Heredity and evolution

Evidences of Evolution

❖ Morphological evidences of evolution:

Homologous organs:

- The term **homologous** mean the organs of different species that are related to each other through common descent, although now functionally different. Homologous structures in different organisms are inherited from a common ancestor.
- Vertebrate forelimbs contain the same sets of bones organised in similar ways, despite their dissimilar functions. One can observe that the forearms of human, the wings of bat, the flippers of whales and the forelimbs of other verterbrates all are formed of the same basic skeletal elements. Even they have a common structural plan. All of them contain bones named as humerus, radius, ulna, carpals, metacarpals and phalanges. Also, all the bones are derived from the same part of the body.

Analogous organs:

The converse of homologous organs is **analogous organs**. They are similar in function but are anatomically different and unrelated. For example, the wings of birds and the wings of butterfly, both of which are used for flying, are completely different in their anatomical framework. Neither do they have similar origin nor they have evolved from the same organ in aommon ancestor. The flippers of penguin (bird) and dolphin (mammal), which perform similar functions in these aquatic animals, have originated from different structures of two different lineages.

Vestigial organs:

Those organs which have no longer function are known as vestigial organs. These organs have reduced structurally as well as functionally.

It appears that these organs were well developed in ancestors but due to their reduced or less use they became functionless.

There are many vestigial organs in human body.

e.g. • Vermiform appendix in man • External ear in man. • Nictitating membrane • Wisdom tooth

❖ **Comparative Paleontological Evidences:**

From the study of living and fossil primates it has been established that primates including monkey and man has descended from a common ancestor and separated from the main stock of a very early period, Oligocene.

Fossils record of men are very poor and limited in comparison to other mammals. The fossils discovered are no doubt intermediate between apes and man but it was very much doubtful whether they represent direct ancestors of man, although they point outlines of the descent.

Principal fossils forms of man are as follows:

✓ Australopithecus Africanus (African Apen man):

They belonged to lower Pleistocene or Pilocene.

Cranial capacity - 450-650 cc. Existed about 1.5 millions years ago. They showed character of both man and Apes but had advancement of apes.

✓ Java Apes man (Pithecanthropus erectus). Fossils discovered from central Jawa by Eugene Dubois. They belonged to mid Pleistocene.

Cranical capacity - 900 cc

Existed about 1.5-2 million years ago

They showed complete erect posture.

Peking ape man (Sinanthropus pekinensis)

Discovered by W.C. Pai from china.

The fossils belonged to mid pleistocene.

Cranial capacity - 1050 to 1300 cc

Existed 3.6 lakh years ago.

They lived in caves, used fire and primitive stone tool.

Peking ape man closely related to java ape man.

✓ Heidelberg man (Hormo heidelbergensis):

Fossils discovered in Germany.

Cranial capacity - 300 cc

Mandiable was large, tooth raw rounded.

✓ Neanderthan man (Homo neanderthalenesis)

The fossils discovered by C. fulhrott from Neanderthal vally of Germo

Cranial capacity- 1300-1600 cc

They lived pleistocene about 75,000 ye

Lived in Huts and wear cloths of animal skin. Complete erect posture. Semicircular jaw and less developed chin. They was good believed in 'immortality of soul'. They have large head with prominent supraorbital ridge.

- ✓ Cramangnon man (Homo Sapiens Fossils)

  Fossils discovered by Mac Gregor from cromagnon rocks of France.

  Cranial capacity - 1600-1800 cc.

  Existed about - 20,000-50000 years ago.

  They developed culture of very high artistry and craftmanship. They had complete erect posture, large forehead, very developed speech centre, semicircular jaw and well developed chin. They were carnivorous. Cromangon man resembled the modern man.

- ✓ Modern man (Homosapiens Sapiens)- Man of today. Distributed in whole world.

  Origin- app. 2500 years ago before 10-11 thousand years. Cranial capacity - 13600-1600 cc.

  It is believed that modern man evolved in Africa. Agriculture started by them.