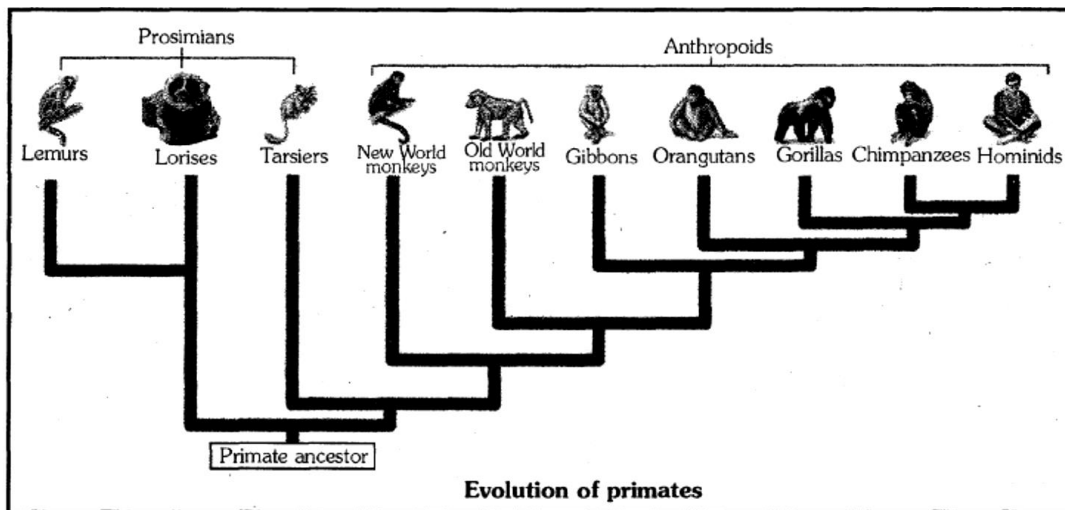


## EVOLUTION

### ORIGIN AND EVOLUTION OF MAN

#### INTRODUCTION OF HUMAN EVOLUTION

- Human is a member of order Primata of class Mammalia.
- First real primate ancestors were tree shrews, originated in palaeocene epoch.



**Monkeys** - 2 types of monkeys:

<b>New world monkeys</b> (South & North America)	<b>Old world monkeys</b> (Africa, Asia)
- Long & prehensile tail	- Long or short, non prehensile tail
- Dental formula $\frac{2133}{2133} = 36$	- Dental formula $\frac{2123}{2123} = 32$
- Mestruation cycle in female - absent eg: Spider monkey	- Menstruation cycle in female - present eg: Rhesus (Macaca), Baboon
<b>Hence, old world monkeys are closer to human.</b>	

#### EVIDENCES FOR COMMON ORIGIN OF HUMAN & APES:

##### (1) Chromosomal similarities:-

- Banding pattern of chromosome no. 3 & 6 of human and chimpanzee is 100% similar.
- Number of chromosomes are approx same in human (46) and apes (48).

- DNA content and DNA matching is same in both. This similarity is more than 99% with chimpanzee, 94% with Gibbon, 88% with Rhesus monkey.

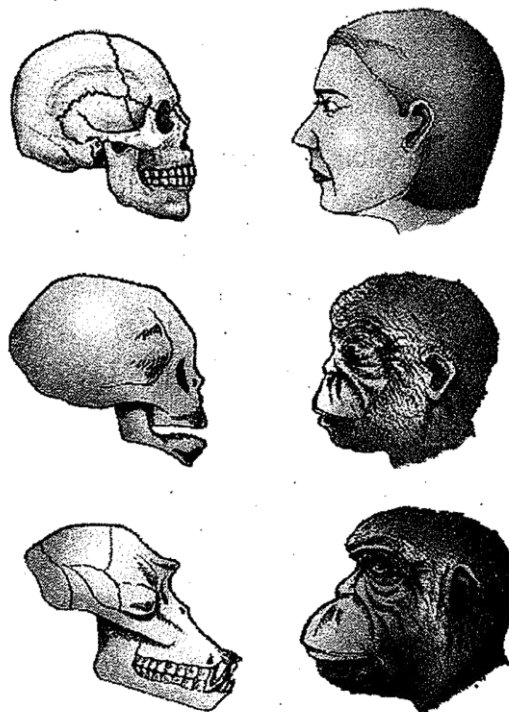
(2) The skull of baby chimpanzee is more like adult human skull than adult chimpanzee skull.

(3) Composition of Hb is same in both. Only one amino acid is different in human and gorilla.

(4) Blood group of AB series is present in both and plasma protein is also same.

(5) Menstruation cycle is present in females of both.

