

Study of Human Evolution and its Effects on Modern Humans from Ancient Species

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Abstract:- Homo sapiens took so long to evolve from the ancient hominin species. This study shows how humans evolved from ancient species and what changes they adapted as a result of that. Basically what parameters mainly affected the development of the humans are described here. After Homo Sapiens evolved from Hominin species is having some evidence that supports the theory of mating between Homo sapiens and Hominin.

Homo Heidelbergensis, Neanderthal. Gorilla, human, chimpanzees have nuclear mitochondrial DNA on chromosome 5. It will provide the evidence that exchange of genes from Gorilla lineage, resulted in the Pan-Homo split (Pan-paranthropus), and formation of paranthropus and Australopithecus species took place. The shape of Brain also has some changes as a result of evolution. H. sapiens have the brain endocranial shape which resembles an intermediate between H. erectus and Neandertals. Sometimes gene loss mutations in some genes resulted in some huge dietary evolution. Mutations observed in gene TAS2R62, TAS2R64 bitter taste receptor genes and MYH16, AMY1 resulted in some huge dietary changes.

Keywords:- Homo Sapiens, Evolution, Hominin, Human, Darwin, Neanderthal, Mosaic Evolution.

I. INTRODUCTION

The Hominid group includes the creatures without tail, swinging arms and shape of teeth. This group includes both humans and apes. All present and ancient humans are included in the group called hominoid. Humans of this era are included in the group known as Hominids with comparatively large brains and walking capacity. In direction of the end of the time . 6 million years ago the climate went on becoming drier, temperature fell down, ice caps formed. Respect to these climate changes, tropical forests became smaller and formation of grasslands and open woodland took place on a large scale. Due to the reduction of the tropical forest, Hominoids who were living in East Africa got trapped. As an adaptation to cross open

grasslands, They started walking on two feet instead of four feet. This is the critical condition which is considered in which Hominids evolved from Hominoid. This process is called Hominization. Hominization took place in Africa where fossils of early hominids are available. This adaptation of locomotion is known as "bipedalism". "Australopithecines" is the term used for early Hominids. They made use of tools for survival and had large brains. Further evolution in this species resulted in a genus homo called "homo habilis". Homo were further evolved into H. erectus. They had many similarities with modern humans but they were taller than modern humans, though brain size was much smaller. The distinct characteristics of H. erectus were its use of fire and speech. They dispersed in Asia, Europe, southwest Asia, China. In the end of that period, the global climate had changed to a different temperature scale, where cold all the time was not noted. This period is known as the quaternary period. Frequent warm intervals took place. A bigger brain was developed by homo erectus to survive in such climate change. Further evolution took place after H. erectus is Homo sapiens. Highly cooperative and unaggressive Neanderthals interbred with H. sapiens as edible insects were available. This interbreeding resulted in behavioral and neurological differences in modern humans. H. sapiens in the sub-Saharan region didn't undergo any interbreeding. H. heidelbergensis and homo sapiens both interbred because of humidity and established the survival of hominins which are non fire making. One distinct hominid species was discovered on the island of Indonesia known as H. floresiensis with a very small brain. Limited food sources in Flores (island of Indonesia) led to H. erectus developing into smaller body size. Human evolution also was caused by introgression from gorillas. With the help of lineage sorting, 15% of the genes got involved in paranthropus and 15% of genes got involved in Homo. "Ps5" (nuclear mitochondrial DNA segment) was given from gorilla to pan and Homo. By comparing "Ps5" with mitochondrial genome, the time taken for diversion of Ps5 between Pan, Homo, and gorilla and the time period of diversion of mtDNA of gorilla, homo and pan can be determined.

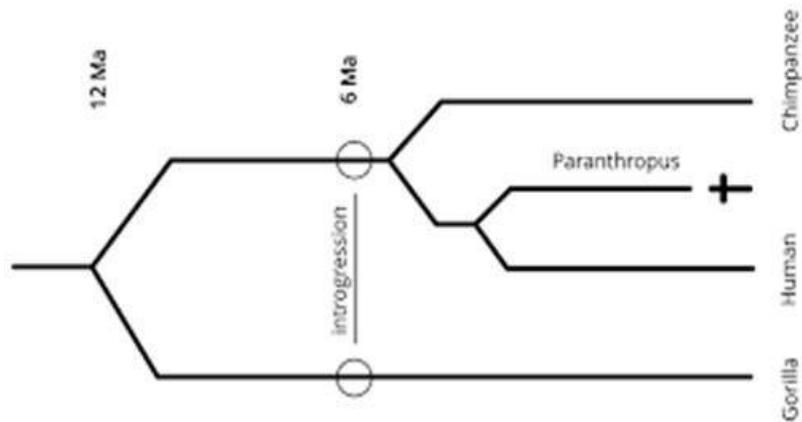


Fig 1:- Phylogenetic tree showing the evolution

Remarkable evolution is known in the brain shape. In direction to the old to developed H.sapiens , The cerebellum becomes more swelled and expanded in area, partial areas swelled, more taller the frontal areas, occipital areas becomes less impeded and turned in rounder shape, side walls came parallel, temporal poles turned anterior-medially and became slender. Globularity took place due to these changes. This data gives information about genes which are important for the behavior and the brain function. Gene which is involved in the development of language and speech is known as FOXP2. This gene is having one amino acid substitution in an intron in the modern human. This substitution affects the regulation of FOXP2 gene by affecting a binding site for transcription factor. It is found polymorphic or not present in Neanderthals.

