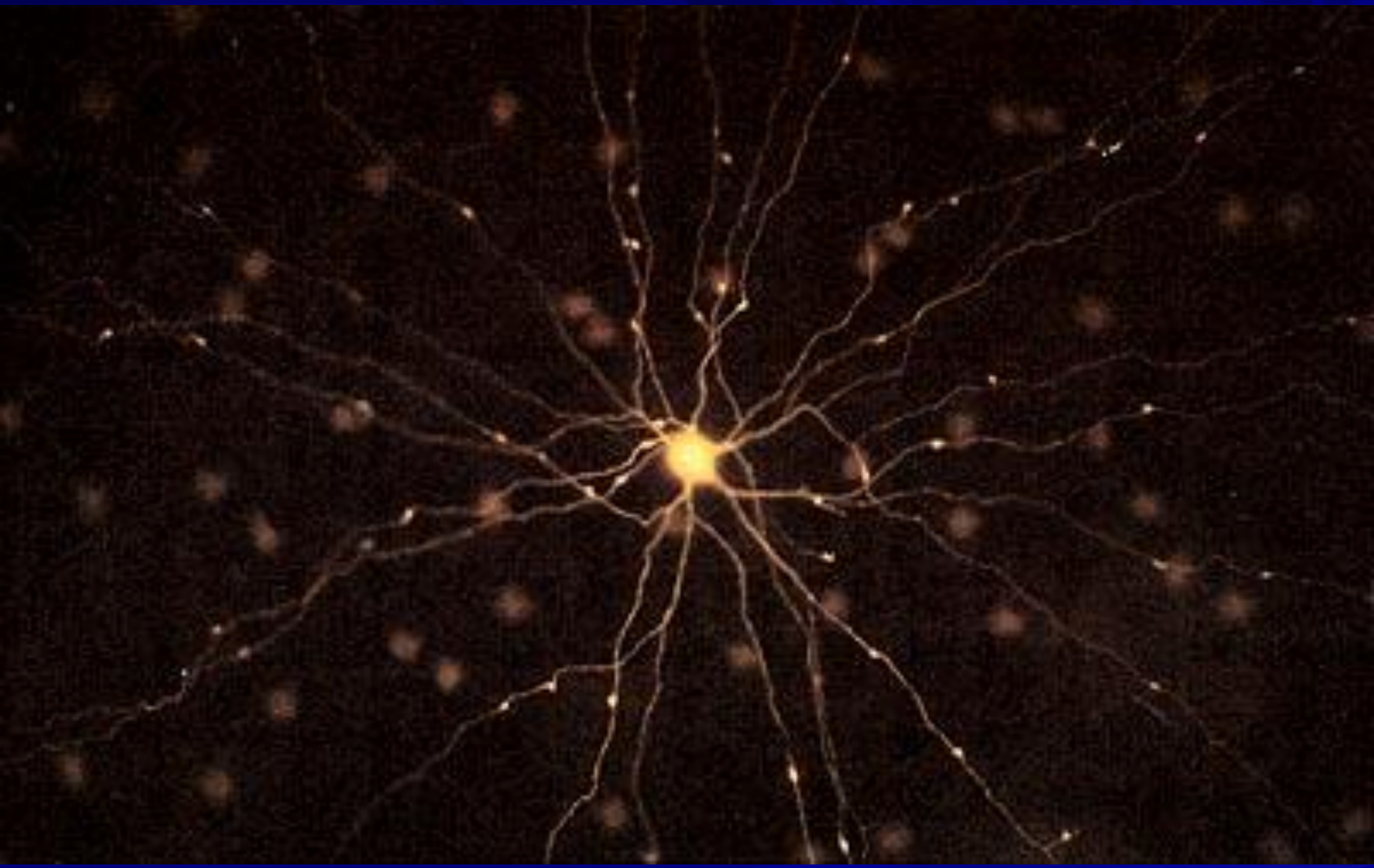
Introduction

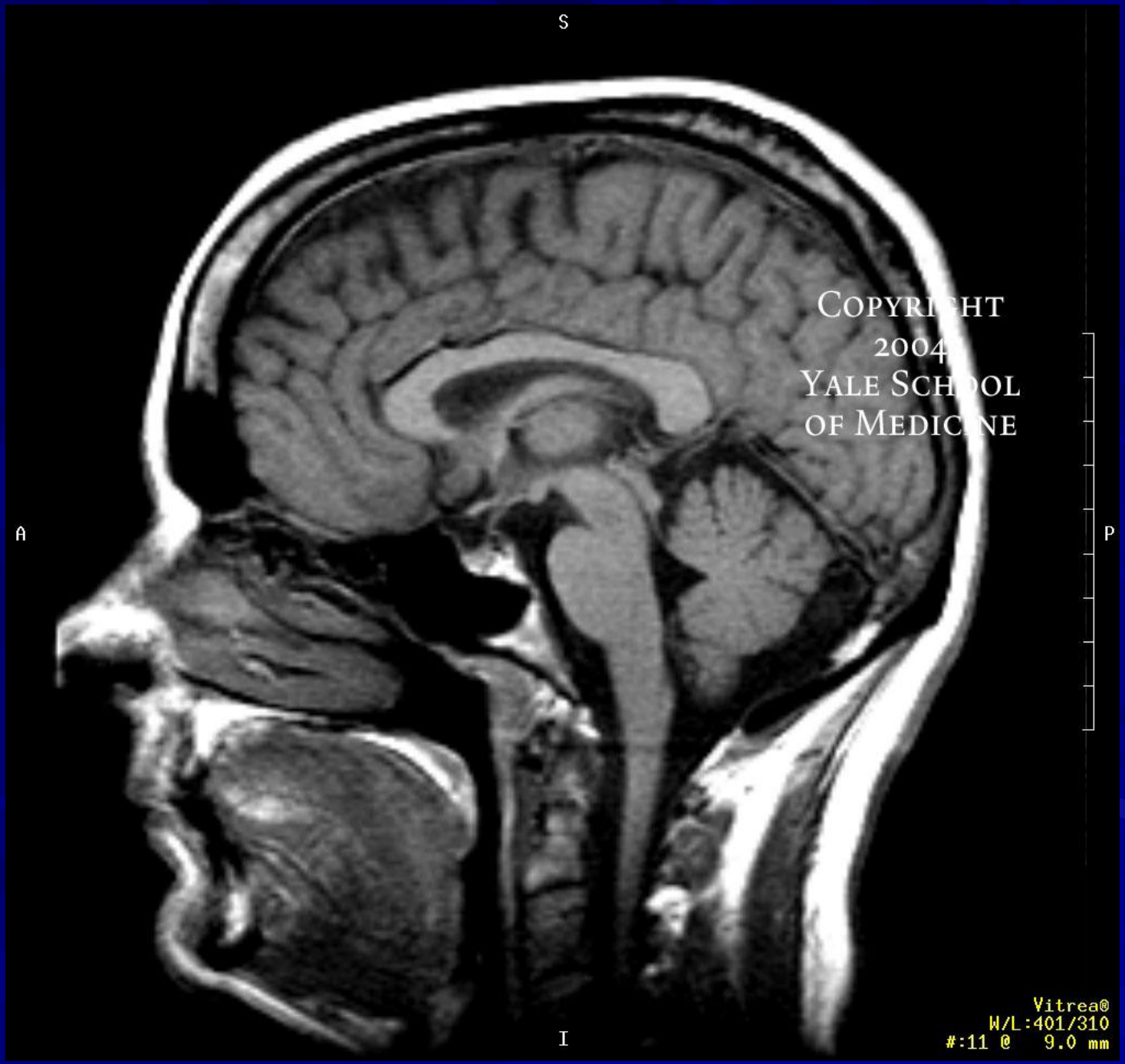
Neuroscience is a composite of several disciplines including

- neuroanatomy,
- neurophysiology,
- neurology,
- neuropathology,
- neuropharmacology,
- behavioral sciences,
- cell biology.

