Contributing Authors p. xi
Foreword p. xiii
Preface p. xv
Acknowledgments p. xvii

The Anatomical Bases
General and Comparative Anatomy of the Cerebral Circulation p. 3
The Blood Vessel Wall: Endothelial and Smooth Muscle Cells p. 30
Perivascular Nerves in Brain Vessels p. 43

The Physiologic Bases
Ion Channels in Cerebral Arteries p. 71
Pharmacomechanical Coupling in Cerebrovascular Smooth Muscle p. 88
Endothelial Regulation p. 107
The Blood-Brain Barrier: Permeability, Substrate Transport, and Drug and Gene Targeting p. 119
Energy Generation in the Central Nervous System p. 140
Neurotransmitters: Metabolic and Vascular Effects p. 162
Neurovascular Control of the Cerebral Circulation p. 172

The Pharmacologic Bases
Catecholamines p. 191
Neuropeptide Y p. 212
Acetylcholine p. 222
Calcitonin Gene Related Peptide p. 248
Neuropeptides p. 256
5-Hydroxytryptamine and Its Receptors p. 283
Nitric Oxide p. 295
Purines, Purine Nucleotides, and Pyrimidine Nucleotides p. 311
Prostaglandins and Other Eicosanoids p. 325
Endothelin p. 339
Histamine p. 354
Cytokines p. 362

Fundamental Responses of the Cerebral Circulation
Measuring Cerebral Blood Flow and Metabolism p. 371
Changes in Arterial Gas Tension p. 384
Autoregulation: Arterial and Intracranial Pressure p. 395
Functional Brain Imaging p. 413

Disordered Control: Pathophysiologic Aspects
Molecular Mechanisms of Ischemic Brain Damage p. 423
Neuroprotection in Stroke Therapy p. 452
Primary Neurovascular Headache: Migraine and Cluster Headache from a Physiologic Perspective p. 457
Subarachnoid Hemorrhage: Extravasation of Blood in the Subarachnoid Space p. 466
Aging and Dementia p. 480