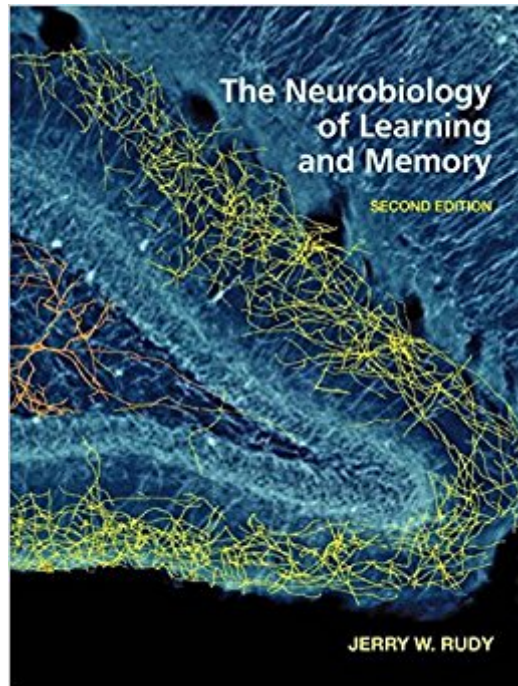




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# **The Neurobiology Of Learning And Memory**



## Synopsis

To understand how the brain learns and remembers requires an integration of psychological concepts and behavioral methods with mechanisms of synaptic plasticity and systems neuroscience. The *Neurobiology of Learning and Memory*, Second Edition, provides a synthesis of this interdisciplinary field. Each chapter makes the key concepts transparent and accessible to a reader with minimal background in either neurobiology or psychology and is extensively illustrated with full-color photographs and figures depicting important concepts and experimental data. Like the First Edition, the Second Edition is organized into three parts. However, each part has been expanded to include new chapters or reorganized to incorporate new findings and concepts. Part One introduces the idea that synapses modified by experience provide the basis for memory storage. It next describes the long-term potentiation methodology used to study how synapses are modified and concepts needed to understand the organization of synapses. The remaining chapters are organized around the idea that the synaptic changes that support long-term potentiation evolve in four overlapping stages referred to as (a) generation, (b) stabilization, (c) consolidation, and (d) maintenance. The goal of each chapter is to reveal that each stage depends on unique molecular processes and to describe what they are. Part Two builds on this foundation to show how molecules and cellular processes that have been identified from studies of synaptic plasticity also participate in the making of memories. It discusses some of the basic conceptual issues researchers face in trying to relate memory to synaptic molecules and describes some of the behavioral and neurobiological methods that are used. The chapters describing the processes involved in memory formation and consolidation have been extensively modified to provide a more detailed account of the molecular events that are engaged to ensure that established memories endure. The chapters on memory modulation and the fate of retrieved memories have been extensively modified to provide a more in-depth account of the relevant processes. Part Three is organized around the multiple memory systems view--that different neural systems have evolved to store the content contained in our experience. It features discussion of the medial-temporal hippocampal system that supports episodic memory, the concept of systems consolidation, and its relationship to Ribot's law--that memories become resistant to disruption as they age. The cortical-striatal system and its relationship to what are called behavioral actions and habits is described, and the book ends with a discussion of neural systems involved in the acquisition and removal of emotional memories.

## Book Information

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## Customer Reviews

"Rudy's text is well-suited for the student of neuroscience and should also find an audience among constituents of peripheral fields such as psychology or biology. It manages to capture the breadth of the subject without becoming too dense. The student or researcher who has made it their mission to understand how memory works will find this text a great resource in orienting them to the current thinking on this topic to date."--Mary Germino, Yale Journal of Biology and Medicine

Jerry W. Rudy is College Professor of Distinction in the Department of Psychology and Neuroscience at the University of Colorado at Boulder. He received his Ph.D. in psychology from the University of Virginia in 1970, and joined the UC Boulder faculty in 1980. The author of over 150 peer-reviewed research papers and book chapters, Dr. Rudy has served on the editorial boards of the Journal of Experimental Psychology: Animal Behavior Processes, Psychobiology, Developmental Psychobiology (Editor in Chief), Behavioral Neuroscience, Neuroscience & Biobehavioral Reviews, Learning and Memory, and Neurobiology of Learning and Memory (Associate Editor). He also served on the governing board and as President of the International Society for Developmental Psychobiology. He has received grant support from the National Science Foundation, the National Institute of Mental Health, and the National Institute of Health. Professor Rudy's research interests center on learning and memory processes. His research focused primarily on understanding the complementary contributions the hippocampus and neocortex make to learning and memory and the influence immune products have on memory. He is currently the

director of the undergraduate neuroscience program at the University of Colorado, Boulder.

Prof. Rudy's book is a wonderful resource if you want to learn the latest summary of neuroscience, with a background in microbiology, as applied to memory and learning. The author's background is in cognitive psychology, but the book is his auto-didactic summary of the "hard" sciences in three logical progressions: 1. The Synaptic Basis of Memories, 2. Molecules and Memories, and 3. Neural Systems and Memories. At the conclusion of each of the 19 chapters he lists ca. 30-50 references (until 2013) from fundamental journals such as "Science," "Nature," and "Neuron," which are summarized in the chapter. His writing style is lucid and easily comprehended, aided by excellent figures, conveniently placed in the text, for conceptual understanding. In addition to being the previous chair of the neuroscience department, Prof. Rudy has taught from this book at the upper undergraduate level. Highly recommended.

Forget the often-used mantra that "we don't know much about the brain." Jerry Rudy composed the book to reveal how much we actually know about molecular mechanisms of memory and learning. There are hundreds of research articles that are cited, yet this is only the frontier of memory research. The beautiful thing about this book is that it will captivate you and challenge the capacity of your imagination. The discussion about reconsolidation theory entranced me and I will leave that for you to discover. In short, the author attempts to cover as much on memory and learning as possible. Not just molecular mechanisms, but regions of the brain, neural systems, etc. He also uses research findings to rationalize the theories and ideas that he presents. For a neuro nerd, it is a must read!

I'm taking Jerry Rudy's neurobiology of learning and memory class this semester. The book is amazing and the man is a genius! It's really easy to follow along with and understand if you have a solid foundational understanding of how the brain operates. It's very eye opening and interesting, but I wouldn't recommend it if you're looking for a casual read. If you want to broaden your horizons and actually learn and retain new information, this one's for you!

One of the best textbooks I have needed for any class in years. It's easy to feel sometimes like you're wasting money getting all the required texts for some classes, but this is one I would recommend not skipping if you're trying to save on textbook costs.

Suppperrrr useful book. Very straight forward knowledge, easier to understand. The book itself is also small which makes it easy to carry.

Excellent textbook. Clear and comprehensive illustrations. Easy-to-follow descriptions of neurobiological processes. Extremely little chemistry knowledge is required to understand the material.

This book has a very logical and well researched layout and knowledge base.

good

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