(6) Tail is absent in both and have grasping hands.



A comparison of the skulls of adult modern human being, baby chimpanzee and adult chimpanzee

#### DIFFERENCES BETWEEN HUMAN AND APES:

Apes	Human
1. Semi erect posture	1. Complete erect posture with bipedal locomotion
2. Thick growth of hair on whole body	2. Thick growth of hair only on certain parts of body
3. Less cranial capacity (450cc) & less intelligent	3. More cranial capacity {1300-1600 cc} & more intelligent
4. Forelimbs longer than hind limbs	4. Forelimbs shorter than hind limbs
5. 'U' shaped jaw & chin absent	5. Semicircular jaw & chin present
6. Thumb is parallel to palm	6. Thumb is opposable

**HUMAN EVOLUTION:**

**(A) ape Fossils** – About 15 mya, primates called Dryopithecus and Ramapithecus were existing. They were hairy and walked like gorillas and chimpanzees.

**(1) Proconsul/ Dryopithecus:**

- It is considered as common ancestor of man and apes.
- Dryopithecus is considered as direct ancestors of modern day apes.
- They had semi erect posture, thick hair, U shaped jaws, larger and sharper teeth and were vegetarian.
- They walked on four legs and their forelimbs were longer than hind limbs.
- They were forest dwellers and spent most of the time on the trees.

**(2) Ramapithecus** - Fossils discovered from Shivalik hills in India.

**(3) Shivapithecus** - Fossils discovered from Shivalik hills in India.

**(4) Kenyapithecus** - Fossils discovered from Kenya.

- They are considered as ancestors of human, similar in characteristics to Dryopithecus, but spent most of the time on the land.
- Ramapithecus was more man-like while Dryopithecus was more ape-like.

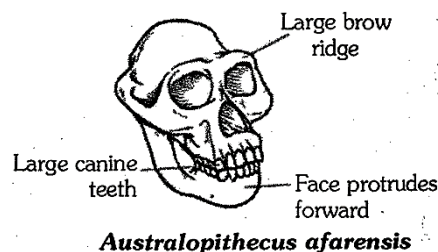
**(B) Ape man fossils – Australopithecus**

- Prof. Raymond Dart discovered a fossil of skull of 5-6 years old baby from the Pliocene rocks of Tuang region (S. Africa) and named it Tuang baby. Later he renamed it as A. africanus (African apeman).
- 2 mya. Australopithecines probably lived in East African grasslands.
- Evidence shows they hunted with stone weapons but essentially ate fruit.

It is also considered as connecting link between apes and man .

(i) **Ape like characters:**

- Less cranial capacity (600 c.c.)
- Thick growth of hair
- U shaped jaw (prognathous face)
- Larger and sharper teeth



(ii) **Man like characters:**

- Complete erect posture and Bipedal locomotion (first man who stood erect)
- Forelimbs shorter than hind limbs
- Vertebral column with distinct lumbar curve

Few fossils of man-like bones have been discovered in Ethiopia and Tanzania. These revealed hominid features leading to the belief that about 3-4 mya, man-like primates walked in eastern Africa. They were probably not taller than 4 feet but walked up right.

**(C) Prehistoric Man**

A number of other species of Homo appeared and became extinct from time to time on the evolutionary scene before the origin of Homo sapiens. These extinct species are called as prehistoric species of man.

(i) **Homo habilis:**

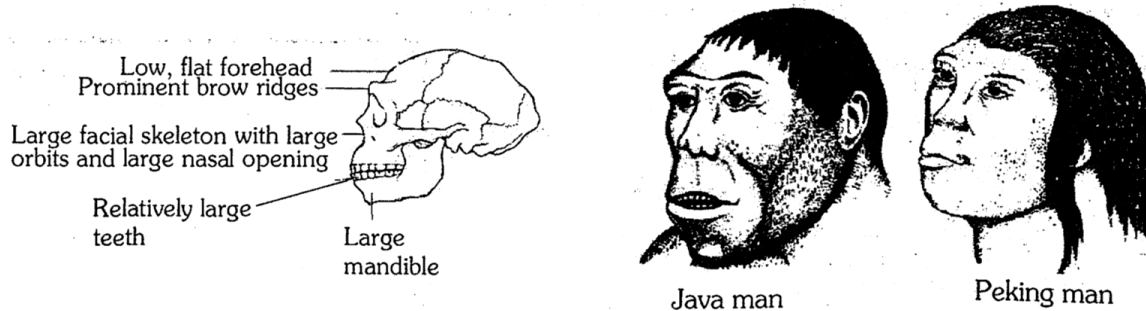
- First human like being
- First man who made tools of stones for hunting animals, hence called as first tool maker man or Handy man.
- They probably did not eat meat.
- The brain capacities were between 650-800cc.
- Its fossils were discovered by Dr. Leakey from 2 million years old rocks in Africa.
- They lived in caves.

