruminent]. **Even toed ungulate** animals.

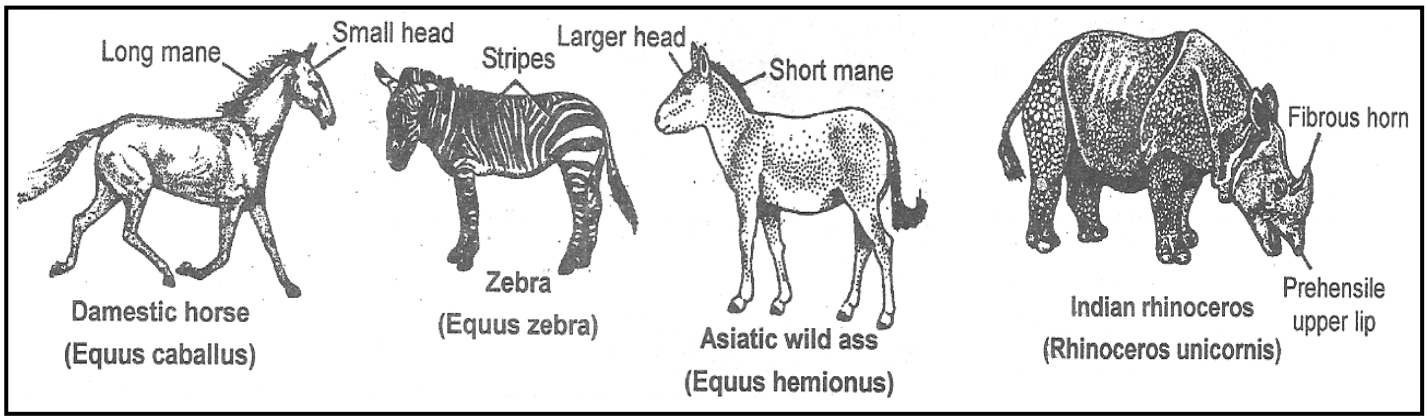


e.g.

- ***Bos indicus*** - Cow
- ***Bubalus bubalus*** - Buffalow
- ***Camelus*** - Camel [RBC nucleated]
- ***Sus*** - Pig
- ***Capra*** - Goat
- ***Ovis*** - Sheep
- ***Bos mutus/Peophagus*** - Yak
- ***Cervus*** - Dear
- ***Cameloparadelis*** - Girrafe
- ***Moschus moschiferus*** - Musk dear (Smallest RBC)

Order (15) : Perisodactyla

- Limbs long, which have 1 or 3 digits with hooves. These are fast runners.
- Odd toed animals

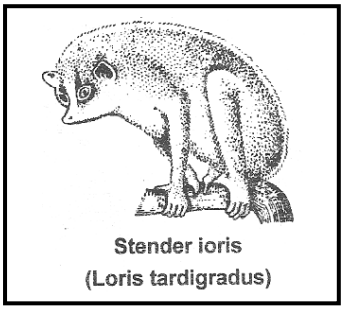


e.g.

- ***Equus caballus*** - Horse
- ***Equus asinus*** - Donkey
- ***Equus hemionus*** - Indian Donkey
- ***Equus zebra*** - Zebra
- ***Rhinoceros unicornis*** - Rhino - Single horn Genda. It is found in Kariranga National Park Jorhat, Assam Rhino posses keratin hornoversnout.

Order (16) : Primates

- Most develeped mammals. It incldues **wise** or msto intelligence animals e.g. man, monkeys, lemur, apes, gibbons, gorilla chimpangi etc.
- Cerebrum highly advanced.


Stender ioris
(Loris tardigradus)

(a) Prosimians
e.g.

- ***Nycticebus*** - Lemur
- ***Lors*** - Loris (tail less)
- ***Tarsius*** - Tarsir

(b) Simians
e.g.

- ***Macaca mulalta*** - Rhesus monkey
- ***Semnopithecus*** - Baboon (Langur)

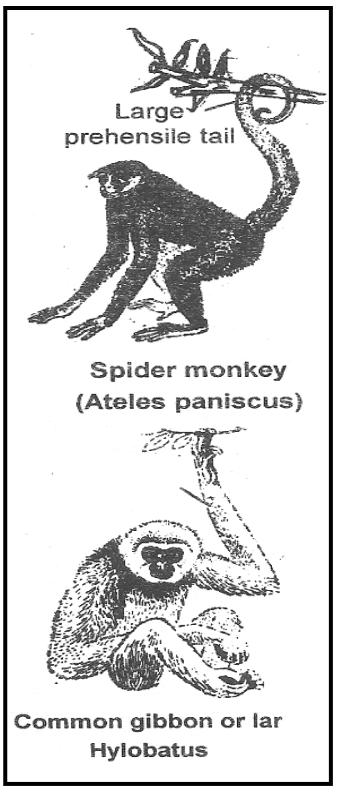
} Moneky of old world catarrhini)

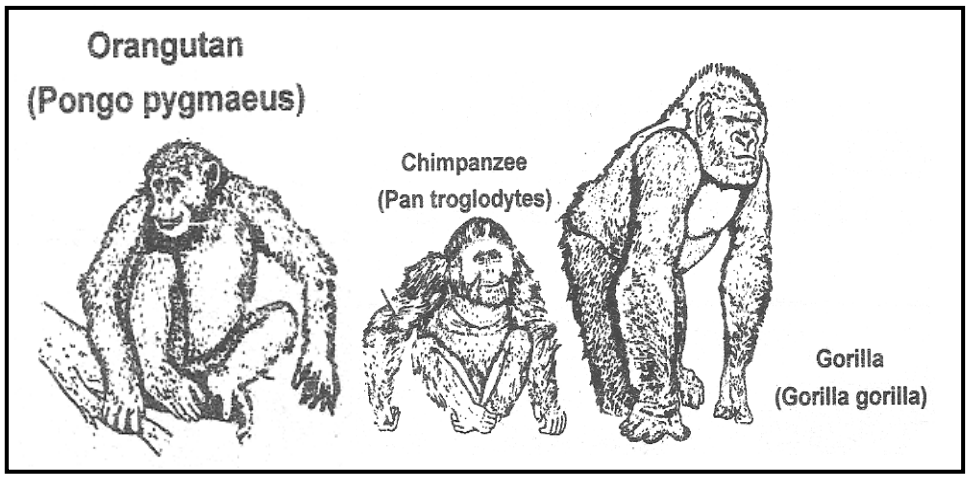
- ***Atles*** - Spider money (Prechensile tail)

} Money of modern worl (Platrrhini)

- ***Hylotbates*** - Gibbon - smallest ape. (found in India) Only ape found india -Hoolock gibben
- ***Gorila*** - Largest ape.
- ***Pan chimpanze*** - Most intelligent in apes.
- ***Oranguttan*** - Man of forest (found in Indonesia)
- ***Homo Sapiens*** - Man

} Ape





REVIEW

Mammalis (mammals) : Skin with sweat and milk glands, and with hairy coat that conserves body heat, four limbs having digits armed with claws, nails or hoofs, buccal cavity with thecodont, heterdonot, diphyodont teeth, spongy elstic lungs, heart 4 chamered, erebral hemispheres connected rogether bo corpus classosum, optic lobes divided into four corpora quadrigemina, external ear often with pinna, males with copulatory orans, eggs amminoitc, fertiliztion internal, no larval stage, viviparrou, diaphargm betweeen thorax and abdomen, endothermic.