



**AL-Mustaqbal University College**  
**Radiology Techniques Department**

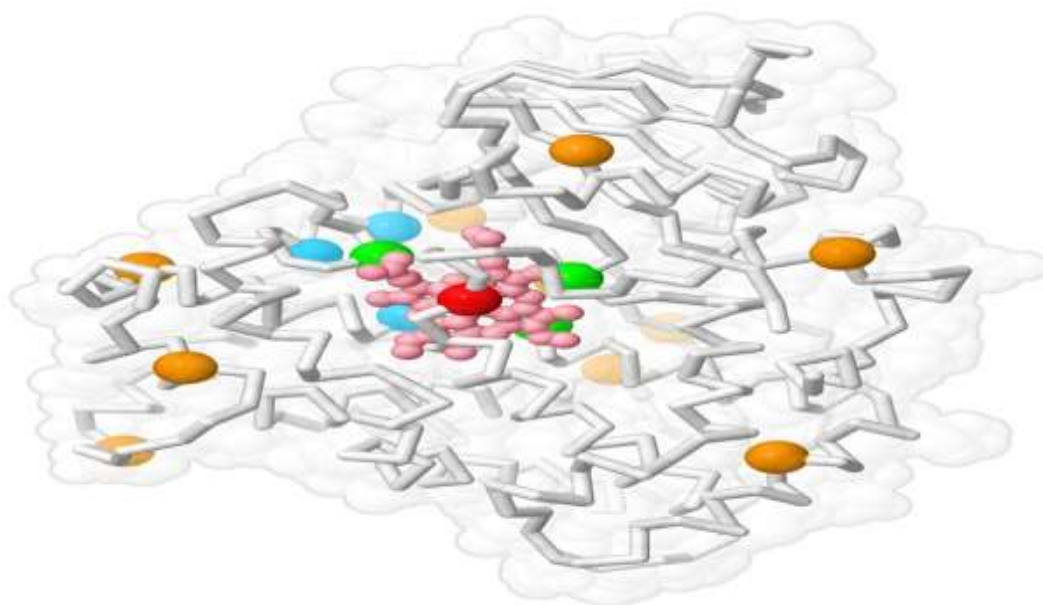
**First Class**

**Theoretical General Chemistry**

**Third lecture (3)**

**Biochemistry and the machinery of life**

**Lecturer: M.Sc. Esraa Rafied Abass**



**24/5/2021**

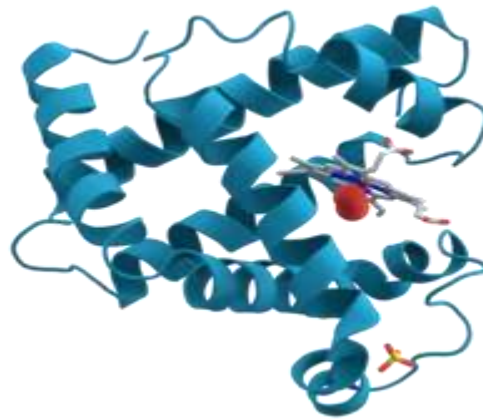
# Biochemistry

**Biochemistry**: is one of the branches of natural sciences and it is specialized in studying the chemical composition of cell parts in various living things, whether they are simple organisms such as (bacteria, fungi and algae) or as complex as humans, animals and plants.

Biochemistry is sometimes described as the science of life chemistry due to the link between biochemistry and life. Scientists in this field have focused on researching the chemical reactions within living organisms of all kinds by studying the cellular components of these organisms in terms of the chemical structures of these components, their areas of presence and their vital functions. As well as studying the different biological reactions that take place inside these living cells in terms of structure and composition, or in terms of catabolism and energy production. Which helps greatly in understanding the tissues, organs and functions of living things.

Closely related to molecular biochemistry, biochemistry is the study of the molecular mechanisms by which genetic information is encoded in DNA in biological processes. Depending on the precise definition of the terminology used, molecular biology can be viewed as a branch of biochemistry, or biochemistry, as a tool for the

investigation and study of molecular biology.



It is primarily used in biochemistry results in medicine, nutrition and agriculture. In medicine, biochemists study the causes and treatment of diseases. In the field of nutrition, they study how to maintain health and wellness and study the effects of under nutrition (or what is known as malnutrition). In agriculture, biochemists are investigating soil and fertilizers, and trying to discover ways to improve crop cultivation, crop storage and pest control.

### Primordial Matter

The Chemical Elements of Life About 24 of the 94 chemical elements found in nature are important to life. Most of the trace elements in Earth are not important to life (except for iodine and selenium), while a few are not used (such as aluminum and titanium). Most organisms have common needs, but there are slight differences between animals and plants. For example, aquatic algae use bromine, but land algae and animals do not need it.

All animals need sodium, but some plants don't. Plants need boron and silicon, but animals don't. Only six elements (carbon, hydrogen, oxygen, nitrogen, calcium, and phosphorous) make up 99% of the mass of the human body. In addition to these six elements, humans need small amounts of 18 other ingredients.

## **Biomolecules**

The four main classes of molecules in biochemistry are carbohydrates, fats (or so-called lipids), proteins, and nucleic acids. Many biomolecules are polymers, as monomers are small molecules that bind together to form large molecules, which are known as polymers.

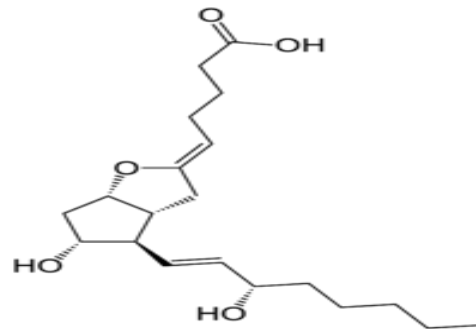
1-**Carbohydrates**: are made up of molecules called monosaccharides, such as glucose and fructose. When two molecules of monosaccharides combine, one water molecule comes out due to the release of two hydrogen molecules and an oxygen molecule. Carbohydrates are also called carbon water because the carbon atom is surrounded by hydrogen and oxygen atoms.



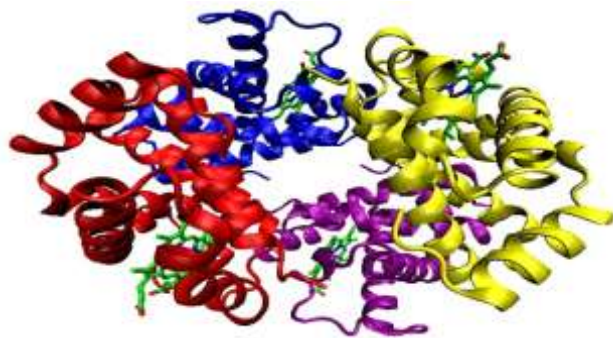
2-**Fats**: A glycerol molecule with three fatty acid molecules The word lipid has long been used to express



groups of heterocyclic chemicals that do not dissolve in water but dissolve in organic solvents.



**3-Proteins:** Proteins are very large molecules made up of monomers called amino acids. In the body there are 20 amino acids.



**4-Nucleic acids:** Nucleic acids are the molecules that make up DNA, an important material that living things use to store genetic information.

