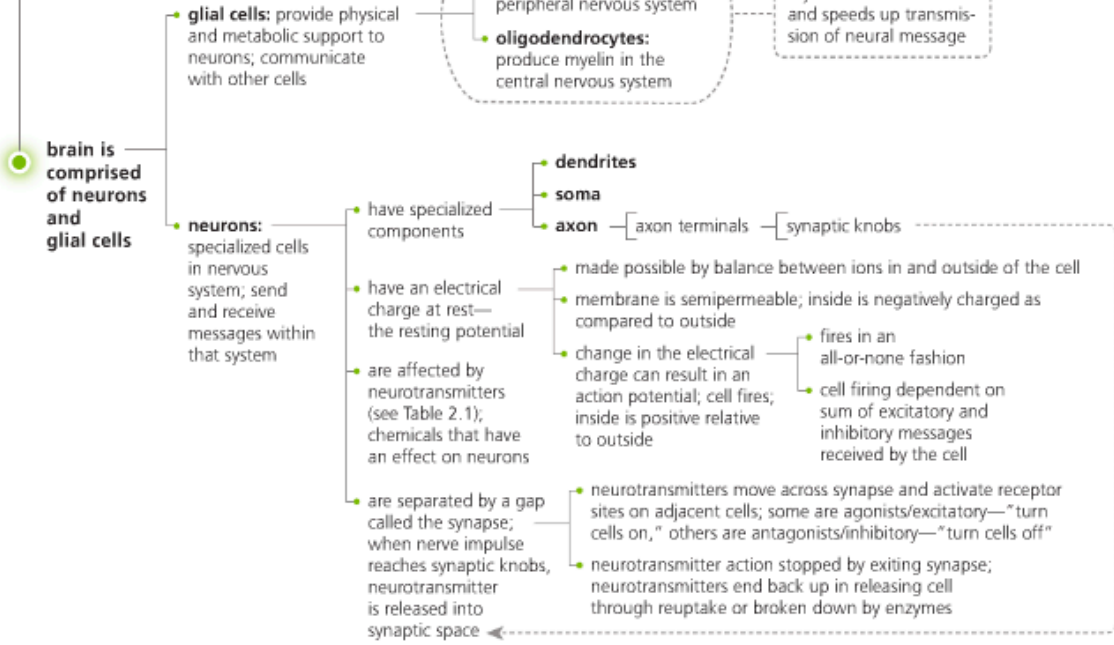


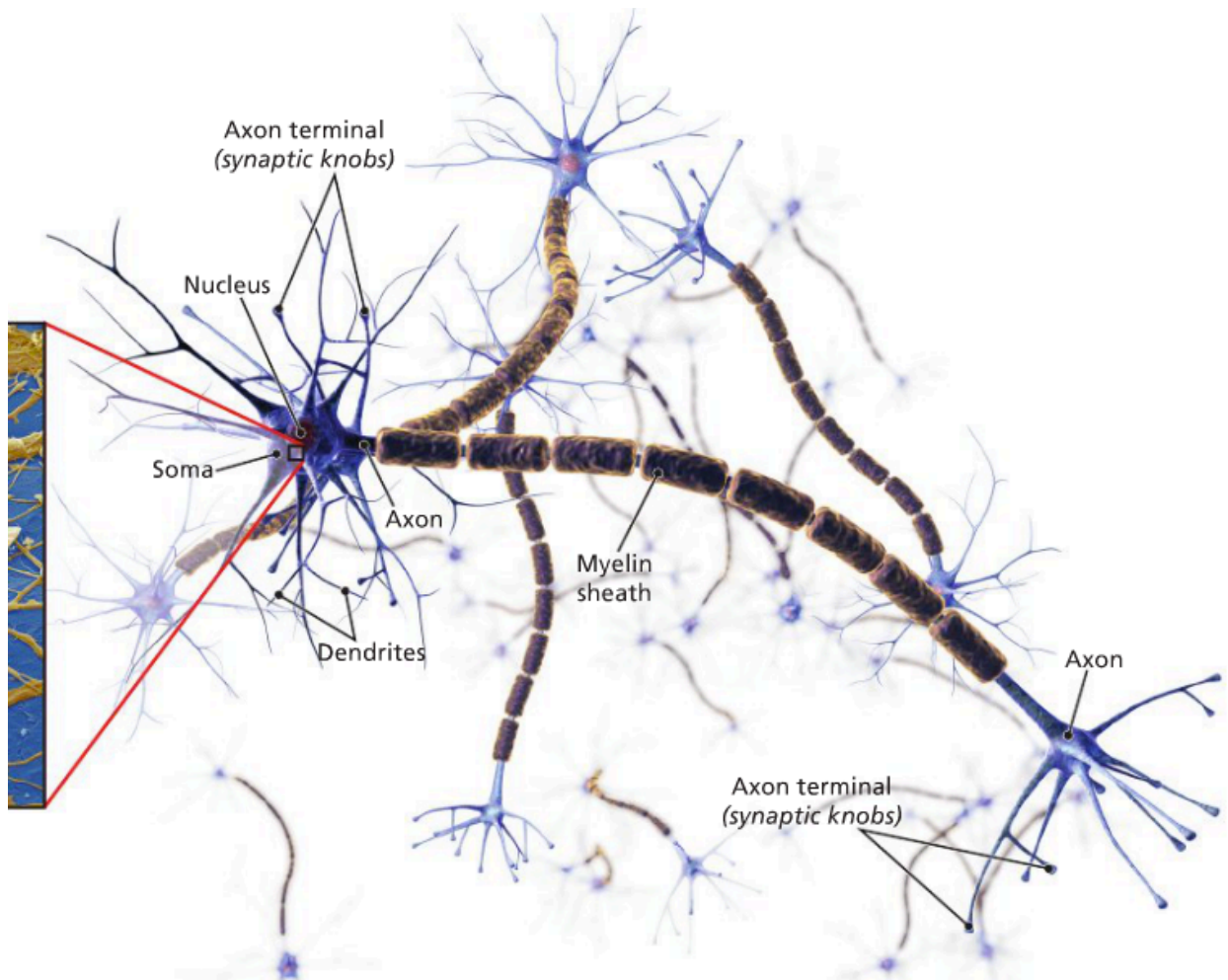
Table 2.1 Neurotransmitters and Their Functions

NEUROTRANSMITTERS	FUNCTIONS
Acetylcholine	Excitatory or inhibitory; involved in memory and controls muscle contractions.
Serotonin	Excitatory or inhibitory; involved in mood, sleep, and appetite.
GABA (gamma-aminobutyric acid)	Major inhibitory neurotransmitter; involved in sleep and inhibits movement.
Glutamate	Major excitatory neurotransmitter; involved in learning, memory formation, and nervous system development.
Norepinephrine	Mainly excitatory; involved in arousal and mood.
Dopamine	Excitatory or inhibitory; involved in control of movement and sensations of pleasure.
Endorphins	Inhibitory neural regulators; involved in pain relief.

The nervous system is a network of cells that carries information to and from all parts of the body; **neuroscience** is the field of study that deals with the structure of the brain and components of the nervous system

Neurons and Nerves





2.3

2.4

The Central Nervous System

(comprised of the brain and spinal cord)



brain

true core of nervous system: takes information from senses, processes it, makes decisions, sends commands to rest of body



spinal cord

long bundle of neurons that carries information to and away from the brain; helps control pain response

- spinal cord reflexes involve several different neurons (sensory neurons, interneurons, and motor neurons)

- spinal reflexes enable fast, often lifesaving, actions that do not require conscious thought

The Peripheral Nervous System

comprised of the nerves and neurons not contained in the brain and spinal cord; allows the brain and spinal cord to communicate with the sensory systems and to control the muscles and glands of the body; divided into somatic and autonomic nervous systems



somatic nervous system

controls the voluntary muscles of the body; involves the sensory pathway (sensory neurons carrying information to spinal cord and/or brain) and the motor pathway (nerves that carry information to voluntary skeletal muscles)

