Biochemistry, or biological chemistry (distinct from chemical biology), is the study of chemical processes within and relating to living organisms. A sub-discipline of both chemistry and biology, biochemistry may be divided into three fields: structural biology, enzymology, and metabolism. Over the last decades of the 20th century, biochemistry has become successful at explaining living processes through these three disciplines. Almost all areas of the life sciences are being uncovered and developed through biochemical methodology and research. Biochemistry focuses on understanding the chemical basis that allows biological molecules to give rise to the processes that occur within living cells and between cells, in turn relating greatly to the understanding of tissues and organs as well as organism structure and function.[4] Biochemistry is closely related to molecular biology, the study of the molecular mechanisms of biological phenomena.

Around two dozen chemical elements are essential to various kinds of biological life. Most rare elements on Earth are not needed by life (exceptions being selenium and iodine), while a few common ones (aluminium and titanium) are not used. Most organisms share element needs, but there are a few differences between plants and animals. For example, ocean algae use bromine, but land plants and animals do not seem to need any. All animals require sodium, but is not an essential element for plants. Plants need boron and silicon, but animals may not (or may need ultra-small amounts).

Just six elements—carbon, hydrogen, nitrogen, oxygen, calcium and phosphorus—make up almost 99% of the mass of living cells, including those in the human body (see composition of the human body for a complete list). In addition to the six major elements that compose most of the human body, humans require smaller amounts of possibly 18 more.

Researchers in biochemistry use specific techniques native to biochemistry, but increasingly combine these with techniques and ideas developed in the fields of genetics, molecular biology, and biophysics. There is not a defined line between these disciplines. Biochemistry studies the chemistry required for biological activity of molecules, molecular biology studies their biological activity, genetics studies their heredity, which happens to be carried by their genome. This is shown in the following schematic that depicts one possible view of the relationships between the fields:

- ***Biochemistry*** is the study of the chemical substances and vital processes occurring in live organisms. Biochemists focus heavily on the role, function, and structure of biomolecules. The study of the chemistry behind biological processes and the synthesis of biologically active molecules are applications of biochemistry. Biochemistry studies life at the atomic and molecular level.
- ***Genetics*** is the study of the effect of genetic differences in organisms. This can often be inferred by the absence of a normal component (e.g. one gene). The study of "mutants" – organisms that lack one or more functional components with respect to the so-called "wild type" or normal phenotype. Genetic interactions (epistasis) can often confound simple interpretations of such "knockout" studies.

- ***Molecular biology*** is the study of molecular underpinnings of the biological phenomena, focusing on molecular synthesis, modification, mechanisms and interactions. The central dogma of molecular biology, where genetic material is transcribed into RNA and then translated into protein, despite being oversimplified, still provides a good starting point for understanding the field. This concept has been revised in light of emerging novel roles for RNA.
- ***Chemical biology*** seeks to develop new tools based on small molecules that allow minimal perturbation of biological systems while providing detailed information about their function. Further, chemical biology employs biological systems to create non-natural hybrids between biomolecules and synthetic devices (for example emptied viral capsids that can deliver gene therapy or drug molecules).