TEXTBOOK OF

Medical Biochemistry:

Chemical Basis of Life and Human Metabolism

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Textbook of Medical Biochemistry: Chemical Basis of Life and Human Metabolism

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Textbook of Medical Biochemistry: Chemical Basis of Life and Human Metabolism

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Preface

Medical biochemistry forms the essential foundation for understanding the molecular mechanisms that govern human health and disease. Textbook of Medical Biochemistry: Chemical Basis of Life and Human Metabolism has been developed to provide students, educators, and healthcare professionals with a clear, structured, and clinically relevant understanding of biochemical principles.

This book bridges the gap between basic biochemical concepts and their practical applications in medicine. It begins with the fundamental chemical basis of life, including biomolecules, cellular organization, and biochemical interactions, and gradually progresses to the complexities of human metabolism. Special emphasis has been placed on integrating biochemical pathways with physiological functions and clinical conditions, enabling readers to appreciate not just “what happens” but “why it matters” in real-life medical scenarios.

The content is organized systematically to enhance learning, starting from core concepts and advancing toward applied aspects such as metabolic regulation, enzymatic functions, and disease-related biochemical alterations. Each topic has been written in a concise yet comprehensive manner to support both academic study and competitive examinations. Wherever relevant, clinical correlations have been included to strengthen conceptual clarity and promote critical thinking.

This textbook is designed particularly for undergraduate medical, dental, nursing, and life science students, but it also serves as a valuable reference for postgraduate learners and professionals seeking to refresh their knowledge.

In an era where medical science is rapidly evolving, a strong grasp of biochemistry is indispensable. This book aims to simplify complex concepts, encourage analytical understanding, and foster a deeper appreciation of the biochemical basis of life.

We hope this text will serve as a reliable guide and inspire learners to explore the fascinating interface between chemistry and medicine.

Ackowledgement

The completion of Textbook of Medical Biochemistry: Chemical Basis of Life and Human Metabolism has been a deeply enriching academic journey, made possible through the support, guidance, and encouragement of many individuals and institutions.

First and foremost, we express our sincere gratitude to all the contributors, reviewers, and subject experts whose valuable insights, constructive feedback, and scholarly perspectives have significantly enhanced the quality and depth of this work. Their expertise has ensured that the content remains accurate, relevant, and aligned with current advancements in medical biochemistry.

We are equally thankful to the academic and research community whose foundational work and continuous contributions in the field of biochemistry have served as the backbone of this textbook. Their dedication to scientific exploration has made it possible to present complex biochemical concepts in a structured and accessible manner.

Special appreciation goes to the editorial and publishing team for their unwavering support, professionalism, and meticulous attention to detail throughout the process of manuscript preparation, editing, and final production. Their commitment has played a crucial role in bringing this book to fruition.

We also extend our heartfelt thanks to our colleagues, mentors, and students, whose interactions, discussions, and inquisitive approaches have inspired the development of this book. Their curiosity and engagement have continuously motivated us to present the subject in a clear and comprehensive way.

Finally, we express our deepest gratitude to our families for their constant encouragement, patience, and understanding during the course of this work. Their support has been the foundation of our perseverance and dedication.

This book is a collective effort, and we remain indebted to everyone who contributed, directly or indirectly, to its successful completion.

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About the Authors

Dr. Devesh Kumar Joshi is an accomplished academician in the field of Biochemistry, specializing in Medical and Nutritional Biochemistry. He holds a PhD degree in Biochemistry and has extensive teaching experience in higher education. He is currently working as an Associate Professor at Nims University Rajasthan Jaipur, where he actively engages in teaching and guiding students at undergraduate, postgraduate and PhD levels. His areas of interest include metabolism, clinical biochemistry, and human nutrition. He has published several research papers/articles in reputed journals and has participated in various national and international conferences, workshops, and faculty development programs. This book is a sincere effort by the author to present Medical Biochemistry in a simple, concise, and student-friendly manner, aligning with university curricula and helping students build a strong conceptual foundation.

Shipra Shrivastava, Assistant Professor at S S College, Bhopal, brings 15 years of rich experience in academics and clinical practice. With MSc Biochemistry and MMLT Medical Microbiology qualifications, she's a versatile expert in Medical Lab Technology, Clinical Biochemistry, General Biochemistry, Biotechnology, Applied Microbiology, and Medical Microbiology. A prolific researcher, she has authored over 10 articles in national and international journals and presented more than 10 papers. Shipra has guided students in dissertation and training, showcasing her expertise and dedication to allied health sciences education. Her blend of academic and clinical expertise makes her a valuable contributor to the field .

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Energy Production, Oxidative Systems, and Clinical Biochemistry

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ABOUT THE BOOK :

Textbook of Medical Biochemistry: Chemical Basis of Life and Human Metabolism is a comprehensive and student-oriented resource that effectively bridges fundamental biochemical concepts with their clinical applications. The book provides a structured exploration of the chemical basis of life, covering essential biomolecules such as carbohydrates, proteins, lipids, and nucleic acids, along with detailed discussions on enzymes, bioenergetics, and metabolic pathways. It highlights how these biochemical processes are interconnected and regulated within the human body to maintain normal physiological functions.

A key feature of this textbook is its strong clinical focus, linking core biochemical principles to disease mechanisms, diagnostic tools, and therapeutic approaches. This integration helps readers understand not only the “what” but also the “why” behind biochemical processes in health and disease. The content is presented in a clear, concise, and accessible manner, making it suitable for undergraduate and postgraduate students in medicine, nursing, pharmacy, and life sciences.

To enhance learning, the book incorporates diagrams, tables, and relevant examples that simplify complex topics and improve retention. It also reflects recent advancements in medical biochemistry, ensuring that readers remain updated with current scientific knowledge. Overall, this textbook serves as a reliable academic guide, supporting both conceptual understanding and clinical insight, while helping students develop a strong foundation for further study and professional practice in healthcare and biomedical sciences.

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