

## **UNIT -4**

**MOLECULES OF CELL-** All life on Earth is built from four different types of molecules. These four types of molecules are often referred to as the molecules of life.

The four molecules of life are proteins, carbohydrates, lipids and nucleic acids. Each of the four groups is vital for every single organism on Earth. Without any of these four molecules, a cell and organism would not be able to live. All of the four molecules of life are important either structurally or functionally for cells and, in most cases, they are important in both ways.

**Protiens-Proteins** are the first of the molecules of life and they are really the building blocks of life. Proteins are the most common molecules found in cells. If all the water is removed from a cell, proteins make up more than half of the remaining weight.

Protein molecules are involved in a range of aspects of a cell's biology. They come in a huge variety of forms and perform a massive range of functions. They are involved in muscle movement, storage of energy, digestion, immune defence and much more.

The primary structure of a protein is a long chain made of many smaller molecules called amino acids. There are 20 different amino acids that are used to build proteins. The different amino acids can be arranged into trillions of different sequences that each creates a unique protein. The long chain of amino acids twists and folds on itself to produce the final shape of a protein.

**Water-** Water has been used since antiquity as a symbol by which to express devotion and purity. Some cultures, like the ancient Greeks, went as far as to worship gods who were thought to live in and command the waters. Whole cities have been build by considering the location and availability of pure drinking water. The place of gathering was around the wells, which is perhaps the following trend in building fountains in the middle of piazzas.

Traditional and modern medicine have been makings use of the psychological and physiological diverse properties of water, in all forms of hydrotherapy (composite Greek word: hydro, of water and therapy, . We all know of the simple, yet effective, calming qualities of a warm bath or the invigorating qualities of a cold shower. For centuries, numerous healing springs located all around the world have been recognised for their benefits. The famous Belgium spas in the Ardennes is a fine example. Historical records of these cold springs claim 'cures' since the fourteenth century. The hot Californian spas, the healing spas of Loutraki in Greece, the Dalhousie hot springs in the border of South Australia and Northern Territory, Moree in NSW, Hepburn mineral spas in Victoria are just a few examples.

Contrary to the past, our recent developed technological society has become indifferent to this miracle of life. Our natural heritage (rivers, seas and oceans) has been exploited, mistreated and contaminated. The population decline of the marine and riparian life, the appearance of green algae in the rivers and the stench and slime that comes as a result of putrefaction in the water, are clear signs of the depth and extent of disruption that has been caused to this intricate ecosystem (a composite Greek word: eco, home and systema, a combination of things or parts forming a complex or unitary whole). Government bodies and water authorities will have us believe that it is 'safe' and we should not worry about this global alarm. Awareness and action lies entirely upon us, as we need to become our own educators, physicians and innovators. Socrates had once said: "an unexamined life is not worth living....", Jesus took it a step further: "seek, and you shall find.....the truth shall set you free..." So questioning everything and anything that anyone tells you until it makes sense, is of upmost importance. If it is the truth it will feel right, set you free and lead you on the road of discovery and recovery.

**LIPIDS-** A lipid is chemically defined as a substance that is insoluble in water and soluble in alcohol, ether, and chloroform. Lipids are an important component of living cells. Together with carbohydrates and proteins, lipids are the main constituents of plant and animal cells. Cholesterol and triglycerides are lipids.

**Mineral acids-**Commonly used mineral acids are sulphuric acid, hydrochloric acid and nitric acid (they are also known as bench acids). Mineral acids range from superacids (perchloric acid) to very weak (boric acid). Mineral acids tend to be very soluble in water and insoluble in organic solvents.

Mineral acid also known as inorganic acid, which is an acid derived from one or more inorganic compounds. It is a substance that yields hydrogen ions in solution and from which hydrogen may be displaced by a metal to form a salt. Different acids have different formulae. For e.g., the formula for sulfuric acid is  $H_2SO_4$ ; the formula for nitric acid is  $HNO_3$ . But one common thing in all acids is that they always have at least one hydrogen atom in their molecule. All acids react with bases to form salts and water (neutralization). Other properties of acids include a sour taste and the ability to cause certain dyes to undergo a color change. A common example of this is the ability of acids to change litmus paper from blue to red.

**Solubility of Hydrocarbons in water – Mineral Acid System.**The Preparation of d-galacturonic acid from Lemon Pectic acid.

**Vegetable and Mineral acids in the treatment, prevention and remedial of Cholera an other epidemic disorders of the bowels.**

**Simulation by Mineral and Fatty Acids in the barnacle Balanus balanoides.**

**Ensilng of Sugar Cane with Ammonia Molasses and Mineral acids.**

**Characterization of acid Catalytic Domain for Cellulose Hydrolysis and Glucose Degradation.**

**NUCLEIC ACIDS**-Nucleic acids are the biopolymers, or small 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.

Nucleic acids, which are composed of nucleotides, are very large and complex organic molecules that contain the genetic code for that organism. Two closely related types are needed to transmit the genetic information from parent to offspring: DNA and RNA.

**AMINO ACIDS**-Amino acids are organic compounds that combine to form proteins. Amino acids and proteins are the building blocks of life. When proteins are digested or broken down, amino acids are left. The human body uses amino acids to make proteins to help the body: Break down food.

Protein plays a crucial role in almost all biological processes and amino acids are the building blocks of it. A large proportion of our cells, muscles and tissue is made up of amino acids, meaning they carry out many important bodily functions, such as giving cells their structure.

Summary Supplementing with certain essential amino acids may help improve mood, boost exercise performance, prevent muscle loss and promote weight loss.

**BINARY FISSION**-Binary fission ("division in half") is a kind of asexual reproduction. It is the most common form of reproduction in prokaryotes such as bacteria. It occurs in some single-celled Eukaryotes like the Amoeba and the Paramecium. In binary fission DNA replication and segregation occur simultaneously.

The bacterium cell must copy its DNA so the new cells will have DNA. DNA or, deoxyribonucleic acid, has all of the information the bacterium will need to survive, so it is important it gets copied. ...

Each cell is now called a daughter cell and they separate.

Organisms like the amoeba, bacteria, euglena, etc., exhibit binary fission. During multiple fission, organism divides itself into numerous daughter cells. Examples of multiple fission are sporozoans and algae.

Prokaryotes, such as bacteria, propagate by binary fission. For unicellular organisms, cell division is the only method used to produce new individuals. In both prokaryotic and eukaryotic cells, the outcome of cell reproduction is a pair of daughter cells that are genetically identical to the parent cell.

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