**(2) Homo erectus:**

- They existed about 1.5 million years ago.
- They had large brain with a cranial capacity around 900cc.
- They were cave dwellers and probably ate meat.
- Many subspecies are discovered of Homo erectus as given below

**(a) Java man (*Homo erectus erectus*/ *Pithecanthropus erectus*):**

- Its fossils discovered in Java in 1891.
- First man who used fire for hunting, protection and cooking.
- They used tools of bones and stones.
- Their cranial capacity was 800 - 1000cc (avg. 900cc)
- They were omnivorous and cannibalism have also found.

**(b) Peking man (*Homo erectus pekinensis*/*Sinanthropus erectus*):**

- W.C. Pei discovered the fossils from China.
- They used fire for cooking meat and protection.
- They used sharp chisel shaped tools of stones/bones for cutting and killing animals.
- Their cranial capacity was 850-1300cc (avg. 1050cc)
- They were omnivorous and cannibalism have also found.

**(c) Heidelberg man:**

- Its fossil was recovered in form of lower jaw from Heidelberg in Germany.
- It is believed that this man was evolved as a branch from main line of evolution and got extinct after some time.

**(3) Homo sapiens:**

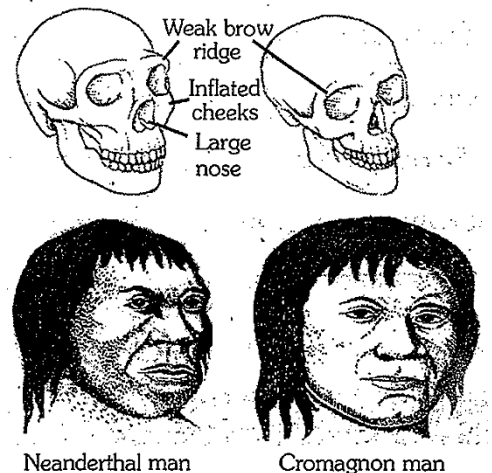
- Many subspecies are discovered of Homo sapiens as given below

**(a) Neanderthal man (Homo sapiens neanderthalensis):**

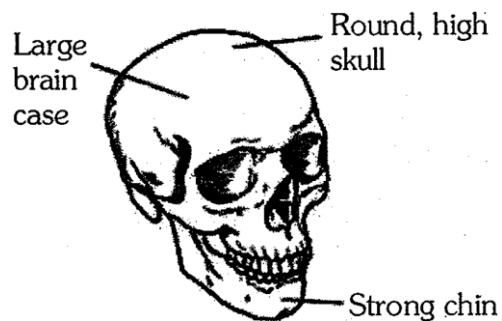
- They lived near east and central Asia between 1,00,000 - 40,000 years back, fossil was discovered by Fuhlrott in Neanderthal valley of Germany.
- They had a brain size of 1400cc (same as modern man).
- They used hides (skin of animals) to protect their body.
- They buried their dead and probably believed in immortality of soul.
- They lived in huts and omnivorous by nature.
- Development of speech centre and language started.

**(b) Cromagnon man (Homo sapiens fossilis):**

- Origin and evolution 50,000 to 10,000 years ago.
- Fossils discovered by Mac Gregor from Cromagnon rocks of France.
- They had a cranial capacity of 1650 c.c. (maximum)
- They lived in caves and Omnivorous by nature.
- They had larger forehead and well developed chin.
- Semi circular jaw and orthognathous face.
- Speech and language centre were well developed in them.
- They wore clothes of animal skin.
- This man was hunter and used domesticated dogs in hunting, Hence domestication was started by this man.
- They also painted beautiful paintings on cave walls. Pre-historic cave 'art developed about 18.000 years ago. Such cave painting by prehistoric man of can be seen at Bhimbetka rock shelter in Raisen district of Madhya Pradesh.

**(c) Modern man (Homo sapiens sapiens):**

- During ice age between 75.000-10.000 years ago modern Homo sapiens arose.
- It arose in Africa and moved across continents and developed into distinct races (Caucasoid, Negroid, Mongoloid and Australoid).
- This is the man of today having a brain capacity of 1300- 1600 c.c (avg. 1450cc).
- This man has well developed chin, well developed speech centre, smailer forehead and reduced body hair.
- Semi circular jaw and orthognathous face.
- It is omnivorous by nature.
- Agriculture was also started by this man. Agriculture came around 10.000 years back and human settlements started.



**Modern man**