

ing patch clamping and molecular structures), coding of sensory information (split off from a chapter that formerly also discussed the somatic sensory system), visual perception, muscles, and the autonomic nervous system. In addition, new material (and in some cases new coauthors) have been added to many existing chapters; the distribution of topics has been rearranged and some chapters have been merged, especially in the sections on motor systems and development; some chapters (such as those on schizophrenia and affective disorders) have new authors and have been substantially reworked; and almost all chapters have been updated. The appendixes have been shortened by dropping cerebral blood flow, physiological optics, and a problem set on membrane potentials, while retaining the old sections on electrical circuits, stroke, and cerebrospinal fluid.

Although the book was written for medical students, the editors list subsets of chapters that they believe would make the book suitable for graduate and undergraduate courses. For a graduate course, a minor weakness is that information in the text and figures is not linked explicitly to the reference lists, although one can often deduce sources. For an undergraduate neurobiology course, my choice of chapters would differ somewhat from the editors' suggestions. I would incorporate all six of the cell biology chapters (instead of just one) and the four chapters on vision (but not the somatosensory chapters, the reverse of their choice), and I would skip the chapters on myasthenia gravis and brain imaging (while otherwise following their choices for motor systems, development, and behavior).

But in spite of the editors' suggestions, I would be reluctant to use this book for an undergraduate course. Its depersonalized presentation of facts requires a prestructured, detailed curiosity that some medical students may bring with them but most undergraduates certainly lack. If they are in a course where the lectures carry most of the weight, undergraduates can use this book as a reference, but not as a book that will in itself inspire their learning. Aside from an occasional "as X and his colleagues showed," the people who created neuroscience are largely invisible, experimental details are relatively sparse, old controversies are presented as resolved, and a sense of thrilling and puzzling intellectual inquiry is absent. It is not a good way to learn about how new science is produced. For example, six pages on phototransduction describe in detail the steps linking rhodopsin to a cyclic GMP-gated sodium channel and the modulating role of calcium. The account is clearly and straightforwardly written, but it is presented

as revealed truth. There is no hint that phototransduction was a major puzzle for many years, or that calcium was once suspected to be the intermediate messenger, or that rapid action by a cyclic nucleotide was a surprise. In fairness, the book's homogenized approach is probably necessary for covering its vast territory, and comprehensiveness is definitely one of the book's attractive features. From time to time, however, a glimmer of what might have been done comes through. The first two chapters, both by Kandel, provide examples of the best and the worst. The first chapter makes the general point that different parts of the brain are specialized for different functions by recounting the historical clash of ideas about the localization of speech processing. It is vivid, concrete, and intellectually lively. The second chapter, in contrast, plods through a synopsis of neural and glial cell types and the steps in neuronal signaling, all but inviting students to memorize definitions with minimal context. It would be a major advance if the next edition had more chapters like the first and fewer like the second.

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