I. Overview → Note difference from text!

Central Nervous System (CNS)
(Brain & Spinal Cord)

Peripheral Nervous System (PNS)

Somatic Nervous System Autonomic Nervous System (ANS)
--conscious --unconscious

II. Cells → Fig. 8-1 (poor quality)

A. Neurons
   1. dendrites
      (“tree”)
      a. many, short, branched processes
      b. carry info to cell body
   2. axons
      a. single, long process
      b. carry info away from cell body
      c. often myelinated by a white waxy sheath
   3. path of information:
      excites nerve impulse
      stimulus → dendrite → cell body → axon → another neuron/muscle/gland

B. Neuroglia = “glue”
   1. nervous “connective tissue” →~6 different cell types
      a. supports
      b. protects
   2. some produce myelin sheath
   3. others produce cerebrospinal fluid (CSF)
   4. glioma is most common “brain tumor”

III. Terminology
A. White matter vs gray matter
   Myelinated axons cell bodies & unmyelinated axons
   -- Functionally, white matter = communicating pathways
      gray matter = integrating centers (decision making)

Poliomyelitis = “polio” – viral disease
spinal cord (“marrow”)
“gray” matter

B. Nerve = bundle of axons outside of CNS
   sensory (afferent) → to CNS from PNS
   motor (efferent) → from CNS to PNS
IV. Brain – Fig 8-2, & 8-3
“encephalo” = “in head”
4 main parts
A. Cerebrum
1. Separated by fissure into 2 hemispheres
2. Convoluted surface: ridges called gyri, depressions called sulci, or fissures if deeper
3. NRF lobes, but realize that functions are localized
4. Outer layer of gray matter = cerebral cortex ( = rind, bark)
5. Functionally, site of “higher” mental functions
B. Diencephalon ≠ thalamus, as text implies
1. Thalamus – relay center for sensory info
2. Hypothalamus – controls ANS & endocrine systems
3. Pineal gland – coordinates sleep/wake cycles with light/dark cycles
C. Cerebellum – “little” cerebrum
- Coordinates muscle activity
D. Brain stem – 3 (4?) parts
1. Midbrain – connects to diencephalon
2. Pons – “bridge” between cerebellum & other regions
3. Medulla oblongata
4. As a whole, controls basic visceral functions (breathing, heart rate, BP)
E. Ventricles → Fig. 8-4
1. “little pouches” within brain
2. Contain CSF
   a. Circulates within & around
   b. Sampled via lumbar puncture (LP), [spinal tap]
F. Meninges (sing. = meninx) → Fig. 8-3
- 3 layers of connective tissue that protect brain and spinal cord
- NRF names

V. Spinal Cord – “myel/o”
A. Review vertebral column— p.156, Fig. 4.6
   “spondyl/o”
B. Nerves emerge between vertebral arches
   → If nucleus pulposus bulges, can exert pressure on cord or nerves result is a
      o herniated disc → Fig. 8-8
         - symptom is typically sciatica: radiating pain from the hip
         - correctable via diskectomy (Fig. 8-19) or spondylosyndesis (Fig. 8-21)

VI. Peripheral nervous system (PNS)
A. Cranial nerves
   -- 12 pairs
B. Spinal nerves
   -- 31 pairs, usually named after body region they supply
C. Cell bodies found outside CNS in knot-like clumps called ganglia (sing. = ganglion)
VII. Autonomic nervous system (ANS)
A. Includes portions of both some spinal & cranial nerves
   --usually considered part of PNS, not a “3rd” part as your text implies

B. Two divisions, usually opposite actions
   1. sympathetic → prepares body for emergency, stress
   2. parasympathetic → restores body to resting state

VIII. Clinical
A. cerebrovascular disease → same terms as systemic
B. cerebrovascular accident (CVA) = “stroke” (Fig. 8-6)
   1. loss of blood supply to neurons → cell death
   2. Four causes
      a. compression (by tumor) → not illustrated
      b. hemorrhage → hemorrhagic stroke
      c. thrombus → ischemic stroke
      d. embolism
   3. often preceded by TIA – transient ischemic attack

C. neural tube defects (congenital)
   1. spina bifida
      - due to failure of lamina to meet
      - several degrees of severity
         a. meningocele → only meninges protrude
         b. myelocele → only spinal cord
         c. meningomyelocele → both
   2. anencephaly
      - improper formation of brain

D. “motor” disorders (but cause is neurological)
   -paresis vs. –plegia (paralysis)
   ↓ weakness
   ↓ temporary or permanent loss of movement

   hemi- vs. para-
   ↓ one side
   ↓ lower half

So, hemiparaplegia = ?

   • amyotrophic lateral sclerosis (Lou Gehrig’s disease) – progressive muscular weakness; unknown cause
   • cerebral palsy (= paralysis) – general term for a variety of congenital/neonatal disorders that typically don’t progressively worsen

E. agnosia = “without knowing” → loss of sensory interpretation
   astereognosis – can’t identify by touch
   atrypagnosis – can’t locate a “touch”
IX. Diagnostic tests and procedures
A. Electrodiagnostic
   1. Electroencephalogram (EEG)
   2. Evoked potentials → in response to visual, auditory stimuli
   3. Polysomnography (PSG) → sleep disorders

B. Reflex testing
   1. Deep tendon reflexes → may be depressed or exaggerated (NRF scoring)
   2. Babinski reflex → abnormal plantar reflex (Fig. 8-17)

X. Psychiatric terms/disorders
Diagnosis/treatment controversial → where do you draw the line?: See “Incidence of Mental Disorders” article on website

neurosis – anxiety prominent
vs.
psychosis – inability to communicate or function

Ex: “depression” → 6 terms! autism → broad classification (like “cancer”)
dermaty = mild form with multiple causes/treatments
“mind”

--We’ll focus on word roots and abbreviations:

A. Mood disorders
   bipolar (BD) disorder / manic depression: severe swings
   seasonal affective disorder (SAD) – pineal gland disorder

B. Anxiety disorders
   generalized anxiety disorder (GAD)
   posttraumatic stress disorder (PTSD)
   obsessive-compulsive disorder (OCD)
   hypochondriasis
   * can be treated with anxiolytic (antianxiety) drugs

C. Childhood (usually) disorders
   autism → ample evidence that NOT caused by vaccines!!
dyslexia → written or spoken
   “word”
   attention-deficit/hyperactivity disorder (ADHD)

D. Eating disorders
   anorexia nervosa vs. bulimia nervosa
   “appetite” “hunger”

E. Psychotic disorders
   “split”
   “mind”

XI. Psychiatric (psychotropic) drugs
   neuroleptic = antipsychotic