Methods for brain study

- Microscope
- Tomography (in vivo).
- EEG
- Biochemical methods
- Behavioral methods

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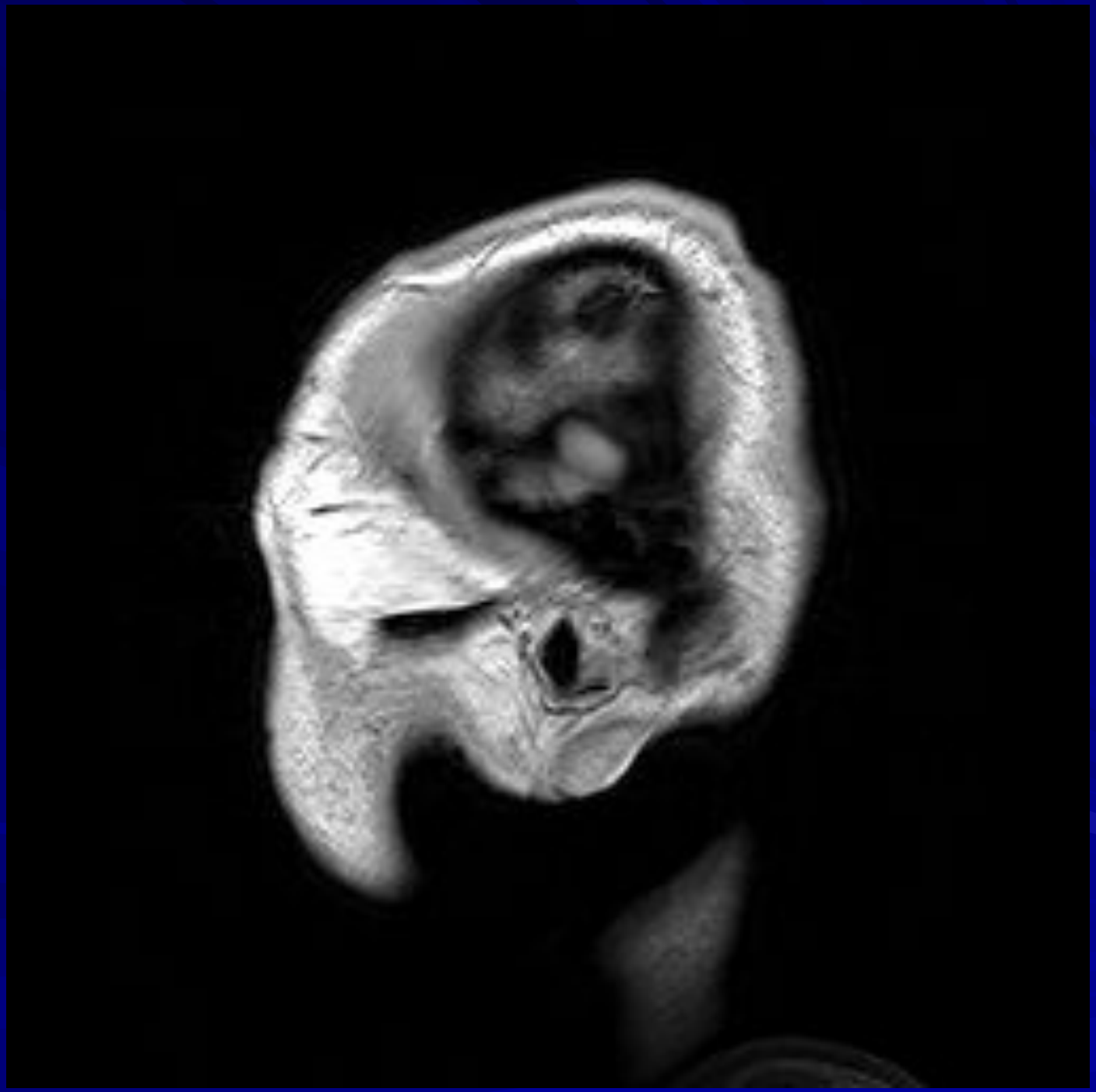
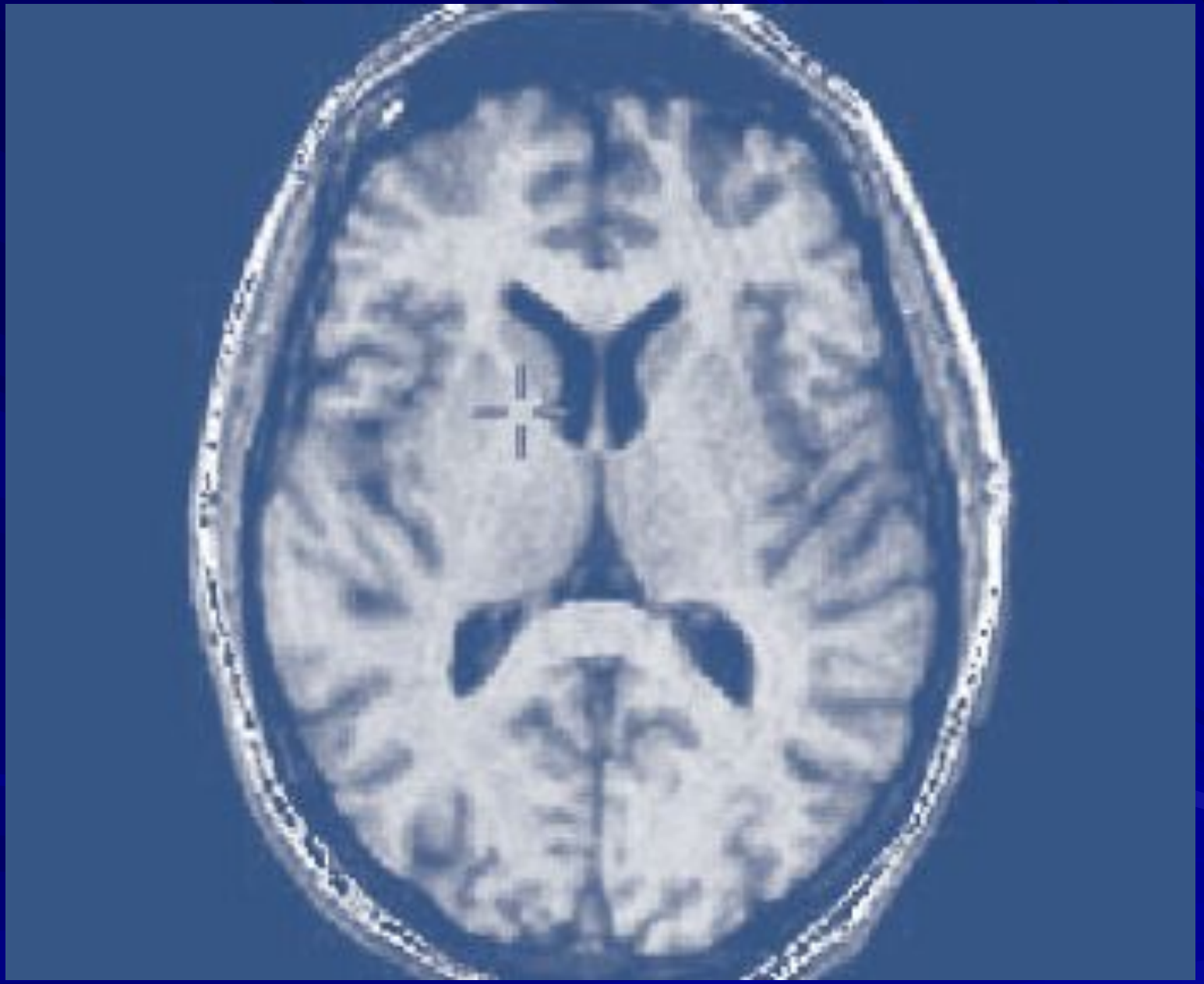




