

CONTENTS

Foreword xiii

Preface xv

Acknowledgments xvii

PART I Major Divisions of the Central Nervous System: Introduction and Overview 1

Cranial Anatomy and Meningeal Layers 3

External and Midline Sagittal Anatomy of the Brain 12

External Anatomy of the Brain Emphasizing the Cranial Nerves 44

The Cerebellum 56

Major Divisions of the Cerebral Hemispheres Demonstrated on Reference Sections 65

Three-Dimensional Anatomy of Deep Telencephalic, Diencephalic, and Mesencephalic
Structures 72

Craniospinal Anatomy 81

The Ventricular System 97

Cerebrovascular Anatomy and Cerebral Angiography 113

PART II Sectional Neuroanatomy 153

Coronal Sectional Neuroanatomy 154

Horizontal Sectional Neuroanatomy 197

Sagittal Sectional Neuroanatomy 231

Neuroanatomy of Sections Parallel to the Longitudinal Axis of the Brainstem 263

Neuroanatomy of Sections Perpendicular to the Longitudinal Axis of the Brainstem 293

Neuroanatomy of Sections Parallel to the Parieto-Occipital Sulcus 304

PART III Neurohistology 315

Cerebral Cortex 317

Substantia Nigra 324

Choroid Plexus 325

White Matter and Cortical-White Matter Transition 326

Astrocytes 327

Cerebellar Cortex and White Matter 328

Spinal Cord 338
Peripheral (Dorsal Root) Ganglia 341
Trigeminal Ganglion 342
Peripheral Nerve 343

PART IV Sectional Neuroanatomy of the Thalamus and Basal Ganglia 345

Magnified View of the Lenticular Nucleus, Coronal Section, Level of the Anterior Commissure 347
Basal Ganglia and Extreme Rostral Thalamus, Coronal Section 348
Thalamus and Basal Ganglia, Coronal Section, Level of the Anterior Nucleus and Mammillary Bodies 351
Thalamus and Basal Ganglia, Coronal Section, Level of the Subthalamic Nucleus 354
Thalamus, Coronal Section, Level of the Ventroposteromedial Nucleus 356
Thalamus, Coronal Section, Level of the Lateral Geniculate Nucleus 358
Thalamus, Level of the Centromedian Nuclei, 362
Thalamus, Coronal Section, Level of the Posterior Commissure, 363

PART V Neuroanatomic Organization of the Mesencephalic-Diencephalic Transition 365

The Mesencephalic-Diencephalic Transition, Horizontal Section, Level of the Medial and Lateral Geniculate Nuclei 367
The Mesencephalic-Diencephalic Transition, Section Parallel to the Sylvian Fissure, Level Including the Optic Tracts 371
Cerebellum, Brainstem, and Diencephalon, Paramedian Sagittal Sections 373
Rostral Brainstem and Diencephalon, Sagittal Section 376
The Mesencephalic-Diencephalic Transition, Sagittal Section through the Fasciculus Retroflexus of Meynert 379
The Mesencephalic-Diencephalic Transition, Section Parallel to the Parieto-Occipital Sulcus, Level Including the Medial and Lateral Geniculate Nuclei 381
Horizontal Section of the Brain, Level of the Mammillary Bodies, the Olfactory Tract, and the Infundibular Recess of the Third Ventricle 383
Horizontal Section of the Brain, Level Including the Supraoptic Recess of the Third Ventricle and the Lamina Terminalis 385

PART VI Sectional Neuroanatomy of the Brainstem, Cerebellum, and Spinal Cord 387

Rostral Mesencephalon 388
Caudal Mesencephalon 392
Mesencephalon, Level of the Trochlear Nuclei 394
Caudal Mesencephalon and the Trochlear Nerves 396
Rostral Pons at the Caudal Aspect of the Decussation of the Superior Cerebellar Peduncles 398
Rostral Pons, Level of the Locus Coeruleus 400
Detail of the Locus Coeruleus 402
Pons, Level of the Superior and Middle Cerebellar Peduncles and the Trigeminal Nerves 403
Sagittal Section of the Rostral Pons, Cerebellum, and Mesencephalic-Diencephalic Transition Including the Rostral Termination of the Lateral Lemniscus 404
Detail of the Nodules, Dentate Nuclei, and Roof of the Fourth Ventricle 407

Pons and Cerebellum, Transverse Section Through the Dentate Nuclei and Middle Cerebellar Peduncles	408
Section Parallel to the Longitudinal Axis of the Brainstem, Including the Locus Coeruleus and Ventroposteromedial Nucleus of the Thalamus	410
Pons, Level of the Rostral Aspect of the Spinal Tract and Nucleus of the Trigeminal Nerve	412
Caudal Pons, Level of the Nuclei and Fascicles of the Abducens and Facial Nerves	414
Oblique Sections (Parallel to the Parieto-Occipital Sulcus) of the Pontomedullary Junction Demonstrating the Deep Cerebellar Nuclei	417
Rostral Medulla, Level of the Vestibulocochlear and Glossopharyngeal Nerves	419
Medulla, Horizontal Section Intersecting the Pontomedullary Sulcus	423
Medulla, Level of the Rostral Aspect of the Hypoglossal Nucleus	425
Medulla, Horizontal Section through Midcaudal Level Demonstrating the Internal Arcuate Fibers	428
Sagittal Section of the Medulla, Caudal Pons, and Cerebellum, Level of Nucleus and Fasciculus Cuneatus and the Internal Arcuate Fibers	430
Oblique Section (Approximating the Coronal Plane) of the Brainstem Extending from the Superior Colliculus through the Medullary Pyramids	432
Medulla, Level of the Convergence of the Vagal Trigone Dorsal to the Hypoglossal Nuclei (Caudal Obex)	434
Sagittal Section of the Medulla, Caudal Pons, and Cerebellum, Level of the Inferior Olivary Nucleus, Medial Vestibular Nucleus, and Nucleus and Tractus Solitarius	436
Medulla, Caudal, Level Including the Accessory Cuneate Nucleus	437
Medulla, Immediately Rostral to the Pyramidal Decussation	440
Cervical Spinal Cord	443
Thoracic Spinal Cord	446
Lumbar Spinal Cord	450
Comparison of Cervical, Thoracic, and Lumbar Spinal Cord Levels	453

