

Study of genetics: important for human society



Human genetics describes the study of inheritance as it occurs in human being. Human genetics encompasses a variety of overlapping fields including: classical genetics, cytogenetics, molecular genetics, biochemical genetics, genomics, population genetics, developmental genetics, clinical genetics, and genetic counselling, Genes can be the common factor of the qualities of most human-inherited traits. Study of human genetics can be useful as it can answer questions about human nature, understand the diseases and development of effective disease treatment, and understand genetics of human life.

DNA a partner that is very similar to it but in the nucleus in a human body is half paternal and half maternal. This is because each chromosome in our genome has with genes coding slightly different. One chromosome comes from father and one from mother. They come from the cells with only half the normal number of chromosomes, the ovum and the sperm. When the sperm and the egg join one cell is produced which, has both partners in each pairs, one from the father and one from the mother. This means that both the parents contribute same DNA in the nucleus. This is not true in males because the chromosomes which comes from father significantly shorter that the chromosomes that comes from the mother. That means in boys the mother has contributed more DNA in the nucleus. The mitochondria in a cell contains mitochondrial DNA. The mitochondria in the sperm cell that power its motion are in the mid piece which drops of once the head of sperm has penetrated the ovum, this means that all the mitochondria and mitochondrial DNA comes from the mother ovum. So I agree with the statement that the child inherits more from the mother than father.

PART-B

Scientists have always been interested in exploring human evolution. Why is needed to study human evolution?

ANS:-

Human evolution, or anthropogenesis, is the origin and evolution of Homo sapiens as a distinct species from other hominids, great apes and placental mammals. The study of human evolution encompasses many scientific disciplines, including physical anthropology, primatology, archaeology, linguistics and genetics.

The term “ human” in the context of human evolution refers to the genus Homo, but studies of human evolution usually include other hominids, such as the Australopithecines, from which the genus Homo had diverged by about 2. 3 to 2. 4 million years ago in Africa. Scientists have estimated that humans branched off from their common ancestor with chimpanzees about 5-7 million years ago. Several species and subspecies of Homo evolved and are now extinct. These include homo erectus, which inhabited Asia, and Homo sapiens neanderthalensis, which inhabited Europe. Archaic Homo sapiens evolved between 400, 000 and 250, 000 years ago.

Who had discovered the cell? Describe cell theory and give examples of exception of cell theory.

ANS:-

The cell is the functional basic unit of life. It was discovered by Robert Hooke and is the functional unit of all known living organisms. It is the smallest unit

of life that is classified as a living thing, and is often called the building block of life. Some organisms, such as most bacteria, are unicellular. Other organisms, such as humans, are multicellular. Humans have about 100 trillion or 10^{14} cells; a typical cell size is $10\ \mu\text{m}$ and a typical cell mass is 1 nanogram. The largest cells are about $135\ \mu\text{m}$ in the anterior horn in the spinal cord while granule cells in the cerebellum, the smallest, can be some $4\ \mu\text{m}$ and the longest cell can reach from the toe to the lower brain stem. The largest known cells are unfertilised ostrich egg cells which weigh 3.3 pounds.

The cell theory, first developed in 1839 by Matthias Jakob Schleiden and Theodor Schwann, states that all organisms are composed of one or more cells, that all cells come from preexisting cells, that vital functions of an organism occur within cells, and that all cells contain the hereditary information necessary for regulating cell functions and for transmitting information to the next generation of cells.

Cell theory refers to the idea that cells are the basic unit of structure in every living thing. Development of this theory during the mid 17th century was made possible by advances in microscopy. This theory is one of the foundations of biology. The theory says that new cells are formed from other existing cells, and that the cell is a fundamental unit of structure, function and organization in all living organism.

Exception

1)viruses are considered alive by some, yet they are not made up of cell. viruses have many features of life, but by the cell theory it is not alive.

2)the first cell did not originate from pre-existing cell. there was no exact first cell since the definition of cell is imprisice.

3)Mitrochondria and Chloroplasts have their own genetic material and reproduce independently from rest of the cell.

Theory of evolution is considered as unifying theory of biology. Why?

ANS:-

Evolution is the change in the inherited traits of a population of organisms through successive generations. This change results from interactions between processes that introduce variation into a population, and other processes that remove it. As a result, variants with particular traits become more, or less, common. A trait is a particular characteristic-anatomical, biochemical or behavioural-that is the result of gene-environment interaction.

The main source of variation is mutation, which introduces genetic changes. These changes are heritable, and may give rise to alternative traits in organisms. Another source of variation is genetic recombination, which shuffles the genes into new combinations which can result in organisms exhibiting different traits. Under certain circumstances, variation can also be increased by the transfer of genes between species, and by the extremely rare, but significant, wholesale incorporation of genomes through endosymbiosis.

Two main processes cause variants to become more common or rarer in a population. One is natural selection, through which traits that aid survival and reproduction become more common, while traits that hinder survival and reproduction become rarer. Natural selection occurs because only a small proportion of individuals in each generation will survive and reproduce, since resources are limited and organisms produce many more offspring than their environment can support. Over many generations, heritable variation in traits is filtered by natural selection and the beneficial changes are successively retained through differential survival and reproduction. This iterative process adjusts traits so they become better suited to an organism's environment: these adjustments are called adaptations.