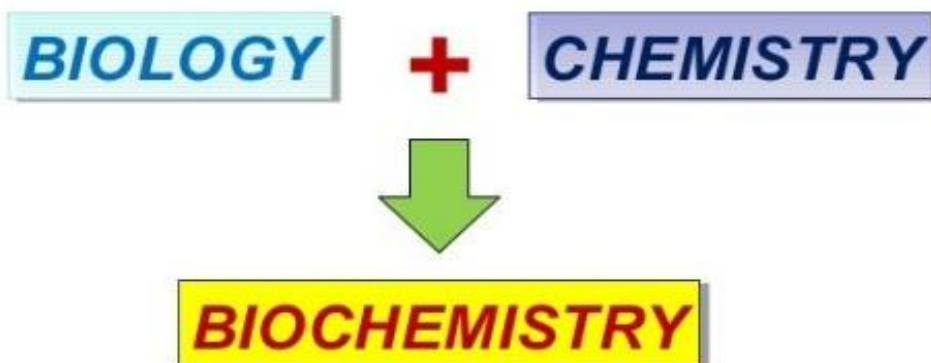


Overview of Biochemistry

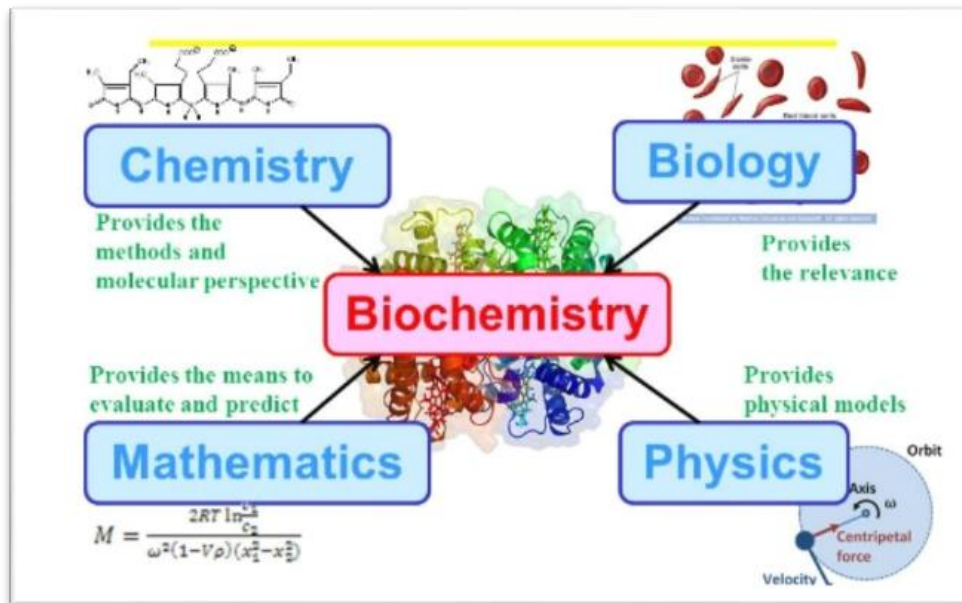
Biochemistry is the study of the structure, composition and chemical reactions of substances in living systems



Note:- The term “Biochemistry” was first introduced by German chemist Carl Neuberg in 1903 from Greek word “bios” means “life”.

Biochemistry:

- Biochemistry is a basic science which deals with chemical nature and chemical behavior of living matter and with the reactions and processes they undergo.
- Biochemistry is used to learn about the biological processes which take place in cells and organisms.



Biochemistry involves the study of:

- Chemical constituents of living matter.
- Chemical changes which occur in the organism during digestion, absorption and excretion.
- Chemical changes which occur during growth and multiplication of the organism.
- Transformation of one form of chemical constituent to the other.
- Energy changes involved in such transformation.

