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What is the Molecular Basis of Inheritance?

Molecular basis of inheritance is the study of genes, hereditary and genetic variations which explains how an offspring looks similar to its maternal or paternal features. DNA, RNA and genetic code are the fundamental parts of the molecular basis of inheritance and are responsible to transmit genes from parents to the offspring.

Various traits get inherited from one generation to another generation where variations also come into picture due to recombination. With lots of research and studies, it is found out that the genetic material of most of the organisms is called DNA (DeoxyriboNucleic Acid) and it is responsible for the transfer of traits from one to another. Exceptions are the viruses where RNA is the genetic material.

Molecular Basis of Inheritance Notes

It's often complicated to find appropriate notes for this topic; Worry not! Here, we give you a brief understanding of the basics related to molecular inheritance.

Why is DNA Important in the Molecular Basis of Inheritance?

If we see a cell under a microscope, we can see a nucleus which is the region containing all genetic materials. The nucleus contains nucleolus and chromatin which are thread-like structures. Chromatin condenses to form chromosomes located with genes. Each chromosome has thousands of genes and each gene points to a particular trait. The number of chromosomes inside each cell of living organisms is fixed, for example, humans have 23 pairs of homologous chromosomes i.e. 46 in number. On the other hand, the number

of genes in each chromosome is huge, up to thousands. In varied species, chromosome number may be different.

A Gene is made up of a double-stranded structure called DNA; different portions of DNA are responsible for different traits like skin colour, hair colour, eye colour, etc. This explains that DNA is highly responsible for molecular inheritance.

Nucleic Acids

A group of biomolecules contains two kinds of nucleic acids including DNA and RNA that play very important roles in molecular inheritance.

DNA is Deoxyribonucleic acid and double-stranded helical structure, ribbon-like wrapped around each other. It is a polynucleotide or polymer (small molecules- many monomers combine to form polymers). Here, the monomer units are deoxyribonucleotides and the length of DNA is determined by the number of nucleotides.

RNA is Ribonucleic acid and its structure is similar to DNA structure but consists of a single strand. It is a polymer or polynucleotide, formed by several monomer units called ribonucleotides. RNA is the molecular basis of inheritance in a few viruses.