Levels of study

- Organism (behavior)

↑

- Systems (nervous system)

↑

- Organ (spinal cord)

↑

- Tissue (nervous tissue)

↑

- Cellular (neuron)

↑

- Subcellular (biochemical)

4 kind of tissue

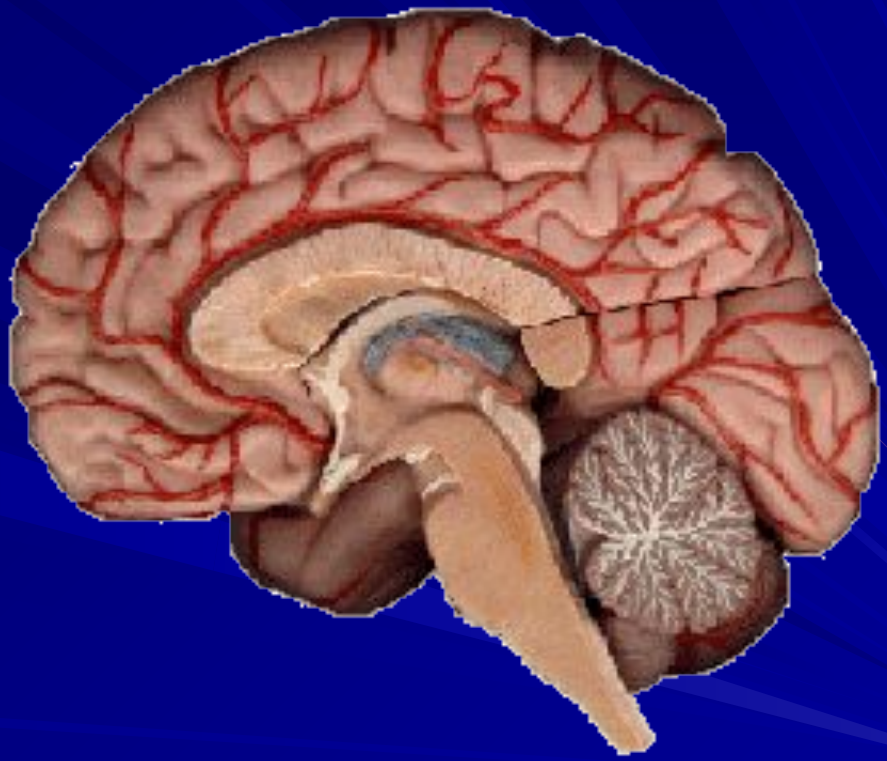
1. Epithelial tissue
2. Connective tissue (blood, bone)
3. Muscular tissue
4. Nervous tissue

Systems

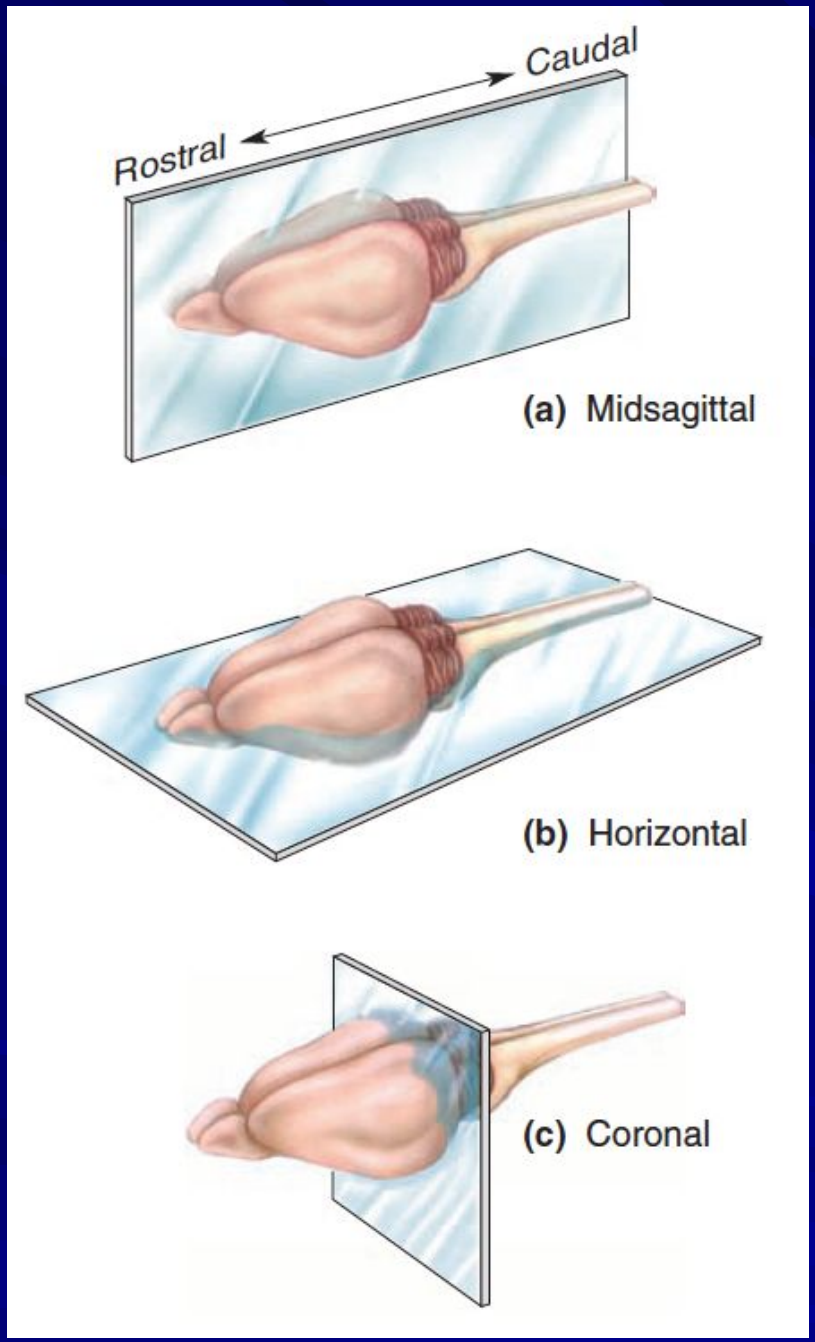
- digestive
- respiratory
- urinary
- reproductive
- nervous
- circulatory (vascular)
- immune