Apart from that, dietary and phenotypic evolution has also been noticed. MYH16 gene was found in masticatory muscles of non-human primates. As a result of evolution 2 bp deletion in exon 18 occurred and frame shift of the downstream amino acid sequence took place. After evolution, reduced size of muscle type-2 fiber is seen in modern humans. Salivary amylase gene is not observed in the Denisovan and Neanderthal genomes, so the origin of the AMY1 gene was observed in modern humans. Neanderthals and Denisovans used to consume starch rich food for survival and they did not obtain the digestive benefits of increased salivary amylase. In the Neanderthal genome TAS2R38 bitter taste receptor was observed which was sensitive against the PTC(Phenylthiocarbamide). In contrast modern humans have nonsynonymous mutations on 49,262,296 positions of amino acids. These derived haplotypes do not have PTC sensitivity. It is observed in chimpanzees too.

➤ Objective

Proper organization of knowledge involving human evolution and supplementing them with the latest research results.

II. MATERIALS & METHOD

To verify the information regarding the topic PubMed search was conducted which included articles between 2010–2018. Amalgamation of the above key words were used: ‘Homo sapiens’, ‘Evolution’, ‘Hominin’, ‘Human’, ‘Darwin’, ‘Neanderthal’ (key words: Mosaic evolution and Darwin) to verify the information obtained. The complete text of every paper was considered, with specific focus on papers having information regarding human evolution. The main aim for this activity was to provide readers with the knowledge of relevant articles allowing the reader to get updated with the current literature and interpret and conclude.

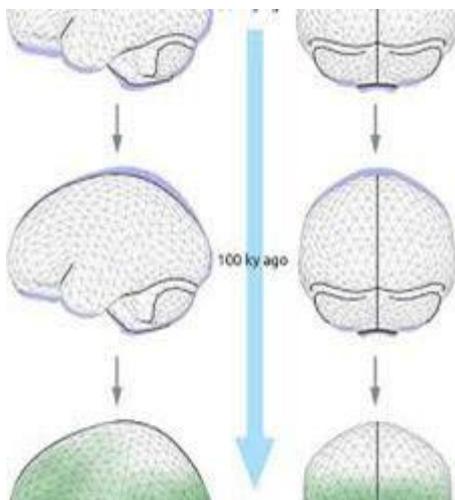
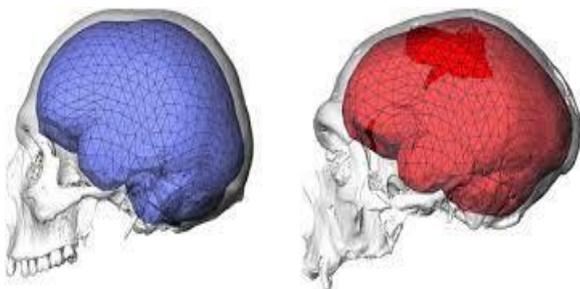


Fig 2:- It shows the development of structure of brain and its size over a period of years

III. RESULTS AND DISCUSSION

Climate changes like reduction of the tropical forests resulted in evolution of Hominids from Hominoid. Interbreeding between H.sapiens and Denisovans resulted in developed ability to survive and live in the mountains. Gene Exchange from Gorilla resulted in human-chimpanzees split. Because of that Pan and homo got diverted. Evolution also resulted in the brain shape of the human. Globularization took place. Size increase which was observed in parietotemporal areas and cerebellar resulted into the endocranial shape changes from geological age group 1 to 2. A recent study shows that the genetic material of Neanderthals exchanged some genes in modern humans that have an impact on the brain and cranial morphology.

IV. CONCLUSION

The claim that was given by Charles Darwin was opposed regarding the 'From where the man originated', that stated that man from some apes-like organism. The scientists who support Darwin have stated that over a span of 5 million years of man's evolution, the evolution took place from one species to another. The evolution of different stages that have evolved one after the other have been discussed in detail. So scientists which have given counter arguments have stated that the stage that came first was the Australopithecus also came to be recognized as South African ape that became extinct a long time back. In depth research was carried out English anatomists stated that it was an ordinary species that went out of existence and did not have any resemblance to humans. It was followed by the next step in the order of evolution that is Homo, which was further classified into Homo habilis, Homo erectus and Homo sapiens. All the above are believed to be each other's ancestors. Although recent scientific studies carried out on the fossils suggested that Australopithecus, Homo habilis, and Homo erectus were inhabitants at the same time but at different geographical locations. Some groups of Homo erectus were considered to be alive till recent times. The research also suggested that Homo sapiens and Neanderthals lived at the same time and also in the same geographical area.

This same research was backed by one of the scientists as he carried out his studies on Australo-pithecus fossils for around sixteen years of time and came to a conclusion that there was no such family tree which showed that man evolved from ape-like creatures. A 'spectrum of science' was formed by the scientists which showed the sciences that were considered scientific by him to those he considered unscientific were allotted together. Most scientifically precise data-fields are science of chemicals and physics according to him. These are followed by biological sciences and social sciences. Some of the most scientifically irrelevant sciences are found at one of the ends of the spectrum which consists of extra-sensory perception, telepathy, sixth sense and human evolution.

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