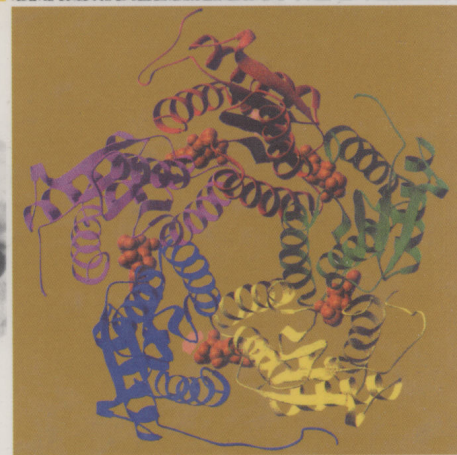
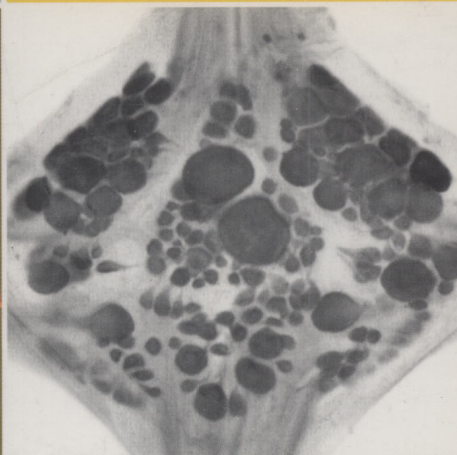
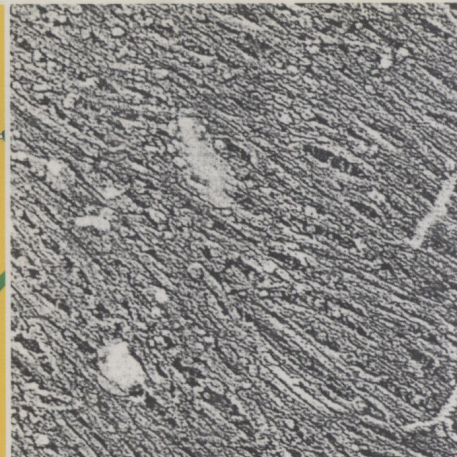
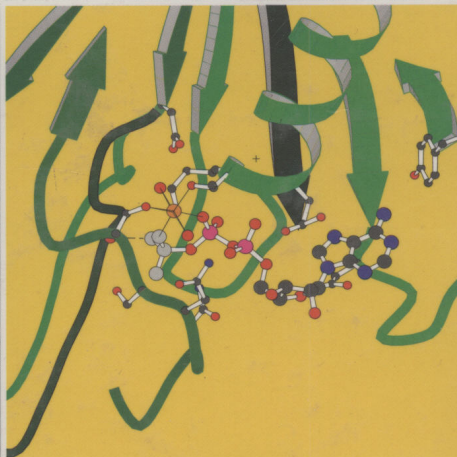
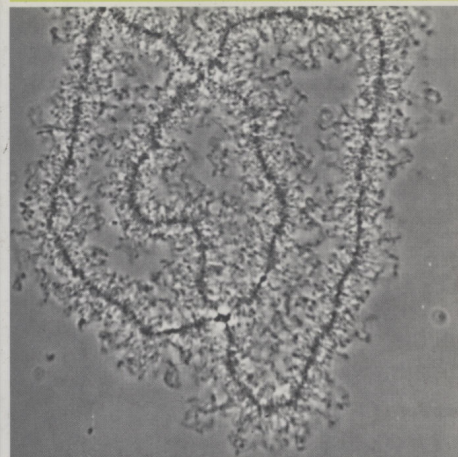
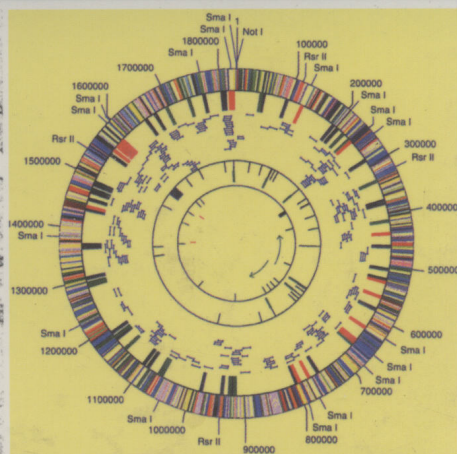
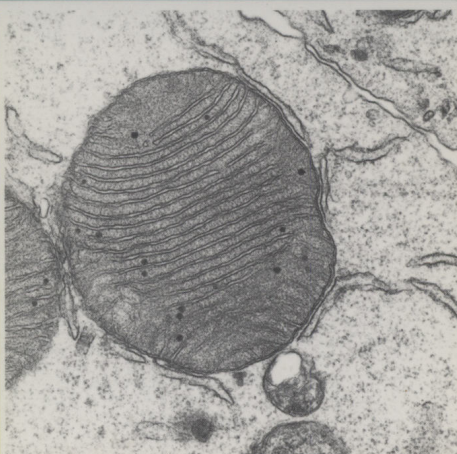
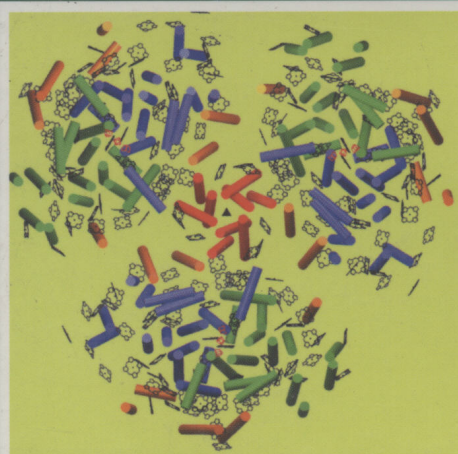


