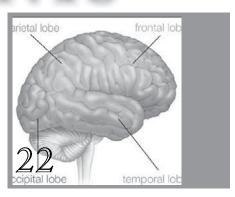
CONTENTS

Introduction 10

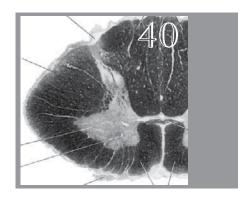
CHAPTER 1: THE CENTRAL NERVOUS SYSTEM 19

The Brain 19
Cerebrum 20
Brainstem 30
Cerebellum 37
The Spinal Cord 39
Cellular Laminae 42
Ascending Spinal Tracts 43
Descending Spinal Tracts 44



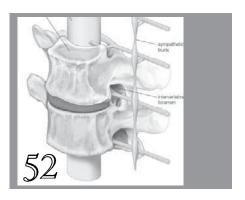
Chapter 2: The Peripheral and Autonomic Nervous Systems 50

The Peripheral Nervous System 50
Spinal Nerves 51
Cranial Nerves 62
The Autonomic Nervous System 74
Sympathetic Nervous System 76
Parasympathetic Nervous
System 80
Enteric Nervous System 82



Chapter 3: Functions of the Human Nervous System 85

Identifying Neural Pathways 85
Receptors 89
Autonomic Control of Organs 92
The Eye 93
The Endocrine System 94
The Reproductive System 95
The Cardiovascular System 96
The Urinary System 99
Higher Cerebral Functions 99







Analytical Approaches 100
Hemispheric Asymmetry,
Handedness, and Cerebral
Dominance 102
Language 106
Memory 108
Executive Functions of the Frontal
Lobes 110

Chapter 4: The Nervous System in Motion 112

Reflex Actions 114 Sensory Receptors of Movement 117 Basic Organization of Movement 121 Lower-Level Mechanisms of Movement 125 Higher-Level Mechanisms of Movement 127 The Vestibular System 135 Saccule and Utricle 136 Semicircular Canals 137 Nerve Supply 137 Vestibular Functions 138 Vestibulo-Ocular Reflex 139 Conscious Sensation 139

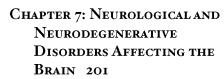
Chapter 5: Perception, Sensation, and Neuroplasticity 142

Perception 143
General Organization of
Perception 144
Vision 145
Hearing 148
Theories of Pain Sensation 149
Emotion and Behaviour 151
Neuroplasticity 158

Types of Cortical Neuroplasticity 159 Brain-Computer Interface 164

Chapter 6: Neurobiological Disorders of Development and Behaviour 167

Neural Tube Defects 167 Cerebral Palsy 168 Pervasive Developmental Disorders 171 Autism Spectrum Disorders 172 Autism 173 Asperger Syndrome 176 Pervasive Developmental Disorder Not Otherwise Specified 178 Childhood Disintegrative Disorder 179 Rett Syndrome 181 Mental and Behavioral Disorders 182 Schizophrenia 183 Depression 186 Bipolar Disorder 189 Anxiety Disorders 190 Attention-Deficit/Hyperactivity



Dementia 201
Pick Disease 202
Alzheimer Disease 203
Essential Tremor 209
Parkinsonism 210
Parkinson Disease 213
Dystonia 216
Chorea 217

Disorder 196







Sydenham Chorea 218
Huntington Disease 219
Epilepsy 220
Partial Seizures
Generalized Seizures 222
Diagnosis and Treatment 224
Meningitis 225
Encephalitis 228
Brain Cancer 230
Cause and Symptoms 230
Diagnosis and Treatment 231



Diseases of the Brainstem 233 Trauma 233 Sleep Disorders 234 Brain Death 235 Demyelinating Disease 236 Multiple Sclerosis 236 Ataxia 239 Diseases of the Peripheral Nervous System 240 Neuropathies 240 Myasthenia Gravis 252 Muscular Dystrophy 254 Congenital Myopathy 256 Other Inherited Muscle Diseases 257 Diseases of the Cranial Nerves 258

Neuroblastoma 261
Diagnosis 262
Biological and Genetic Factors 263
Treatment and Development of
Targeted Therapies 263

CONCLUSION 266 GLOSSARY 268 BIBLIOGRAPHY 271 INDEX 275

