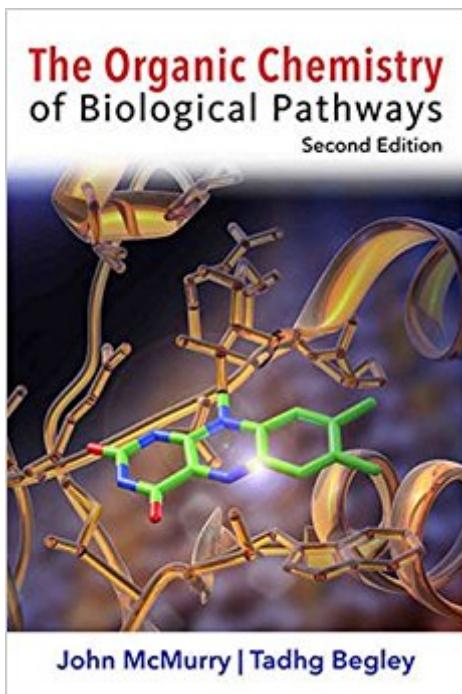


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The Organic Chemistry Of Biological Pathways



Synopsis

The Organic Chemistry of Biological Pathways was written for an audience of advanced undergraduates and graduate students who want a deeper understanding of the chemical reactions that take place in living organisms. The authors assume readers have a background in organic chemistry at the level of the typical two-semester college course. Although enzymes are crucial to biological reactions, the authors' focus always remains on the reactivity patterns of the substrate molecules and on the organic, arrow-pushing details of the individual reactions. The authors begin the book with a brief review chapter on the fundamental organic reaction mechanisms commonly found in biochemical pathways. Following this brush up on reaction mechanisms is a general introduction to the main classes of biomolecules. Then comes the heart of the book: full chapters devoted to the major metabolic pathways of the main classes of biomolecules—lipids, carbohydrates, proteins, nucleotides, and secondary metabolites. In the course of these chapters, readers cover the chemistry of the common coenzymes, see examples of the common sorts of biological transformations, and ultimately begin to develop an understanding of the patterns found throughout bioorganic chemistry. The authors conclude with a summary of the reaction patterns and mechanisms frequently used in nature to effect chemical transformations, followed by a brief chapter summarizing some general themes of enzymatic catalysis. All mechanisms have been updated in this second edition, and several hundred references to recent literature are given for those students who want more detail.

Book Information

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"The book's greatest strength is its emphasis on the conceptual unity of organic chemistry and biochemistry. The chemical structures are presented with great care and accompanied by lucid explanations." Charles Clapp, Bucknell University "This textbook elegantly portrays the complementary nature of chemistry and biology. By describing biological processes in detailed chemical terms, the authors have provided a resource that provides an unparalleled look into the fascinating and emerging field of chemical biology." Hung-wen Liu, University of Texas "This textbook satisfies a major need in chemistry curricula, bridging the gap between introductory organic chemistry and biochemistry/biology. It is the first book written for students that presents biological transformations from the perspective of organic mechanism. The book significantly augments modern biochemistry curricula and may catalyze a resurgence of interest in biological mechanism." Carolyn R. Bertozzi, University of California, Berkeley "This text provides a contemporary and authoritative treatment of the molecular logic of the chemistry of life." Christopher T. Walsh, Harvard University "This text/reference book uniquely bridges organic chemistry and biochemistry and appears at an opportune time when an understanding of chemical biology is becoming essential. It should be indispensable for all bioscientists interested in a chemistry-based clarification of biological pathways." Koji Nakanishi, Columbia University "McMurry and Begley present the logic of biosynthetic pathways in the language of organic chemistry. This text will serve as an essential guide for new students of biological chemistry and will also prove a resource for the experienced student who aims to understand the molecular basis of biological chemistry." Milan Mrksich, Northwestern University "The book's greatest strength is its emphasis on the conceptual unity of organic chemistry and biochemistry. The chemical structures are presented with great care and accompanied by lucid explanations." Charles Clapp, Bucknell University "This textbook elegantly portrays the complementary nature of chemistry and biology. By describing biological processes in detailed chemical terms, the authors have provided a resource that provides an unparalleled look into the fascinating and emerging field of chemical biology." Hung-wen Liu, University of Texas "This textbook satisfies a major need in chemistry curricula, bridging the gap between introductory organic chemistry and biochemistry/biology. It is the first book written for students that presents biological transformations from the perspective of organic mechanism. The book significantly augments modern biochemistry curricula and may catalyze a resurgence of interest in biological mechanism." Carolyn R. Bertozzi, University of California, Berkeley "This text provides a contemporary and authoritative treatment of the molecular logic of the chemistry of life." Christopher T. Walsh, Harvard University "This text/reference book uniquely bridges organic chemistry and biochemistry and