Different views of the brain

Lateral view of the brain

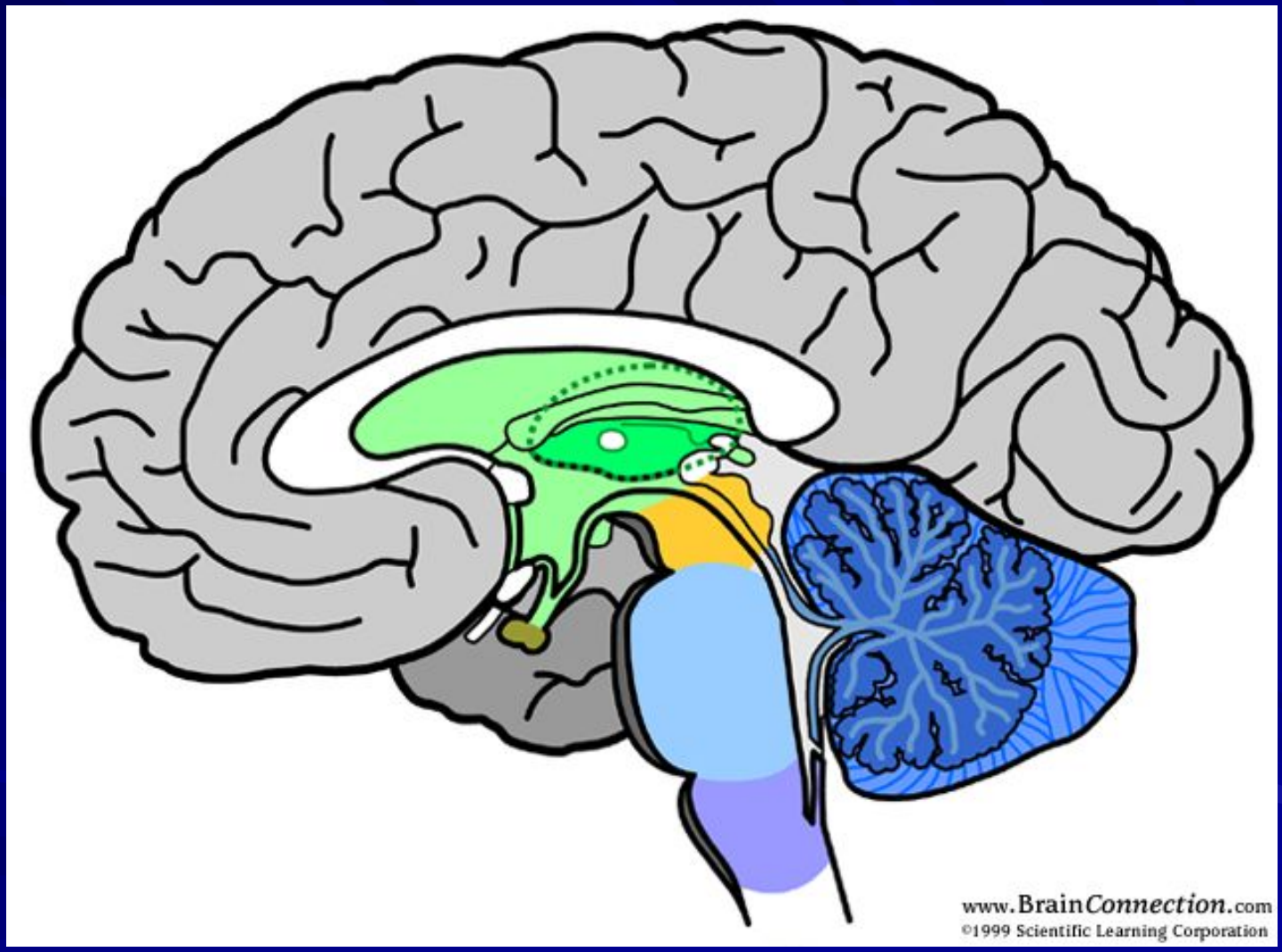


Inner view of the brain

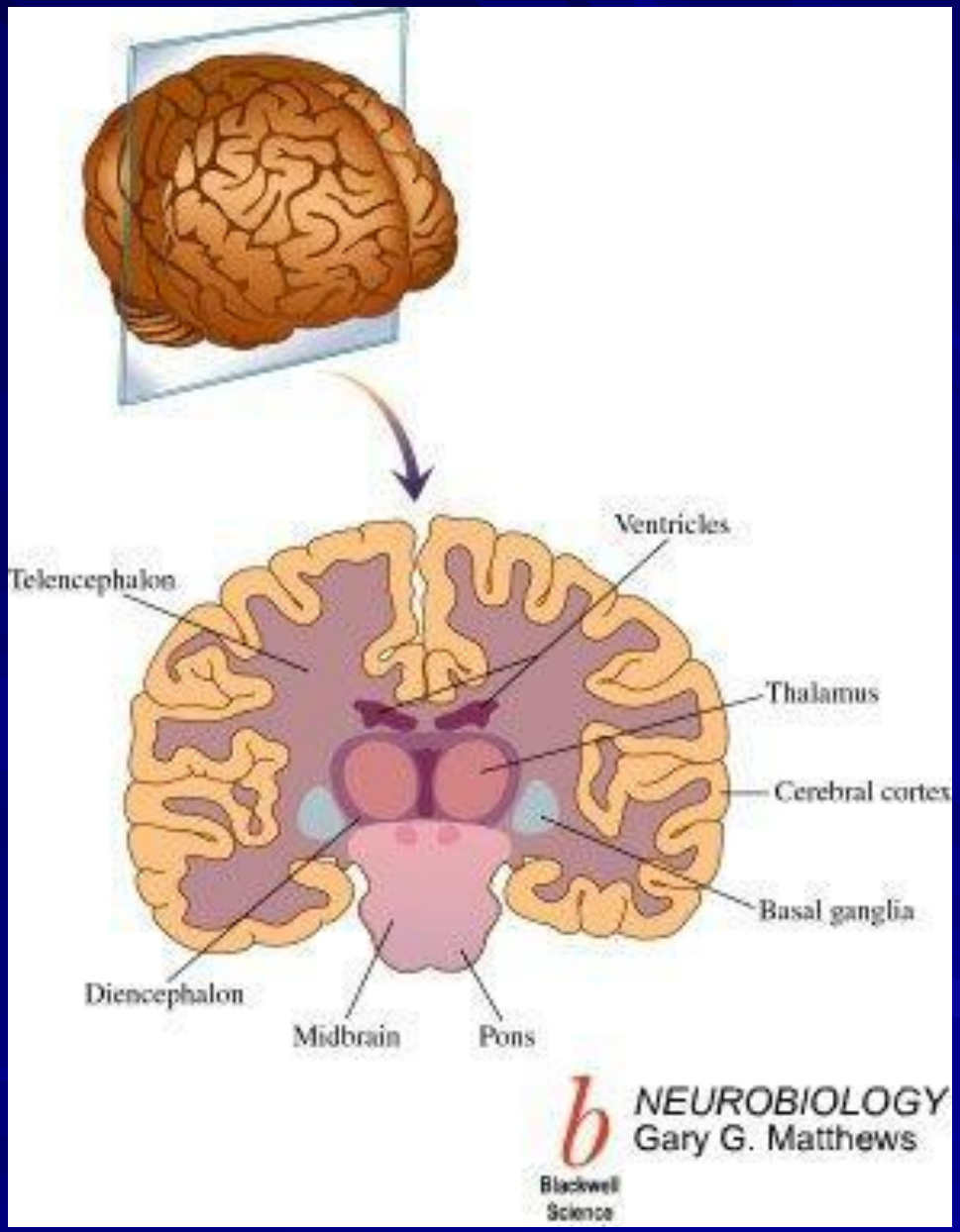


Anatomical planes of section

