

HUMAN EVOLUTION WITH SPECIAL REFERENCE TO UNIQUE HOMININE CHARACTERISTICS

According to Aristotle, man is a political animal. He observed that “Of all animals, man has the largest brain in proportion to his size.” In 1555, Belon compared human skeleton with that of a bird and identified the homologous bones. In 1699, Tyson found 48 traits in common with man and chimpanzee, in contrast to 14 traits in common with monkeys. In 1863, T.H.Huxley produced *Man’s place in nature* – a thorough analysis of all available data that led him to conclude that man differs less from the chimpanzee or the orang, than these do even from the monkeys. The discovery of remarkable similarities in body structure between man and animals need not hide the existence of importance differences (Dobzhansky et al., 1976).

Human evolution is a combination of biological and cultural evolutions. Some unique attributes are seen in human evolution, which are not found in other animals. Man can achieve his destiny; he can control his environment upto certain extent, in which he lives; he has the ability to think, remember, and imagine; he has the ability to talk and work with others to achieve a better way of life.

Systematic Position

Phylum- Chordata
Sub phylum- Vertebrata
Class- Mammalia
Order- Primates
Sub order- Anthropoidea
Family- Hominidae
Sub family- Homininae
Genus- *Homo*
Species- *sapiens*

Unique Hominin characteristics contrasted with Primate characteristic

The word Primate is derived from Latin “Prime” that that means “first rank”. It is a mammalian order that commonly includes human, apes, monkeys and prosimians like lemur, tarsier, potto and loris. Primates arose from ancestors that lived in the trees of tropical forests. Most primate species remain at least partly arboreal (except human) in the tropical or subtropical regions of the Asia, Africa and North and South America. They range in size from Berthe’s mouse lemur (smallest primate with length 3.6” & weighs only 30 g), to the eastern Gorilla (largest primate with average body height 6.5’ & weighing over 150 kg).

Important features of Primates

- Almost all living primates have prehensile (grasping) hands and feet, and most have five digits on these appendages, including opposable thumbs & tendency to hold body upright.
- Primates have particularly flexible and long shoulders [to have over arm movement, ideal for swinging, climbing] and hip joints [allowing greater range of motion in legs].

- Highly developed brain with expanded cerebrum (larger brain/body ratio than other mammal).
- Excellent eye-hand coordination and stereoscopic (binocular) vision.
- Each digit has a flat nail instead of a claw (pointed horny nail).

Different Groups of Primates

The primate order is divided into two suborders:

- I. Prosimii - prosimians, or lower primates - include the lemurs, lorises, tarsiers, and tree shrews
- II. Anthroidea – simians /anthropoids, or higher primates include monkeys, apes and humans

It has two superfamilies: Cercopithecoidea & Hominoidea. The Hominoidea consist of two families:

- family Hylobatidae - gibbons and siamangs;
- family Hominidae - men, chimpanzees, gorillas and orangutans

The members of family Hominidae (also known as hominids) have two sub family:

- **Subfamily Ponginae** - Orangutans
- **Subfamily Homininae** -African apes and **humans**

There are three tribes:

- Gorillini-containing the gorillas
- Panini- containing the chimpanzees and bonobos
- Hominini- containing the “hominins,” or humans and their extinct ancestors.

Several features that distinguish Hominidae from other hominoids

1. **Bipedalism with upright posture** - Pelvis is shorter, broader, bowl shaped and spinal column have been modified for an erect posture with bipedal mode of walking. Arms are relatively short and weak compared to legs. Thus, the hand are free from non-locomotory structure, rather making and using tools.
2. **Change in toe structure** - Feet no longer have the ability to grasp objects effectively because the toes became shorter and the big toe moved up into line with the others; rather have lengthened and acquired an arch, making them better body supports.
3. **Brain development** – Cranium is large that accommodates highly developed brain
4. **Changes in mouth** – Chin is distinct. The jaw and teeth size got smaller. Many factors such as the foods eaten and the processing of foods by fire and tools have affected this evolution course.
5. The largely hairless human body with its abundance of sweat glands allows to remain cooler.
6. Humans have 46 chromosomes in their cells.
7. Steep & highbrow.
8. Distinct crest between nose & lips.
9. Speech power.
10. Breast and external genitalia are large.

Trend in human evolution

- Descendent to the ground from tree (arboreal to terrestrial life)
- Opposability of great toe in hind limbs lost
- Development of erect or upright posture (through forward bending of vertebral column in lumber region, known as lumber curve)
- Bipedal locomotion
- Development of basin like pelvic girdle due to broadening of ilium
- Development of chin and disappearance of simian shelf i.e. a bony thickening on the front of the mandible
- Reduction in size of canine & incisors
- Increase in size & complexity of brain with development of intelligence
- Increased volume of cranium & shifting of foramen magnum
- Use of forelimbs for non-locomotory purpose like manipulation & manufacture of tools

N.B.- According to Moody (1970), increasing size of the brain played an important role or moving force in evolution of man, triggered by the freeing of hands.

Important facts of human evolution as seen in the fossil record

- Man evolved by gradual evolution, as per Darwin's view.
- Origin was East Africa.
- Human evolution started 15 millions years ago but man appeared only 3 millions years ago.
- Man originated from ancient apes (ancestors).
- Change of habitat, bipedalism through loss, change or development of related structures, erect posture, change in mouth, increase in size of brain & intelligence and tool using are the major changes during evolution of man.

Main stages in origin of man

There are FOUR main stages namely ape stage, ape man, primitive man & modern man.

1. In the ape stage, the ancestor lived 30 million years ago. They were tailless, arboreal primates. According to Simpson (1967), the primitive one was *Propliopithecus*. It gave rise to *Aegyptopithecus*, followed by *Dryopithecus*.
2. Ape man stage includes three important ape men namely: *Ramapithecus*, *Kenyapithecus* and *Australopithecus*. The latter was the connecting link between apes & primitive men and lived upto 2 to 5 million years ago. It was terrestrial, walking with erect posture, used simple stone tools but not fire.

3. Then came the primitive man. Human originated as 'man' at this stage, i.e. these were the first true men. They form a connecting link between *Australopithecus* and modern man. These men were cave dwellers, hunters and used fire & varieties of tools. Speech & social activities were there. *Australopithecus* gave rise to *Homo habilis*. From *Homo habilis* (Handy man), descendants like *Homo erectus* (Java and Peking men), *H. rhodesiensis* (Rhodesian man), *H. soloensis* (Solo man), *H. hiedelbergensis* (Heidelberg man) and *H. neanderthalensis* (Neanderthal man) were formed. The last one was the advanced primitive man. It lived in Europe & became extinct 25,000 years ago.
4. Modern man includes existing and also some extinct men. They appeared 3 million years ago & originated in Asia around Caspian sea. Modern man belongs to the species *Homo sapiens* (Knowing man). Cro-Magnon man was known as *Homo sapiens fossilis*. It was the extinct modern man who originated about 3 MYA and became extinct 20,000 years ago. It was of the Old stone age man.

Remark: Modern existing man is *H. sapiens sapiens*. There are 4 basic stocks known as Australian black (most primitive), Caucasoid (white man), Negroids (Negros) & Mongoloids (Asiatic & American Indians). These stocks are mixing now (age of assimilation)