BIOCHEMISTRY

The Chemical Reactions of Living Cells

David E. Metzler



Second Edition

Volume 2

BIOCHEMISTRY

The Chemical Reactions of Living Cells

David E. Metzler

Distinguished Professor Emeritus
Iowa State University

Volume 2

in association with

Carol M. Metzler

designed and illustrated by

David J. Sauke



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Preface

When Volume I was published early in 2001 I thought that Volume II would be ready by the end of the same year. However, updating the first edition to cover the major aspects of the rapidly expanding scope of Biochemistry was more difficult than I had imagined. This second volume brings many topics up-to-date. The first chapter (Chapter 17), which has been available on the Web, is an introduction to metabolism, more extensive than that in Chapter 10. This is followed by specialized chapters on oxidative metabolism, muscle chemistry, and on selected aspects of the metabolism of carbohydrates, lipids, and polyprenyl compounds. Chapter 23 deals with light, photochemistry, and photobiology. Chapter 24 describes metabolism of nitrogen fixation, amino acid synthesis and degradation and chemistry of other nitrogenous compounds. Chapter 25 provides a summary of biosynthesis and catabolism of aromatic compounds including the nucleic acid bases. Chapters 26–29 deal with molecular genetics and the biosynthesis and metabolism of DNA, RNA, and proteins. Chapters 30–32 are introductions to the chemistry of intercellular signaling, brain chemistry, immunochemistry, and development.

Volume II contains a huge amount of information. However, it represents only a tiny fraction of the biochemical knowledge presently available. The many references given may help the reader to get

started in consulting this literature. However, the references provide neither a comprehensive review of literature nor an accurate historical record. I hope that my fellow biochemists will forgive me where I have failed to cite their favorite articles. The main purpose of the references is to document the material that I used in preparing the text. The coverage is limited. I used a selection of journals that I could scan quickly, hoping to provide a broad view. However, there are now hundreds of journals that contain biochemical information. An important entrance to this literature is via the World Wide Web, which by now may contain $\sim 10^{11}$ pages of information. (See D. Butler, *Nature*, **405**, 112–115, 2000). I especially recommend <http://highwire.stanford.edu> which provides free of charges both abstracts and full articles from many journals. I hope that you will read many original papers and not only reviews. Above all I hope that this book will help you to find excitement in the many scientific discoveries that are reported week after week. I am especially appreciative of the efforts made by our artist David J. Sauke, who died suddenly on November 6, 2002. He was designer, artist, composer, and close friend. I am indebted to Robert R. Loudon, Emily L. Osam, and Kim McDermott for taking over David's responsibilities and allowing us to complete the volume in a timely fashion.

David E. Metzler

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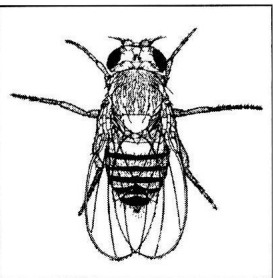
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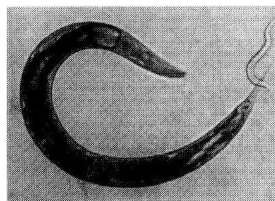
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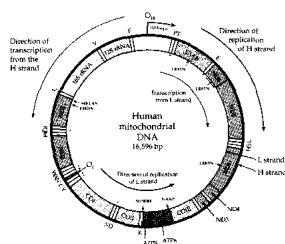
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