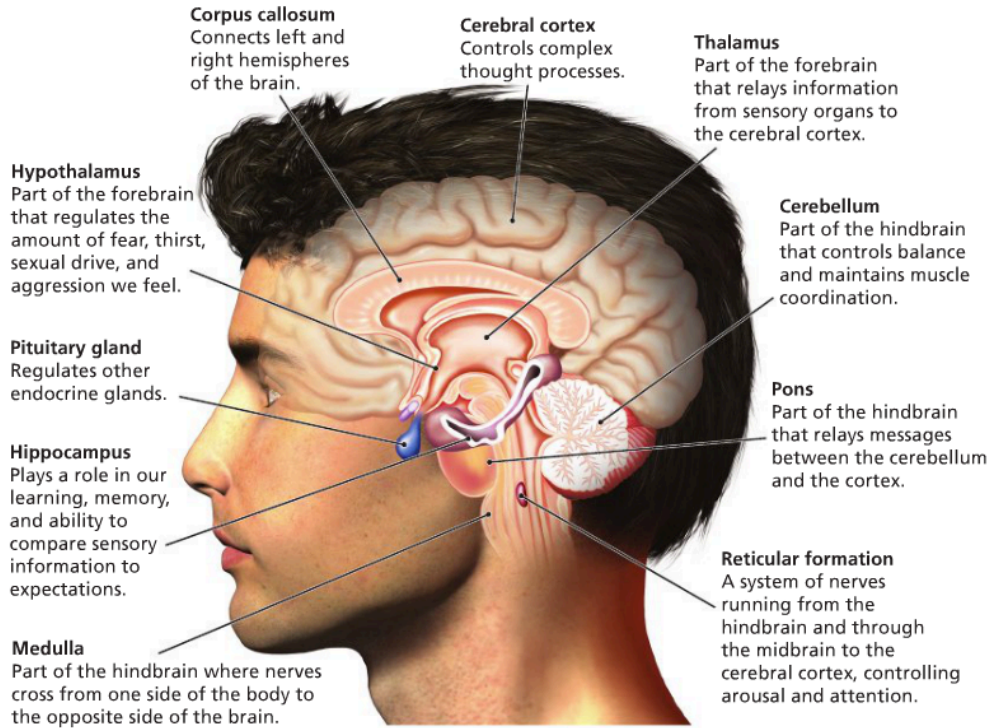


autonomic nervous system

controls automatic functions of the body (organs, glands, involuntary muscles)

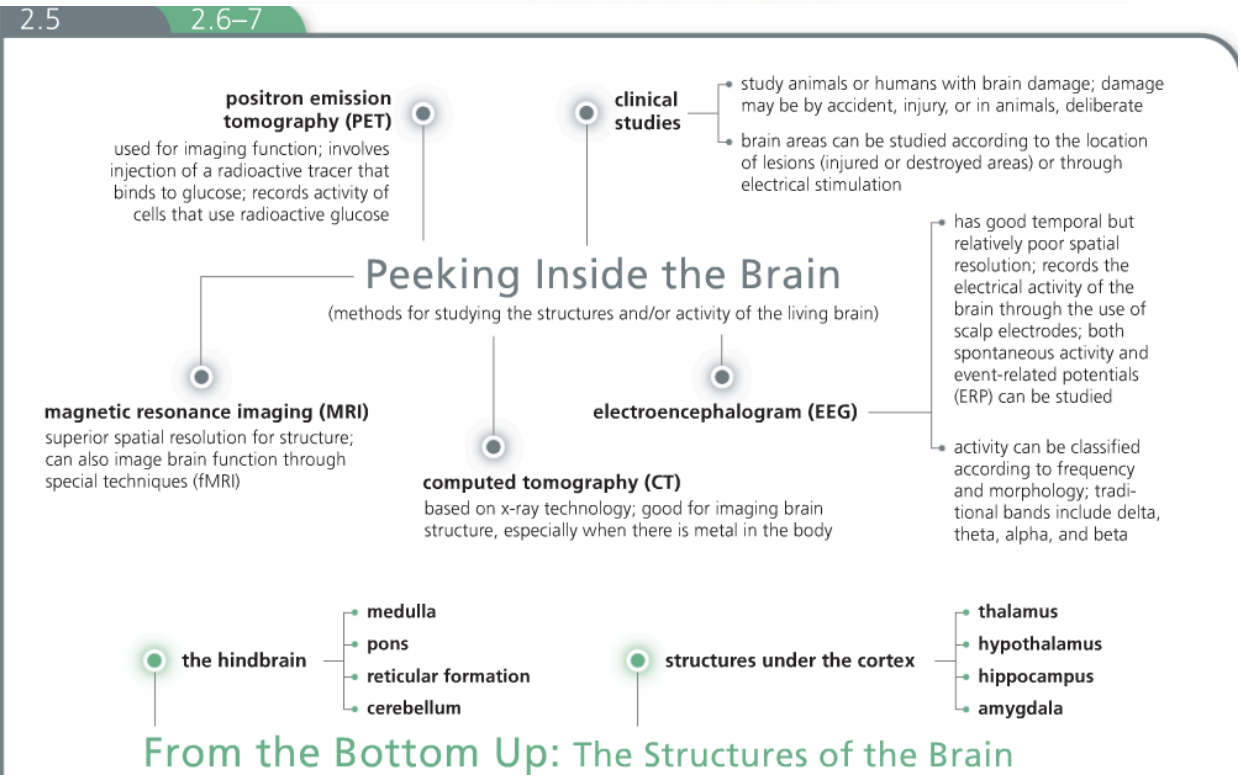
- sympathetic division:** "fight-or-flight" functions—reacts to stressful events and bodily arousal