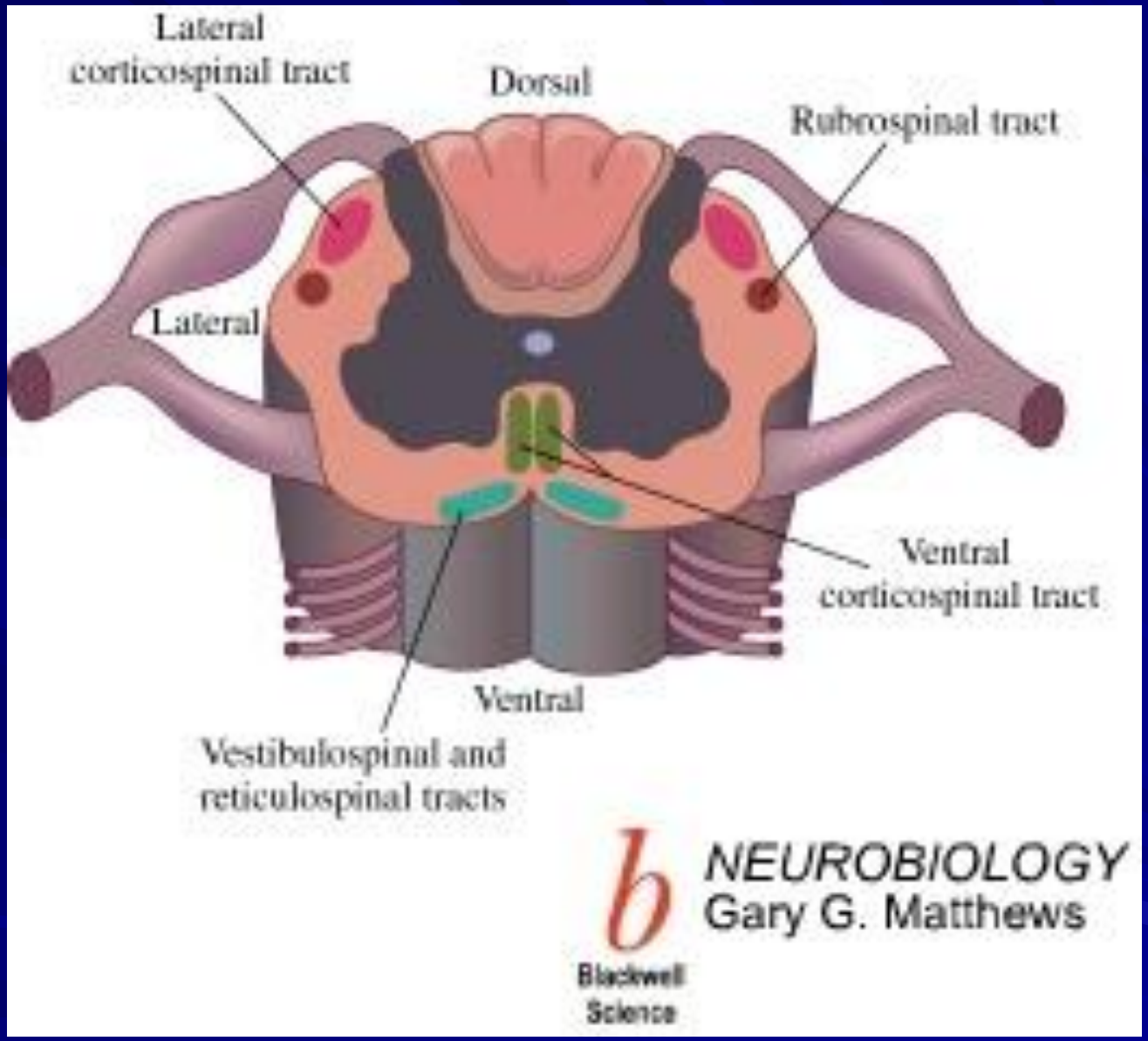
Anatomical planes of section



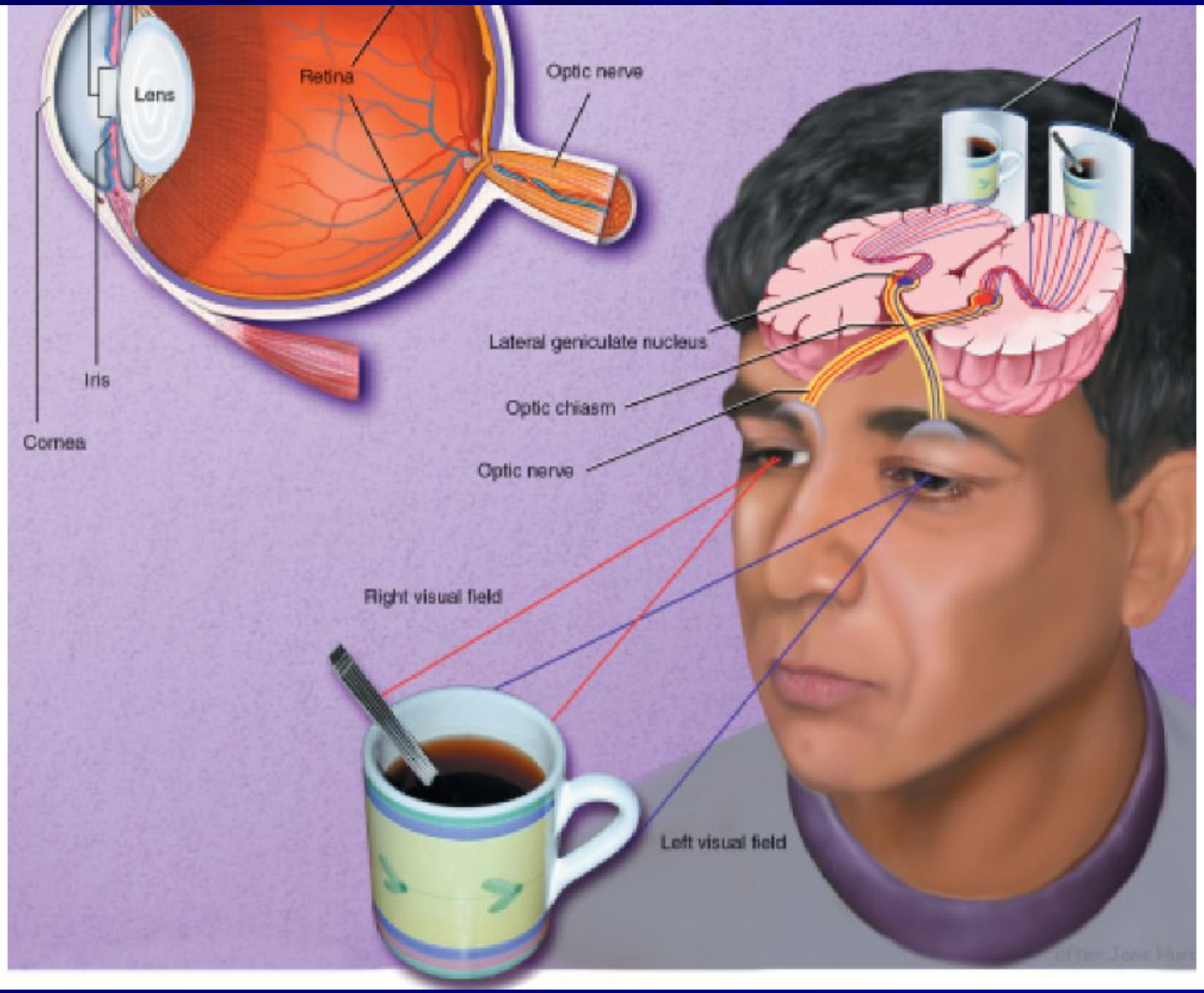
Midsagittal plane of section



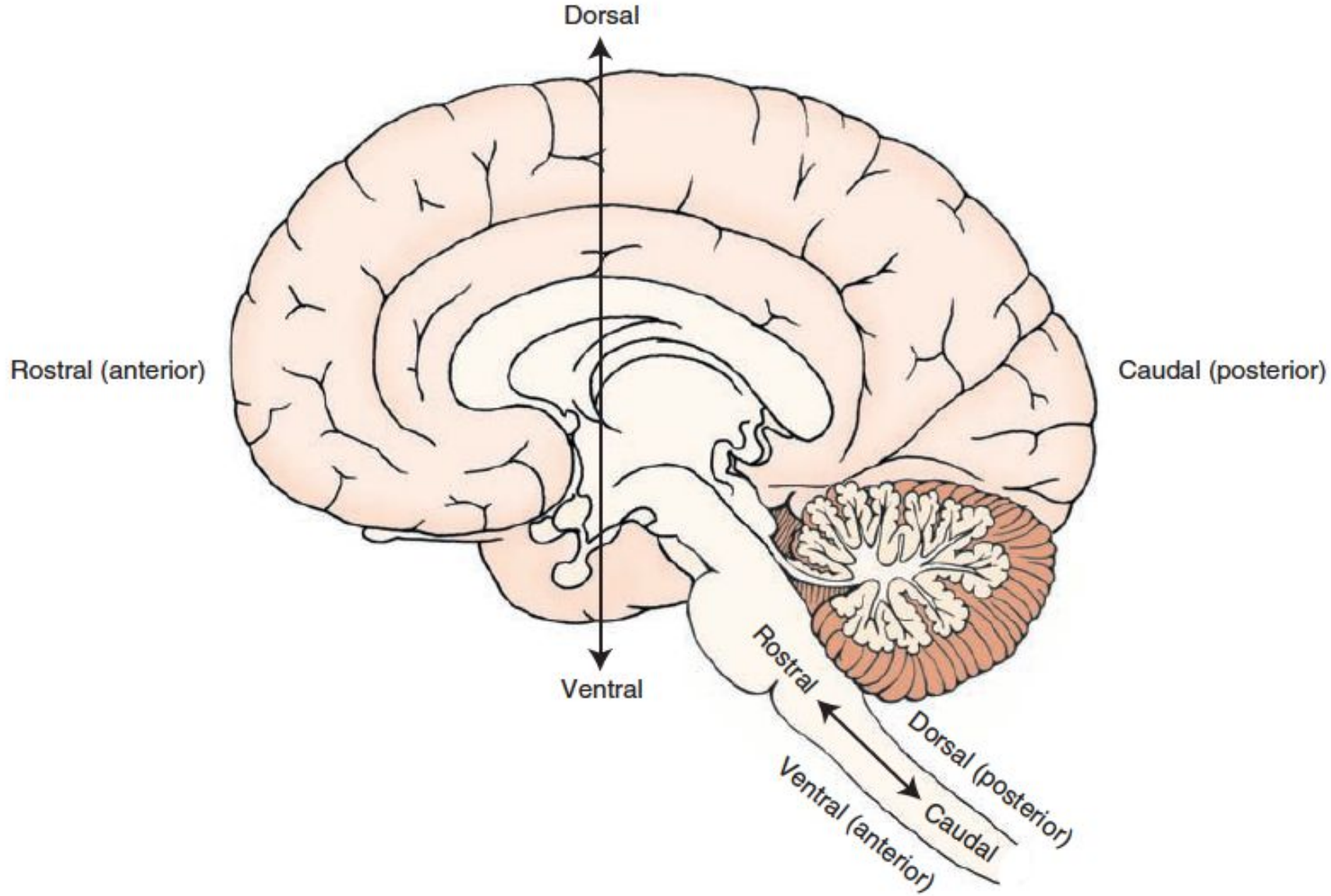
Frontal plane of section

