

TEXTBOOK OF BIOCHEMISTRY AND CLINICAL PATHOLOGY

For Diploma in Pharmacy Second Year

Education Regulation 2020 (New PCI Syllabus)

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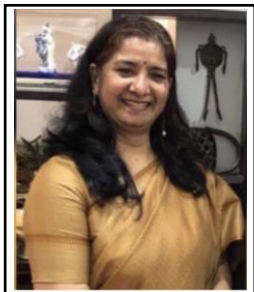
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Blessings



Pharmacists are vital for the primary health care system all around the world. Diploma in Pharmacy is a program with basic level education about Pharmacy as per Pharmacy Council of India (PCI).

I am delighted to know that Probocell Press has come out with good concept of publishing bilingual books for pharmacy students based on new education regulation 2020 PCI syllabus.

I congratulate the authors and the entire team for their hard work and incorporation of book contents based on new syllabus.

I extend by best wishes to them and I hope that students will be benefited by the efforts put forward by the authors in the books.



Prof.(Dr.) Swarnlata Saraf
First Lady Vice President, National APTI Central Zone
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Message



Pharmacy courses in India are among the most popular courses. The study of pharmacy involves health sciences and pharmacists are the primary health professionals.

A good beginning makes a big difference. “I’m happy for Probecell Press!” Books based on new PCI syllabus will be helpful for the students especially belonging to the

rural areas.

My best wishes for all your efforts and doing excellence in the pharma profession.... All the best!



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Preface

The textbook of Biochemistry and Clinical Pathology has been written for students of diploma in pharmacy second year students keeping in mind specific requirements of the Pharmacy Council of India (PCI), Education Regulation - 2020. The book is covering the entire syllabus as per new PCI norms including practicals and MCQs.

This book containing thirteen chapters including carbohydrates, protein, lipids, nucleic acids, enzymes, vitamins, metabolism, minerals, water and electrolytes, biotechnology, organ function test and pathology of blood and urine. Introduction to biochemistry includes scope of biochemistry and cell functions and its organization. Different metabolic pathways for carbohydrates, protein, and lipids have been discussed in the chapter.

We would like to acknowledge the invaluable contributions provided by the Probecell editorial team. I give great thanks to the graphic designers who were instrumental in preparing much of the artwork for this text. I would also like to acknowledge my colleagues and students for their willingness to serve as test subjects for many of the useful contents in this book. Finally, I would like to thank my teachers and parents for their guidance, support and encouragement throughout the process of completing this book.

15 April 2022
Bhilai

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CHAPTER 1

INTRODUCTION AND SCOPE OF BIOCHEMISTRY

INTRODUCTION

Biochemistry is the branch of science that deals with chemical processes within and related to living organisms. It provides information about chemical structures, functions and interactions of biological macromolecules, such as proteins, nucleic acid, carbohydrate and lipids. These information help to understand the physiological process and their mechanisms within living organisms.

- It also explore the information about how cells communicate with each other, for example during growth or fighting illness, enzyme activity, membrane transport mechanisms, homeostasis, blood coagulation, oxygen transport, neurotransmitter function and ageing etc.
- Biochemistry covers a range of scientific disciplines, including genetics, microbiology, forensics, plant science and medicine. The findings of biochemistry are applied in various health disciplines like drug development, disease management, biochemical investigation, nutrition management and many more.
- In field of medicine biochemistry have important role to investigate the causes and cures of disease. Medical biochemistry (also known as molecular biology), biochemical performances are applied to human health and disease.

DEFINITION

“Biochemistry is a basic science which deals with chemical nature and chemical behavior of living matter.” Biochemistry involve-

- It explain chemical constituents of living matter.
- It gives information about Chemical changes which occur in the organism during (life process) digestion, absorption and excretion etc.
- It also explain chemical changes during growth, injury and repair.
- It elaborate transformation of chemical constituents.
- It also give details about nutrition and mineral metabolism, heredity, genetics etc.
- Biochemistry provides the diagnostic platform for medicine.

HISTORY

The term “biochemistry” was introduced by the German Chemist Carl Neuberg in 1903. Biochemistry discipline serve as platform to trace the critical complexities of biology, moreover unravelling the chemical secretes of life.

Several mysteries are solved by biochemistry in last few decades like -

- It discover gene and its role in the transfer of information in the cell. This part of biochemistry is often called molecular biology.
- In 1950s, James D. Watson, Francis Crick, Rosalind Franklin and Maurice Wilkins were explain DNA structure and suggesting its relationship with genetic transfer of information.
- In 1958, George Beadle and Edward Tatum received the Nobel Prize for work in fungi showing that one gene produces one enzyme.
- In 1988, Colin Pitchfork was the first person convicted of murder with DNA evidence, which led to evolvement of forensic science.
- In 2006, Andrew Z. Fire and Craig C. Mello received Nobel Prize for discovering the role of RNA in gene expression and many other discoveries are done.
- Advance Biochemistry has promises to the world of science in expansion of new path-breaking research and coming times would surely prove these promises to be fulfilled.

SCOPE OF BIOCHEMISTRY IN PHARMACY

In the field of pharmaceutical sciences biochemistry has made great contribution in the other branch of medicine such as physiology, cellular biology, pathology, pharmacology and toxicology, microbiology, forensic science and immunology and many other.

- Pharmaceutical biochemistry is that branch of drug involved with the biochemistry and metabolism of human health and sickness.
- Its play a vital role in the operation and management of clinical biochemistry laboratories with help of medical chemist.
- The medical chemist contributes their services in directs clinical laboratories, consults, diagnoses and treats patients with a range of metabolic disorders and biochemical abnormalities.
- Pharmaceutical chemistry consists the data of biochemistry & chemistry & applies to the production of the many important medicines.
- Biochemists are predominantly worked in various sector like biotechnology, toxicology, and food technology and vaccine production.

- Pharmaceutical biochemistry provides a whole understanding of all chemical process occurring and related to living cells at the molecular level that's associated with drug action.
- It also help in fundamental understanding of life, how organism store and transfer information, how food digested, how cell perform physiological function and importance of nutrients.
- New research are help to diagnose new methods to understand the mechanism for the treatment of non-treatable disease like AIDS, Cancer, Genetic disorder and so many more disease.
- Using modern instruments like Electron Microscopes, Lasers, Chromatography, X-ray diffraction, Dual polarisation interferometry, NMR spectroscopy and many more laboratory instruments, they conduct experiments by analyzing enzymes, DNA and other molecules to explain anatomy and physiology of living matter.
- Advance biochemistry includes the application of biological material to technical useful operations such as- use of enzyme in pharmaceutical industry to synthesize complex drugs.
- Biochemistry collaborate with various filed of science to explore the new information of living world. Schematic relationship of pharmaceutical biochemistry with other branch are presented in figure.

