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Commentary

Brief Description on Bio Chemistry Uses

Alanna Schepartz*

Department of Biotechnology, University of Natural Resources and Applied Life Sciences, Vienna, Austria

ABOUT THE STUDY

Bio chemistry is defined as a discipline of chemistry, or more generally, a discipline of science that uses the principles, tools, and techniques of organic chemistry to understand biochemical biophysical processes. For example, classical natural product chemistry with characteristic triads of separation, structural verification, and total synthesis is an obvious but purely organic ancestor. Similarly, exploring the biosynthetic pathways of the same natural product is a simple biochemistry. However, if the total synthesis of neutral products is clearly based on known pathways of biosynthesis, or if biosynthesis is translated into structural and mechanical organic chemistry terms, then bioorganic chemistry is clearly defined. Organic chemistry deals with structural design, synthesis and kinetics of physical organic matter. Structural Design is shows how likely the interaction between the structure and the biological partner is synthesis provides compounds that may be analogs or mimics of the natural kind and may not have been produced in sufficient quantities for natural study. Kinetic is physical organic chemistry and analytical methodologies provide quantitative measurements and details of reaction pathways. Biochemistry deals with the study of life processes using biochemical methods.

Bio polymers function at the molecular and atomic levels through a combination of modern biochemistry and structural biology. Techniques used to study the structure and dynamics of macromolecules include X-ray crystallography, cryo-electron microscopy, NMR, mass analysis, and single-molecule studies including fast reactions and steady dynamics, calories measurement, chemical analysis and various spectroscopies. Proteins and nucleic acids have also been developed to study how macromolecular structures determine function. Using these experimental approaches, researchers are studying mechanisms and specificities to better understand how macromolecules function and their role in intracellular molecular signaling pathways. This knowledge can lay the foundation for new medical, pollution control strategies, or many other uses.

All newly synthesized polypeptides need to be folded into their three-dimensional structure in order to function. Many proteins need to reach destinations other than the cytosol, where protein synthesis takes place. In addition, most proteins undergo post-translational modifications in response to various cellular signals. Therefore, understanding the mechanisms and regulation of protein folding, protein translocation, and protein processing is an important part of modern molecular and cell biology. In addition, errors in these processes cause illnesses ranging from Alzheimer's disease to diabetes. Protein folding and processing is one of the main research areas of our department. Faculty members in this area have covered many research topics such as endoplasmic reticulum stress response, human blood coagulation system, structure and function of molecular chaperones, heat shock response, misfolding of proteins in aging and disease, yeast pheromone treatment, and proteins. Transport in secretory pathways, protein targeting, organelle biosynthesis, and protein design and engineering.

Gene expression is regulated in a highly organized manner to ensure that a particular gene is expressed in the right amount at the right time in response to various genetic and environmental stimuli. In eukaryotes, gene expression is regulated at several levels, from transcription factor-mediated recruitment of basic transcriptional mechanisms to specific gene promoters, processing and maturation of RNA transcripts. The confusion of these events in humans contributes to many medical conditions, including cancer, metabolic syndrome, and developmental disabilities. Departments studying the regulation of gene expression include prokaryotes and eukaryotic transcriptional regulatory pathways, DNA and RNA interactions with proteins, RNA processing and RNA catalytic function, chromatin modification and remodeling, and genes. This study uses a variety of model organisms and many state-of-the-art technologies such as biochemistry, molecular biology, cell biology, and structural biology to control prokaryotes and eukaryotic gene expression.

Correspondence to: Alanna Schepartz, Department of Biotechnology, University of Natural Resources and Applied Life Sciences, Vienna, Austria, Email: Schepartz@alanna.au

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