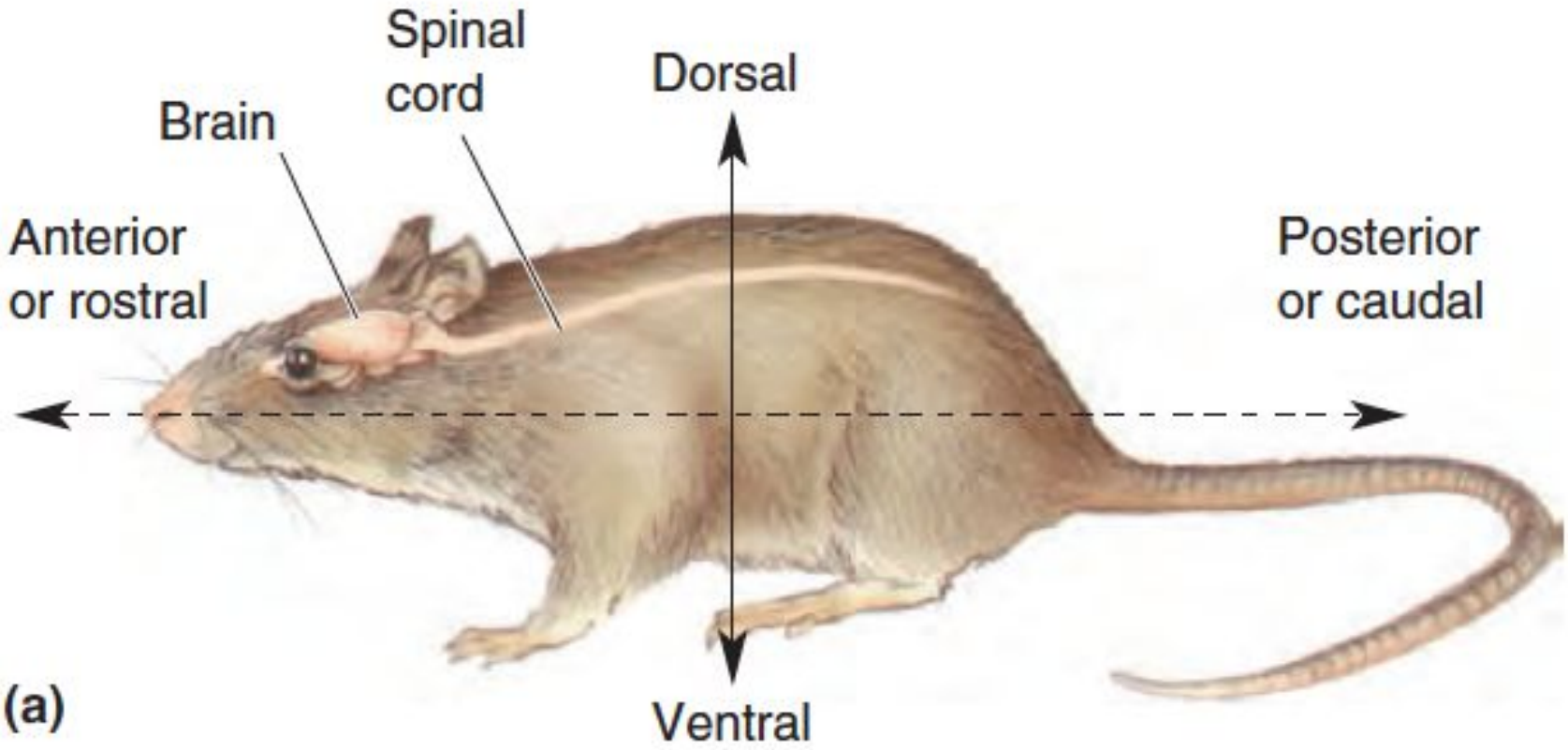


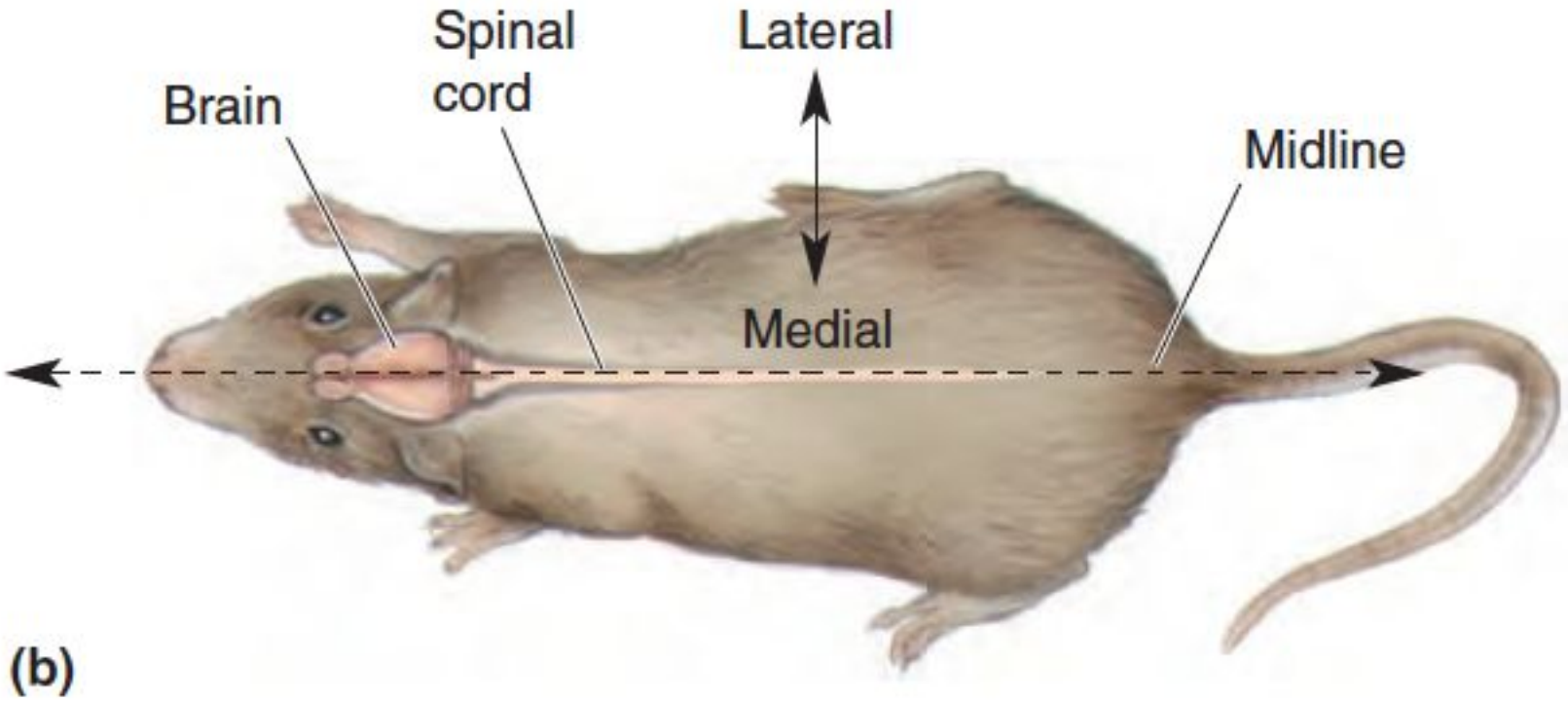
Horizontal plane of section

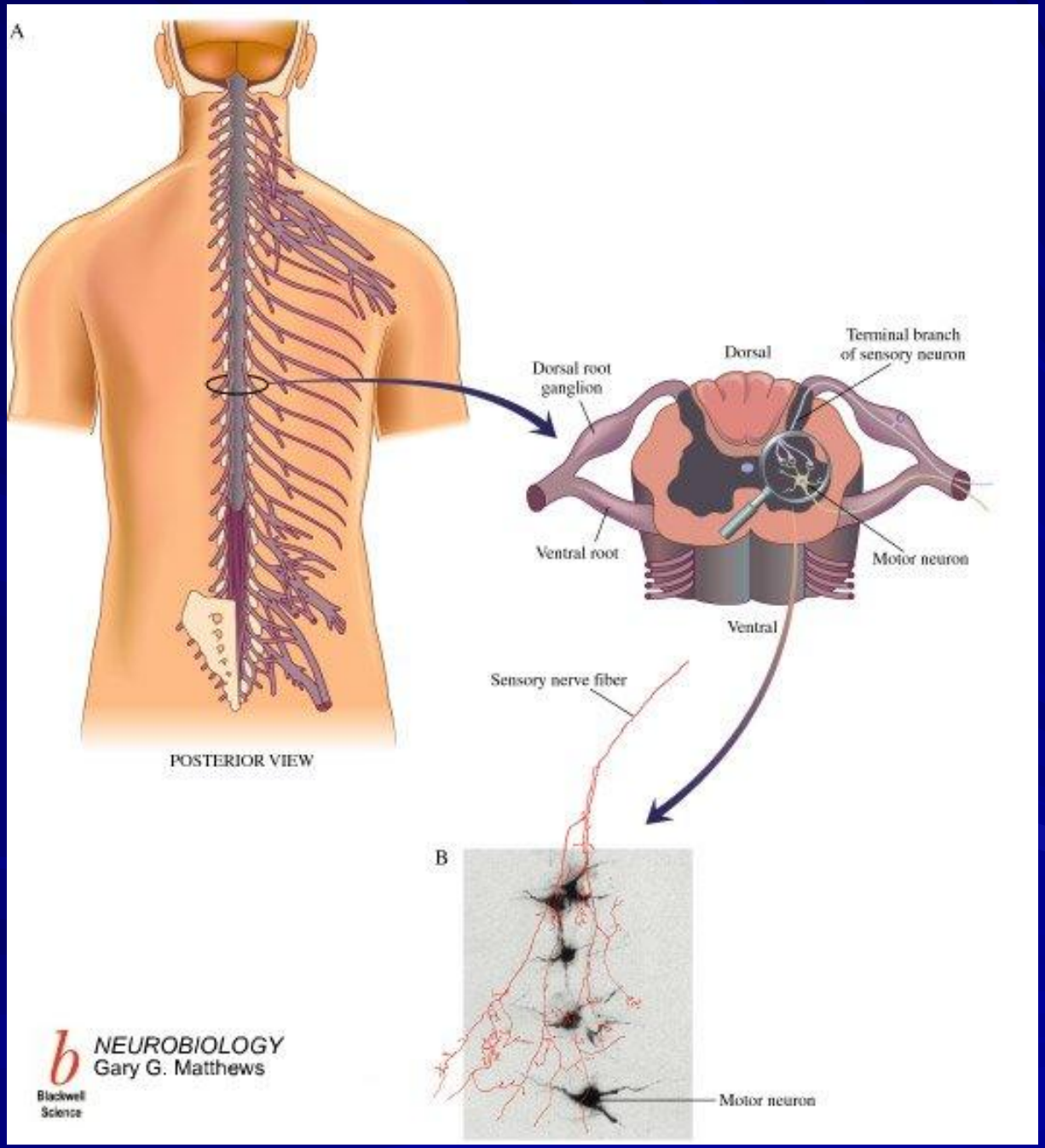


Horizontal plane of section


Dorsal
Rostral (anterior)
Caudal (posterior)
Ventral
Rostral
Dorsal (posterior)
Caudal
Ventral (anterior)


Spinal
cord
Dorsal
Brain
Anterior
or rostral
Posterior
or caudal
(a)
Ventral


Brain
Spinal cord
Lateral
Medial
Midline
(b)


