

Biochemistry is the study of the molecular basis of life. The chemical energy of ATP is then utilized for nearly all the functions of the cell, such as synthesis of its component molecules, active transport of substances into and out of the cell, and also osmotic or mechanical work, for example contraction in muscles and motility in single celled organisms. The integration of molecular genetics and protein biochemistry has also had a profound influence in medicine, and has shed much light on the underlying molecular lesions causing inherited diseases such as sickle cell anemia, cystic fibrosis, and hemophilia. In the field of medical diagnostics, DNA probes are being used in the precise diagnosis of genetic disorders and in industry, genetically engineered bacteria, containing recombinant DNA, are producing important proteins such as insulin, growth hormones, and many others. All reactions in living cells are catalyzed by enzymes and certain basic metabolic pathways, such as glycolysis, the citric acid cycle, and beta-oxidation of fats, are ubiquitous.