



What impact has biochemical research had on medical science?

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INTRODUCTION:

Indigenous knowledge has become recognized worldwide not only because of its intrinsic value but also because it has a potential instrumental value to science and conservation. Traditional knowledge systems are hundreds or even thousands of years old and involve not only the knowledge of plants for medicine and food but also strategies for the sustainable utilization of plant resources. Traditional medicine and ethnobotanical information play an important role in scientific research, particularly when the literature and field work data have been properly evaluated¹.

Ethnobotany is the most important approach to study the natural resource management of indigenous people. The term ethnobotany is considered as the art of collection of useful plants by a group of people and the description of the uses of plants². Over the last century, ethnobotany has evolved into a scientific discipline that focuses on the people-plant relationship in a multidisciplinary manner, incorporating not only collection and documentation of indigenous uses but also ecology, economy, pharmacology, public

health, and other disciplines³. Recent ethnobotanical surveys among tribal populations have brought new information to the forefront, which can be utilized to improve the economy of the tribes by organizing the systematic collection of forest products and locating cottage industries,

especially of herbal drugs⁴. The traditional medicine is increasingly solicited through the tradipractitioners and herbalists in the treatment of diseases. The use of traditional medicine is widespread and it is based on centuries

Biochemistry

Biochemistry is the application of chemistry to the study of biological processes at the cellular and molecular level. It emerged as a distinct discipline around the beginning of the 20th century when scientists combined chemistry, physiology, and biology to investigate the chemistry of living systems.

physics, molecular biology, and immunology to study the structure and behaviour of the complex molecules found in biological material and the ways these molecules interact to form cells, tissues, and whole organisms.

Biochemists are interested, for example, in mechanisms of brain function, cellular multiplication and differentiation, communication within and between cells and organs, and the chemical bases of inheritance and disease. The biochemist seeks to determine how specific molecules such as proteins, nucleic acids, lipids, vitamins, and hormones function in such processes. Particular emphasis is placed on the regulation of chemical reactions in living

cells.

Biochemistry is rapidly expanding, becoming one of the most influential areas of science. Combining the core tenets of biology and chemistry, the field plays a huge role in the development of novel new scientific approaches. But just how important is it to medicine?

Medical science cannot really exist without biochemistry.

Without the ongoing flurry of scientific breakthroughs made by biochemists, we wouldn't have the precise chemical knowledge to create the vital drugs, therapies and diagnostic tools that are used every day.

Much like medical science itself, biochemistry is a vast area of research that yields profound discoveries each year. Biochemical techniques advance our understanding of the chemical structures and processes that underpin human health and disease, revealing the underlying transformations between these two physiological states.

The implications of uncovering the causes of pathologies on a cellular level are huge. By being able to call on a working knowledge of biochemistry and other related disciplines such as molecular biology and immunology, those working in medical science have the potential to transform global healthcare.

Biochemistry is the branch of the science that explores chemical processes related to the living organisms. It is a laboratory based science that brings together biology and chemistry. By using chemical knowledge and techniques, biochemists can understand and solve biological problems.

Biochemistry focuses on processes happening at a molecular level. It focuses on what's happening inside our cells, studying components like proteins, lipids and organelles. It also looks at how cells communicate with each other, for example during growth or fighting illness. Biochemists need to understand how the structure of a molecule relates to its

function, allowing them to predict how molecules will interact.

Biochemistry covers a range of scientific disciplines, including genetics, microbiology, forensics, plant science and medicine. Because of its breadth, biochemistry is very important and advances in this field of science over the past 100 years have been staggering. It's a very exciting time to be part of this fascinating area of study

What do biochemists do?

- Provide new ideas and experiments to understand how life works
- Support our understanding of health and disease
- Contribute innovative information to the technology revolution
- Work alongside chemists, physicists, healthcare professionals, policy makers, engineers and many more professionals

Biochemists work in many places, including:

- Hospitals
- Universities
- Agriculture
- Food institutes
- Education
- Cosmetics
- Forensic crime research
- Drug discovery and development

What impact has biochemical research had on medical science?

Ever since Eduard Buchner's 1897 discovery that a cell-free extract of yeast can ferment sugar (widely considered to be the birth of biochemistry), biochemistry has enjoyed an intimate relationship with medicine — illuminating many aspects of human health and diseases.

For anyone working in medicine or a related field, accruing sufficient biochemical knowledge is needed in order to properly understand the metabolism, function and growth of a healthy human body.

In physiology, the study of body function,

biochemistry has broadened our understanding of how biochemical changes relate to physiological alteration in the body. It helps us understand the chemical aspects of biological processes such as digestion, hormonal action, and muscle contraction-relaxation.

In pathology, the study of how aberrant biochemistry relates to disease conditions in the human body, physicians can use biochemical analysis to confirm predictions based on patient testimony.

For example, if a patient complains of sudden, severe pain in one or more joints, the physician may predict the problem to be gout — a form of arthritis caused by an excess of uric acid in the bloodstream. By measuring uric acid levels, biochemistry can then confirm whether gout is the root of the problem.

All diseases have a molecular basis, so biochemistry enables us to understand the chemical processes involved in conditions as varied as:

- diabetes
- hyperammonemia, hypo- and hyperthyroidism
- hypo- and hyperparathyroidism
- jaundice
- kidney dysfunction
- hypercholesterolemia

The action of a drug almost always involves some change in the biochemical processes taking place in the body. As such, pharmacologists must also be acquainted with the biochemical aspects of the human body. In pharmacy, biochemical testing provides indispensable insights into a drug's:

- mode of action
- half-life
- storage conditions
- metabolism

The molecular phenomena discovered through biochemical analysis help to facilitate this — providing research that gives on-the-ground health professionals greater scope to fulfil their duty of care.

In fact, the trajectory of medical science in the next decade rests upon the discoveries made by biochemists in the laboratory setting. In the week before the publication of this blog alone, a biochemical study found that a common acne drug can prevent artery hardening, while another suggested that women have better episodic memory than men. The scope for research seems almost limitless.

All life on Earth depends on biochemical reactions and processes. By integrating this scientific knowledge with practical strategies to maintain health, understand diseases, identify potential treatments, and enhance our understanding of the origins of life on earth, biochemistry is and will remain one of the most important areas of science