

FUNCTIONS

- (1.) **SOURCE OF ENERGY:** Proteins are large, complex molecules that play many critical roles in the body. Proteins are primarily used in the body to build, maintain and repair body tissues. When protein intake is greater than that required by the body for this primary function, excessive protein is converted to energy and stored in the body as fat. Protein is vital in the maintenance of body tissue including development and repair.
- (2.) **ENZYMES:** They are proteins that act as biological catalysts, that accelerate chemical reactions.
- (3.) **STRUCTURE and MECHANICS:** Structural proteins like collagen and elastin 'provide support in our body'.
- (4.) **CONTRACTILE PROTEINS:** They are present in the muscles and help with movement. Eg- Myosin and Actin.

NUCLEIC ACIDS

Nucleic acids are the biopolymers or large biomolecules, essential to all known forms of life. The term nucleic acid is the overall name for DNA and RNA. They are composed of nucleotides, which are the monomers made of three components: a 5-carbon sugar, a phosphate group and a nitrogenous base. If the sugar is a ribose, the polymer is RNA (Ribonucleic acid) and if the sugar is derived from ribose as deoxyribose, then the polymer is DNA (Deoxyribonucleic acid). Nucleic acids are the most important of all biomolecules. These are found in abundance in all living things, where they function to create, encode and then store information of every living cell of every life-form organism on Earth.

DNA

Deoxyribonucleic acid (DNA) is a nucleic acid containing the genetic instructions used in the development and functioning of all known living organisms.

STRUCTURE

DNA is a helically twisted (double) chain polydeoxyribonucleotide macromolecule which in prokaryotes occurs in nucleoid and plasmid while in eukaryotes, occurs in chromatin of nucleus and mitochondria. It has 2 complimentary strands, coiled spirally like a spiral staircase. A deoxyribonucleotide is formed by linking of 3 chemicals:

- * Phosphoric acid (H_3PO_4)
- * Deoxyribose sugar ($C_5H_{10}O_4$)
- * Nitrogen bases (Adenine, Guanine, Thymine and Cytosine)

RNA

Ribonucleic acid (RNA) functions in converting genetic information from genes into the amino acid sequences of proteins. The 3 universal types of RNA are — mRNA (Messenger RNA), tRNA (Transfer RNA) and rRNA (Ribosomal RNA)

STRUCTURE

RNA is a single stranded chain formed by polymerisation of ribonucleotides. The polynucleotide is characterised by * Ribose sugar and * Uracil (instead of thymine)

A phosphate group is attached to the 3' end of one ribose and 5' position of the next. The phosphate groups are negatively charged, making each RNA a charged molecule (polyanion).

UNIQUE NATURE

DNA is a molecule that contains the biological instructions that makes each species unique. DNA, along with the instructions it contains, is passed from adult organisms to their offspring. This is due to the unique property of DNA to self replicate to make identical copies of itself. Only one of the strands takes part. The strand which functions as a template is known as the anti-sense strand. Its complimentary strand is the sense strand. This strand carries the genetic information but is non-template. During meiosis, chromosomal crossover occurs which results in genetic recombination. This produces new combination of genes, which increases the efficiency of natural selection.

IMPORTANCE

- * **ROLE OF DNA:** DNA is the blueprint of all inherited characteristics in living things. It is transcribed and translated to make proteins essential for life. Any sort of changes in the DNA sequence can lead to changes in proteins and thus changes in traits that these proteins control. This leads to microevolution of species. Scientists have been able to map out entire genomes of many species and compare them. By doing so, it is easy to see where they overlap and where they are different. In fact, this makes it possible to estimate when two species diverged off through speciation.

* **ROLE OF RNA:** In accordance with molecular biology, RNA passes information between the DNA of a genome and the proteins expressed within an organism. Therefore, from any evolutionary standpoint, a mutation within the DNA bases results in the alteration of the RNA transcripts, which in turn leads to a direct difference in phenotype.

RNA is also believed to be the first genetic material of life on earth. On the whole, RNA processing expands the possible phenotypes of a given genotype and contributes to the evolution and diversity of life.

BIBLIOGRAPHY

- Google Images
- en.wikipedia.com
- NCERT Class 12 Chemistry Book
- Modern's Class 12 Chemistry Book
- www.slideshare.net
- www.byjus.com
- www.Brainly.in