appears at an opportune time when an understanding of chemical biology is becoming essential. It should be indispensable for all bioscientists interested in a chemistry-based clarification of biological pathways." Koji Nakanishi, Columbia University" McMurry and Begley present the logic of biosynthetic pathways in the language of organic chemistry. This text will serve as an essential guide for new students of biological chemistry and will also prove a resource for the experienced student who aims to understand the molecular basis of biological chemistry." Milan Mrksich, Northwestern University"

John E. McMurry received his B.A. from Harvard University and his Ph.D. at Columbia University. Dr. McMurry is a Fellow of the American Association for the Advancement of Science, and an Alfred P. Sloan Research Foundation Fellow. He has received several awards, which include the National Institutes of Health Career Development Award, the Alexander von Humboldt Senior Scientist Award, and the Max Planck Research Award. In addition to *The Organic Chemistry of Biological Pathways*, he is also the author of *Organic Chemistry*, *Fundamentals of Organic Chemistry*, and *Chemistry* (with Robert Fay). Tadhg P. Begley received his B.Sc. from National University of Ireland and his Ph.D. at the California Institute of Technology. Dr. Begley is the recipient of many awards, including the Merck Faculty Development Award and the Camille and Henry Dreyfus Teacher-Scholar Award. His research group uses the principles and techniques of organic chemistry to study complex organic transformations found in vitamin biosynthetic pathways. In addition to *The Organic Chemistry of Biological Pathways*, Dr. Begley has edited *Cofactor Biosynthesis: A Mechanistic Perspective*.

When I opened the book for the first time, my immediate reaction was "Wow, there's not much text, is there?" The page is fairly small to begin with, the font is fairly large, the line spacing and margins are generous, and there are a lot of figures. I realized after a while that this wasn't an especially fair criticism, though. Because the purpose of the text is primarily to show mechanisms of important metabolic reactions, most of the information can be conveyed through chemical structures. In fact, a significant chunk of the text is devoted to saying (paraphrased), "well, it's extremely difficult to determine exact mechanisms, so the precise path that this reaction follows is uncertain. The figure shows the most commonly proposed mechanism, but another possibility is that..." The alternative is most often explained in words but sometimes gets its own figure. The book is very descriptive, offering mostly "what" and "how" rather than "why." Arguably, there's nothing inherently wrong with that, especially because the preface essentially says directly that that's the purpose of the book. But

it does mean that the book is quite limited, and isn't very useful on its own. You would need a fully fleshed-out course to extract much value from it, and unfortunately, I know from firsthand experience that a well-designed course is far from a given. Our lectures and exams basically just asked us to regurgitate the mechanisms from the text, which was not useful or enjoyable. That seems to be the danger: a lazy lecturer told to use this textbook to teach a course will produce a worthless class from which the students will take away almost nothing of lasting value. All that aside, there are still some quibbles with the book. Some of the figures are repetitious, which can be quite confusing. And it doesn't cover some extremely important mechanisms, such as THF-mediated methylation. It's frustrating, honestly - even if you have no problem with the book's purpose as a compilation of reaction mechanisms, you would then expect it to be an excellent reference... and it just isn't. There are too many gaps in what it covers, and too many things that are annoyingly difficult to find among the thicket of chemical structures. It certainly still has its uses, considering that there's really no other textbook with such an authoritative compilation of mechanistic detail on the topics it does cover. But there seems to be room for it to be so much better, and its uses are limited at any rate.

Great. My professor has found a lot of errors in the book, but it came really quick so that was sweet.

This is a very easy to read book. If you have already taken organic chemistry it may be a bit of a review but it does apply the information to biological pathways. If you have not already taken organic chemistry, it is a great book to learn it. I think that it is easier, yet just as comprehensive as other textbooks out there, but it skips over things that are more useful in physical organic chemistry (energy equations and things like that). We are using it in our biochemistry class and it's a great review that gets to the point.

Excellent book

Really helpful supplement to any organic chemistry or biochemistry class. It helps you understand the mechanisms through which common biochemical reactions take place.

Great book for a specialized metabolic pathway class! Excellent addition to your students' biochemistry text. Clear, concise and well explained. A salute to the authors and Roberts publishing.

In well condition, and a great addition to my growing chemistry library

John McMurry is a brilliantly clear writer, and this text is no exception.

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