

Preface

This treatise on cell and molecular neurobiology and neurological diseases was compiled from a selection of key articles from the recently published *Encyclopedia of Molecular Cell Biology and Molecular Medicine* (ISBN 978-3-527-30542-1, <http://www.meyers-emcbmm.de/>). This volume is composed of 21 detailed articles arranged in three sections covering Cell Biology and Biochemistry of the Nervous System, Neurodevelopmental Biology and Neurological Diseases. The articles were prepared by eminent researchers from many of the major neurobiology and neurology research institutions spanning the globe, including: the University of Cambridge; MRC Social, Genetic & Developmental Psychiatry Centre, King's College London; University College London; Charing Cross Hospital; the University of Leeds; the University of Salford; the University of Antwerp; Institut de Neurobiologie de la Méditerranée, Marseille; Institute of Clinical Neurobiology, Wuerzburg; Charité, Department of Experimental Neurology, Berlin; Humboldt University; National Institute of Neuroscience, Kodaira, Tokyo; the University of Pennsylvania; the University of California, San Francisco; Wesleyan University; Temple University; the University of Washington, Seattle; Washington University School of Medicine; The State University of New Jersey; and the University of California, Irvine.

Each article begins with a concise definition of the subject and its importance, followed by the body of the article and extensive references for further reading. The references are divided into secondary references (books and review articles) and primary research papers. Each subject is presented on a first-principle basis, including detailed figures, tables and drawings. Because of the self-contained nature of each article, some overlap among articles on related topics occurs. Extensive cross-referencing is provided to help the reader expand his or her range of inquiry.

The master publication, which is the basis of the *Neurobiology* set, is the *Encyclopedia of Molecular Cell Biology and Molecular Medicine*, which is the successor and second edition of the *Encyclopedia of Molecular Biology and Molecular Medicine*, covers the molecular and cellular basis of life at a university and professional researcher level. The first edition, published in 1996–1997 was utilized in libraries around the world. This second edition is double the first edition in length and comprises the most detailed treatment of both molecular and cell biology available today. The Board and I believe that there is a serious need for this publication, even in view of the vast amount of information available on the

World Wide Web and in text books and monographs. We feel that there is no substitute for our tightly organized and integrated approach to selection of articles and authors and implementation of peer review standards for providing an authoritative single-source reference for undergraduate and graduate students, faculty, librarians and researchers in industry and government.

Our purpose is to provide a comprehensive foundation for the expanding number of molecular biologists, cell biologists, pharmacologists, biophysicists, biotechnologists, biochemists and physicians as well as for those entering the field of molecular cell biology and molecular medicine from majors or careers in physics, chemistry, mathematics, computer science and engineering. For example there is an unprecedented demand for physicists, chemists and computer scientists who will work with biologists to define the genome, proteome and interactome through experimental and computational biology.

The Board and I first divided all of molecular cell biology and molecular medicine into primary topical categories and each of these was further defined into subtopics. The following is a summary of the topics and subtopics:

- Nucleic Acids: amplification, disease genetics overview, DNA structure, evolution, general genetics, nucleic acid processes, oligonucleotides, RNA structure, RNA replication and transcription.
- Structure Determination Technologies Applicable to Biomolecules: chromatography, labeling, large structures, mapping, mass spectrometry, microscopy, magnetic resonance, sequencing, spectroscopy, x-ray diffraction.
- Proteins, Peptides and Amino Acids: analysis, enzymes, folding, mechanisms, modeling, peptides, structural genomics (proteomics), structure, types.
- Biomolecular Interactions: cell properties, charge transfer, immunology, recognition, senses.
- Molecular Cell Biology of Specific Organisms: algae, amoeba, birds, fish, insects, mammals, microbes, nematodes, parasites, plants, viruses, yeasts.
- Molecular Cell Biology of Specific Organs or Systems: excretory, lymphatic, muscular, neurobiology, reproductive, skin.
- Molecular Cell Biology of Specific Diseases: cancer, circulatory, endocrine, environmental stress, immune, infectious diseases, neurological, radiation.
- Biotechnology: applications, diagnostics, gene altered animals, bacteria and fungi, laboratory techniques, legal, materials, process engineering, nanotechnology, production of classes or specific molecules, sensors, vaccine production.
- Biochemistry: carbohydrates, chirality, energetics, enzymes, biochemical genetics, inorganics, lipids, mechanisms, metabolism, neurology, vitamins.
- Pharmacology: chemistry, disease therapy, gene therapy, general molecular medicine, synthesis, toxicology.
- Cellular Biology: developmental cell biology, diseases, dynamics, fertilization, immunology, organelles and structures, senses, structural biology, techniques.

We then selected some 340 article titles and author or author teams to cover the above topics. Each article is designed as a self-contained treatment. Each article begins with a key word section, including definitions, to assist the scientist or student who is

unfamiliar with the specific subject area. The encyclopedia includes more than 3000 key words, each defined within the context of the particular scientific field covered by the article. In addition to these definitions, the glossary of basic terms found at the back of each volume, defines the most commonly used terms in molecular and cell biology. These definitions, along with the reference materials printed at the back of each volume, should allow most readers to understand articles in the encyclopedia without referring to a dictionary, textbook or other reference work.

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Robert A. Meyers
Editor-in-Chief