PART VII Schematic Diagrams of Systems Organization and Connectivity 455

Trigeminal Sensory Systems	457
Somethesis	458
Spinocerebellar Systems	459
Efferent Projections of the Spinocerebellum	460
Cerebrocerebellar Systems	461
Dentatorubrothalamic Tract, Thalamocortical Projections, and the Corticospinal System	462
Vestibulocerebellar Circuits	463
Purkinje Cell Projections to the Vestibular and Deep Cerebellar Nuclei	464
Basal Ganglia and Sensorimotor Systems	465
Tracts of the Cervical Spinal Cord	466
The Muscle Spindle: Organization and Neural Connectivity	467
Muscle Spindle Afferents and Extrafusar Fiber Innervation	468
Thalamus and Attentional Mechanisms, Cortical and Subcortical Networks	469
Noradrenergic Projections in the Central Nervous System	470
Serotonergic Projections in the Central Nervous System	471
Dopaminergic Projections in the Central Nervous System	472
Descending Motor Control Tracts	473
Clinical Case Correlation of Descending Motor Control Systems: Intracerebral Hemorrhage and the Pathophysiology of Decerebrate and Decorticate Posturing	474
Descending Motor Control Systems	482



Visual Systems 486
Neural Control of Eye Movements 487
Oculosympathetic Innervation 499
Auditory Systems 500

PART VIII Functional Neuroanatomy and Pathophysiology: Clinical Case Correlations 501

Anterior Cerebral Artery Distribution Infarction 505
Complex Partial Status Epilepticus Associated with Left Middle Cerebral Artery
Distribution Infarction 511
Acute Right Middle Cerebral Artery Infarction with Severe Mass Effect and
Transtentorial Herniation 518
Neuroanatomic Characteristics of Middle Cerebral Artery Distribution Infarction 519
Left Hemispatial Neglect Associated with Right Middle and Anterior Cerebral Artery
Distribution Infarction 530
Left Hemispatial Neglect Associated with Right Parietotemporal Intracerebral Hemorrhage:
Acute Findings and Four-Year Follow-Up 535
Brachiocephalic Artery Occlusion with Hemorrhagic Infarction in the Distribution of the
Right Internal Carotid Artery 541
Pontine and Thalamic Infarctions Associated with Hypertension and Vertebrobasilar
Arteriosclerosis 546
Rostral Basilar Artery Occlusion 549
Left Posterior Cerebral Artery Distribution Infarction 551
Oculomotor Nerve Palsy with Sparing of the Parasympathetic Component 554
Abducens Nerve Palsy Associated with Diabetes Mellitus 555
Ventral Mesencephalic Infarction with Contralateral Hemiplegia 556
Lateral Medullary Infarction (Wallenberg's Syndrome) 557
Cervical Spondylosis 562
Hemorrhagic Infarction of the Thoracolumbar Spinal Cord Associated with Aortic
Aneurysm 563
Head Trauma with Basilar Skull Fracture, Acute Epidural and Subdural Hemorrhages,
and Cerebral Contusions 565
Subdural Hematoma: Clinicopathologic Aspects 567
Obstructive Hydrocephalus 570
Severe Anoxic Encephalopathy with Ten-Month Survival 575
Effects of Anoxia on Hippocampal Pyramidal Cells 581
Multiple Sclerosis 583
Binswanger's Disease 586
Alzheimer's Disease 590
Pick's Lobar Atrophy: Clinical and Pathologic Correlations 600
Herpes Simplex Encephalitis: Case Presentation and Seven-Year Follow-Up 608
Pathologic Findings in Herpes Simplex Encephalitis 610
Striatonigral Degeneration 613
Huntington's Chorea 615
Pineal Cyst with Paralysis of Upward Gaze 616
Left Perisylvian Meningioma with Episodic Wernicke's Aphasia 618
Frontal Meningioma in a Patient with Progressive Neurobehavioral Changes 619
Pathologic Characteristics of Meningiomas 621
Glioblastoma Multiforme in a 32-Year-Old Male, Clinicopathologic Correlations 627
Histopathology of Glioblastoma Multiforme 628

Glioblastoma Multiforme Presenting with Complex Partial Seizure Activity: Case Presentation, Pre- and Postoperative Neuroimaging, and Clinical Course	635
Glioblastoma Multiforme: Neuroimaging and Pathologic Correlations	636
Transtentorial Herniation with Glioblastoma Multiforme	648
Postmortem Four-Vessel Arteriography, Ventriculography, and Magnetic Resonance Imaging in a Case of Glioblastoma Multiforme	649
Carcinoma of the Lung Metastatic to the Pontine Tegmentum: Clinical Case Presentation and Analysis, Neuroimaging, and Pathologic Findings	656
Characteristics of Carcinoma Metastatic to the Central Nervous System	657
Acute Bacterial Endocarditis with Multiple Septic Emboli to the Brain: Case Presentation and Pathologic Findings	662
Agenesis of the Corpus Callosum	669

<i>Index</i>	673
--------------	-----