Scopes of clinical biochemistry:

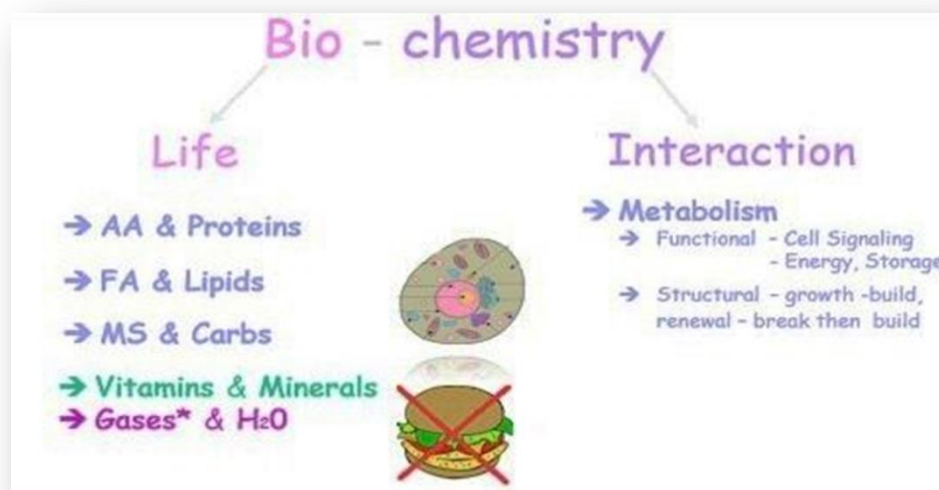
- Biochemistry deals with the chemical nature, structure and functions of the chemicals of life so is involved in various research related works.
- It is used in clinical diagnosis, manufacture of various biological products, treatment of diseases ,in nutrition, agriculture.
- Also, biochemistry has revealed the abnormalities in their metabolism and their relationship to various diseases.
- Biochemistry has helped to correct these disorders with dietary modifications or genetic manipulations.
- Biochemistry has ramified into many branches of science like Medicine, pharmacy, Microbiology Agriculture etc.

What Types of Molecules Do Biochemists Study?

The principal types of biological molecules or biomolecules are:

- carbohydrates
- lipids
- proteins
- nucleic acids

Many of these molecules are complex molecules called **polymers**, which are made up of **monomer** subunits. Biochemical molecules are based on carbon.



What is biochemistry used for?

- ❖ Biochemistry is used to learn about the biological processes which take place in cells and organisms.
- ❖ Biochemistry may be used to study the properties of biological molecules, for a variety of purposes. For example, a biochemist may study the characteristics of the keratin in hair so that shampoo may be developed that enhances curliness or softness.
- ❖ Biochemists find uses for biomolecules. For example, a biochemist may use a certain lipid as a food additive.
- ❖ Alternatively, a biochemist might find a substitute for a usual biomolecule. For example, biochemists help to develop artificial sweeteners.
- ❖ Biochemists can help cells to produce new products. Gene therapy is within the realm of biochemistry. The development of biological machinery falls within the realm of biochemistry.

Branches of Biochemistry

The primary branches of biochemistry are listed in this subsection:

- **Molecular Biology**

It is also referred to as the roots of Biochemistry. It deals with the study of functions of the living systems. This field of biology explains all the interactions between DNA, proteins, and RNA and their synthesis.

- **Cell biology**

Cell Biology deals with the structure and functions of cells in living organisms. It is also called **Cytology**. Cell biology primarily focuses on the study of cells of the eukaryotic organisms and their signaling pathways, rather than focusing on prokaryotes- the topics that will be covered under microbiology.

- **Metabolism**

Metabolism is one of the most important processes taking place in all living things. It is nothing but the transformations or the series of activities that happens when food is converted into energy in a human body. One example of metabolism is the process of digestion.

- **Genetics**

Genetics is a branch of biochemistry that deals with the study of genes, their variations and the heredity characteristics in living organisms.

The other branches include Animal and Plant Biochemistry, Biotechnology, Molecular Chemistry, Genetic engineering, Endocrinology, Pharmaceuticals, Neurochemistry, Nutrition, Environmental, Photosynthesis, Toxicology, etc.

Importance of Biochemistry

Biochemistry is essential to understand the following concepts:

- ❖ The chemical processes which transform diet into compounds that are characteristics of the cells of a particular species.
- ❖ The catalytic functions of enzymes.
- ❖ Utilizing the potential energy obtained from the oxidation of foodstuff consumed for the various energy-requiring processes of the living cell.
- ❖ The properties and structure of substances that constitute the framework of tissues and cells.
- ❖ To solve fundamental problems in medicine and biology.