

PART I: Overall Perspective

1. The Brain and Behavior
2. Nerve Cells and Behavior
3. Genes and Behavior

4. Circuits and Behavior

PART II: Cell and Molecular Biology of the Neuron

5. The Cells of the Nervous System

6. Ion Channels
7. Propagated Signaling: The Action Potential

PART III: Overview: Synaptic Transmission

8. Overview of Synaptic Transmission
9. Signaling at the Nerve Muscle Synapse: Directly Gated Transmission
10. Synaptic Integration in the Central Nervous System
11. Modulation of Synaptic Transmission: Second Messengers
12. Transmitter Release
13. Neurotransmitters

PART IV: Perception

14. Sensory Coding

15. The Somatosensory System: Receptors and Central Pathways
16. Touch
17. Pain
18. The Constructive Nature of Visual Processing
19. Low-Level Visual Processing: The Retina
20. Intermediate-Level Visual Processing: Visual Primitives
21. High-Level Visual Processing: Cognitive Influences
22. Visual Processing and Action
23. The Inner Ear

24. The Vestibular System
25. The Auditory Central Nervous System
26. Smell and Taste: The Chemical Senses

PART V: Movement

27. The Organization and Planning of Movement
28. The Motor Unit, Muscle Action, and Spinal Reflexes
29. Locomotion
30. Voluntary Movement
31. The Control of Gaze

- 32. Posture
- 33. The Cerebellum
- 34. The Basal Ganglia

PART VI: The Unconscious and Conscious Processing of Neural Information

- 35. The Brain Stem

- 36. The Autonomic Motor System and the Hypothalamus
- 37. Emotions and Feelings
- 38. Homeostasis, Motivation, and Addictive States
- 39. Seizures and Epilepsy
- 40. Sleep and Dreaming

PART VII: Development and the Emergence of Behavior

- 41. Patterning the Nervous System
- 42. Differentiation and Survival of Nerve Cells
- 43. The Growth and Guidance of Axons
- 44. Formation and Elimination of Synapses
- 45. Experience and the Refinement of Synaptic Connections
- 46. Repairing the Damaged Brain
- 47. Sexual Differentiation of the Nervous System

PART VII: Language, Thought, Affect, and Learning

- 48. From Nerve Cells to Cognition Internal Representations for Space and Action

- 49. Language
- 50. Learning and Memory
- 51. Cellular Mechanisms of Implicit Memory Storage
- 52. Prefrontal Cortex, Hippocampus, and the Biology of Explicit Memory Storage
- 53. Navigation and Spatial Memory

PART IX: Neurologic Disorders

- 54. Diseases of the Nerve and Motor Unit

- 55. Disorders of Conscious and Unconscious Mental Processes

- 56. Disorders of Thought and Volition: Schizophrenia

57. Disorders of Mood and Anxiety

58. Autism and Other Neurodevelopmental Disorders Affecting Cognition

59. Genetic Mechanisms of Neurodegenerative Diseases

60. The Aging Brain

Appendices

A. Functional Imaging of Cognition

B. Review of Basic Circuit Theory

C. The Neurological Examination of the Patient

D. Circulation of the Brain

E. The Blood-Brain Barrier, Choroid Plexus, and Cerebrospinal Fluid

F. Neural Networks