Book Review

Elements of Molecular Neurobiology by C. U. M. Smith

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This book, written by a single author, develops a coherent, logical discussion of the neurosciences. The 1996 publication, the second edition of the text, contains abundant illustrations that were both obtained from other published sources and prepared by the author. The book is organized into initial overview chapters that are followed by chapters that discuss specific topics in greater detail. The early overview chapters contain references to specific topics covered in detail in later chapters; such interconnections are rarely seen in other texts and are extremely helpful to students and teachers of neuroscience.

The first chapter describes the primary cells of the brain and their integration into organized neural systems. The neural systems include both the large subdivisions of the brain (e.g., cerebellum, hippocampus, and the like) and the microscopic cortical modules. The author then introduces the macromolecular features of the brain. The well-written, brief description of protein and polynucleic acid structure assumes that the reader understands organic chemistry. However, the verbal descriptions of protein folding, insertion into membranes, and three-dimensional organization of catalytic sites will be comprehensible to the non-chemist.

The chapter "Manipulating Macromolecules" is very useful for the neuroscience student who has some familiarity with biotechnology tools currently taught in many secondary schools in the United States. Most of the current methodologies are mentioned with brief illustrations of their applications; these include neural and non-neural processes. Thus they may be of interest to the general public as well as to the scientific community.

The use of the English language is wonderful in this text. Several of the chapters begin with a tantalizing quotation that sets the

stage for the coming discussion. The most interesting, to this reader, was the comment of Von Baer (Chapter 17) "the more general characters of the large group of animals to which an embryo belongs appear earlier than the special characters." Although this is not always true, this concept is intriguing and well selected to generate discussion in class. Among the portions of particular interest to this reviewer include the discussion on myelin basic protein (MBP), the nicotinic acetyl cholinergic receptor, retinitis pigmentosa and the genetics of the brain. The excellent and brief discussion of the disease manifestations caused either by mutations in the gene of MBP or by immune response to the MBP relates human disease to molecular changes in gene structure or systemic responses to proteins. The continued effort by the author to relate brain structure and function to pathology is instructive to all students and researchers interested in the nervous system.

The final chapter, "Some Pathologies" offers the reader the opportunity to ponder the variety of biological processes that lead to different neural pathologies. The examples include infectious particles that have no genetic material (i.e., prions), neural tumors that result from mutations in a tumor suppressor gene (i.e., neurofibromatosis), and numerous repeats of a trinucleotide in a gene that leads to loss of motor control and dementia (Huntington's disease). These discussions provide the lecturer an opportunity to involve the students in learning communities and to share the excitement of the neurosciences in the last decade of our century.

One potential distraction in this text is the relatively extensive discussion of systems that have little direct impact on the chemistry of the brain (e.g., lac operon regulation, silk fibroin structure). While these examples do have counterparts that can be understood in the context of neuroscience, as in the discussion of *C. elegans* chromosomal structure to pathology in Huntington's disease, many of the connections are not readily apparent as presented.

This book should be an essential component of neuroscience education both because of the clarity and scientific merit of the text and because of the elegant language used in communicating the ideas presented. It is particularly useful for the instruction of university-level students.

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