- parasympathetic division:** "eat-drink-and-rest" functions—restores body to normal functioning after arousal and is responsible for day-to-day functioning of glands and organs



2.5

2.6-7



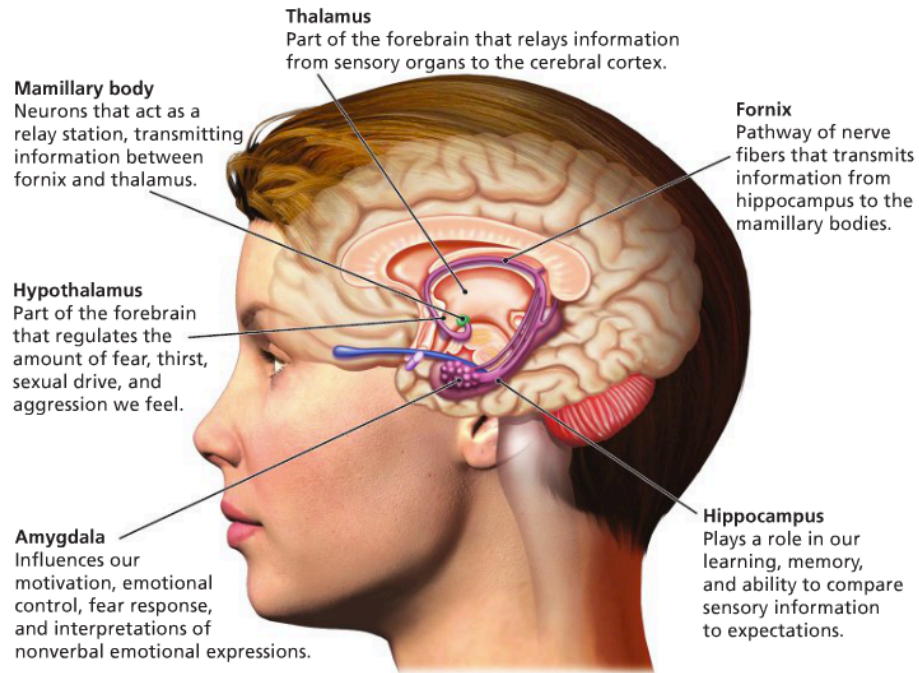
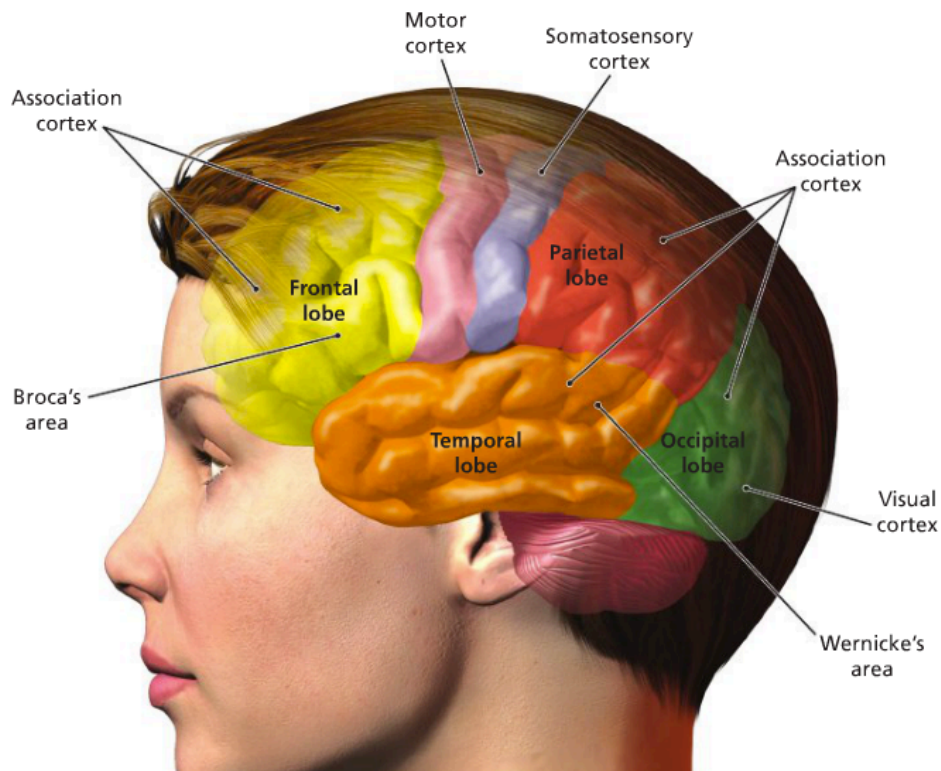


