

Contents

Preface	ix
Acknowledgments	xiii
1 Cross-Sectional Anatomy of the Brain	1
I. Introduction	1
II. Midsagittal section	1
III. Coronal section through the optic chiasm	3
IV. Coronal section through the mamillary bodies	4
V. Axial image through the thalamus and internal capsule	5
VI. Axial image through the midbrain, mamillary bodies, and optic tract	5
2 Meninges, Ventricles, and Cerebrospinal Fluid	7
I. Meninges	7
II. Ventricular system	9
III. Cerebrospinal fluid	10
3 Blood Supply	11
I. The spinal cord and lower brain stem	11
II. The internal carotid system	11
III. Vertebrbasilar system	13
IV. Blood supply of the internal capsule	15
V. Veins of the brain	15
VI. Venous dural sinuses	15
VII. Angiography	16
VIII. Middle meningeal artery	16
4 Development of the Nervous System	17
I. The neural tube	17
II. The neural crest	18
III. Anterior neuropore	19
IV. Posterior neuropore	19
V. Microglia	20
VI. Myelination	20
VII. Positional changes of the spinal cord	20
VIII. Optic nerve and chiasma	20
IX. Hypophysis	20
X. Congenital malformations of the CNS	21
5 Neurohistology	22
I. Neurons	22
II. Nissl substance	22

III.	Axonal transport	22
IV.	Wallerian degeneration	22
V.	Chromatolysis	23
VI.	Regeneration of nerve cells	23
VII.	Glial cells	23
VIII.	The blood-brain barrier	24
IX.	Pigments and inclusions	24
X.	Classification of nerve fibers	25
6	Spinal Cord	26
I.	Gray and white communicating rami	26
II.	Termination of conus medullaris	26
III.	Location of major motor and sensory nuclei of the spinal cord	27
IV.	Cauda equina	27
V.	Myotatic reflex	27
7	Tracts of the Spinal Cord	28
I.	Introduction	28
II.	Dorsal column-medial lemniscus pathway	28
III.	Lateral spinothalamic tract	30
IV.	Lateral corticospinal tract	30
V.	Hypothalamospinal tract	34
8	Lesions of the Spinal Cord	35
I.	Diseases of motor neurons and corticospinal tracts	35
II.	Sensory pathway lesions	37
III.	Combined motor and sensory lesions	37
IV.	Peripheral nervous system (PNS) lesions	38
V.	Intervertebral disk herniation	38
9	Brain Stem	39
I.	Overview	39
II.	Cross section through the medulla	39
III.	Cross section through the pons	41
IV.	Cross section through the rostral midbrain	42
V.	Corticobulbar fibers	42
10	Trigeminal System	43
I.	Overview	43
II.	The trigeminal ganglion	43
III.	Trigeminothalamic pathways	43
IV.	Trigeminal reflexes	45
V.	The cavernous sinus	46
11	Auditory System	47
I.	Overview	47
II.	The auditory pathway	47
III.	Hearing defects	47
IV.	Auditory tests	49
12	Vestibular System	50
I.	Overview	50

II. Labyrinth	50
III. Vestibular pathways	52
IV. Vestibulo-ocular reflexes	52
13 Cranial Nerves	53
I. Olfactory nerve	53
II. Optic nerve	54
III. Oculomotor nerve	54
IV. Trochlear nerve	55
V. Trigeminal nerve	55
VI. Abducent nerve (CN VI)	56
VII. Facial nerve (CN VII)	57
VIII. Vestibulocochlear nerve (CN VIII)	59
IX. Glossopharyngeal nerve (CN IX)	60
X. Vagal nerve (CN X)	61
XI. Accessory nerve (spinal accessory nerve; CN XI)	62
XII. Hypoglossal nerve (CN XII)	62
14 Lesions of the Brain Stem	63
I. Lesions of the medulla	63
II. Lesions of the pons	64
III. Lesions of the midbrain	65
IV. Acoustic neuroma (schwannoma)	66
15 Cerebellum	67
I. Function of the cerebellum	67
II. Anatomy of the cerebellum	67
III. Major cerebellar pathway	68
IV. Cerebellar dysfunction	69
V. Cerebellar syndromes and tumors	69
16 Thalamus	70
I. Introduction	70
II. Major thalamic nuclei and their connections	70
III. Blood supply of the thalamus	72
IV. The internal capsule	72
17 Visual System	73
I. Introduction	73
II. The visual pathway	73
III. The pupillary light reflex pathway	75
IV. The pupillary dilation pathway	76
V. Near reflex and accommodation pathway	76
VI. Cortical and subcortical centers for ocular motility	76
VII. Clinical correlations	77
18 Autonomic Nervous System	79
I. Introduction	79
II. Cranial nerves with parasympathetic components	79
III. Communicating rami	79
IV. Neurotransmitters	79
V. Clinical correlations	83