Figure 2.12 **The Limbic System**

Table 2.2 Specialization of the Two Hemispheres

LEFT HEMISPHERE	RIGHT HEMISPHERE
Controls the right hand	Controls the left hand
Spoken language	Nonverbal
Written language	Visual-spatial perception
Mathematical calculations	Music and artistic processing
Logical thought processes	Emotional thought and recognition
Analysis of detail	Processes the whole
Reading	Pattern recognition
	Facial recognition



2.8-10

2.11

the cortex
the outermost, wrinkled layer of the brain; comprised of left and right hemispheres, connected by corpus callosum; each hemisphere can be further divided into four lobes

- frontal lobes
- temporal lobes
- parietal lobes
- occipital lobes

the association areas of the cortex
devoted to making connections between incoming sensory information and stored memories, images, and knowledge; damage to right association areas can result in spatial neglect where person fails to recognize the left side of the visual field

- **Broca's area:** found in left frontal lobe; devoted to speech production; damage to this area can result in Broca's aphasia
- **Wernicke's area:** found in the left temporal lobe; plays a role in understanding the meaning of words

The Structures of the Brain (continued)

the cerebral hemispheres
some brain functions governed by one hemisphere more than the other; differences found due to work of various researchers (e.g., Sperry's split-brain studies; work of Springer & Deutsch)

- **left hemisphere** specializes in tasks that involve sequence and analysis (language, speech, handwriting, math)
- **right hemisphere** processes information in a more global sense (perception; visualization; spatial perception; recognition of patterns, faces, and emotional expression)

glands are organs in the body that secrete chemicals; some affect functioning of the body but not behavior; others have widespread influence on the body and behavior

The Chemical Connection: The Endocrine Glands

endocrine glands secrete chemicals called *hormones* into bloodstream; affect behavior and emotions by influencing the activity of the brain and by controlling muscles and organs such as the heart, pancreas, and sex organs

- pituitary gland
- pineal gland
- thyroid gland
- pancreas
- gonads
- adrenal glands

(continued)