A
POSTERIOR VIEW
Dorsal root ganglion
Dorsal
Terminal branch of sensory neuron
Ventral root
Motor neuron
Ventral
Sensory nerve fiber
B
Motor neuron
NEUROBIOLOGY
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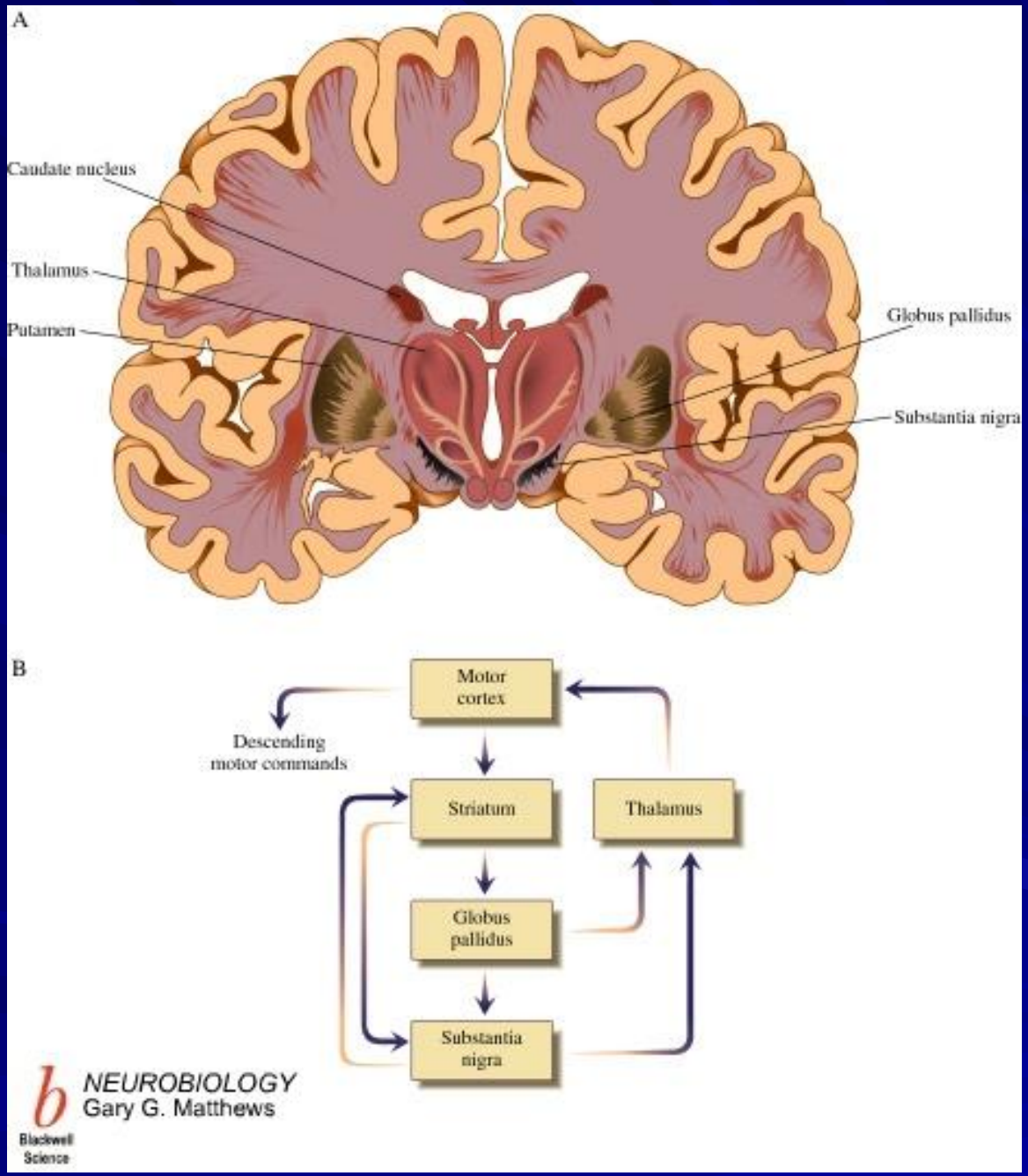
A
Caudate nucleus
Thalamus
Putamen
Globus pallidus
Substantia nigra
B
Motor cortex
Descending motor commands
Striatum
Thalamus
Globus pallidus
Substantia nigra
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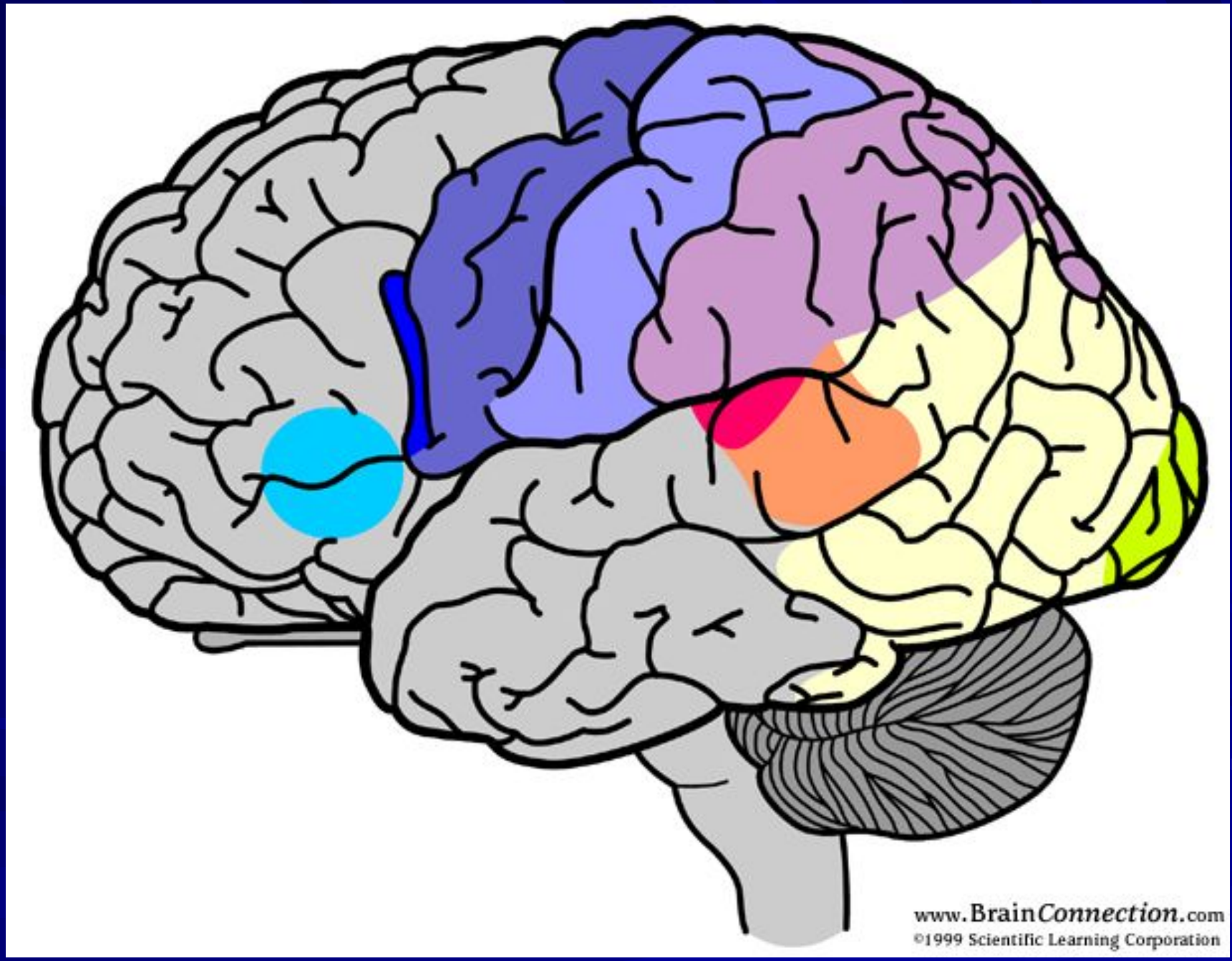
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Overview of the Nervous System

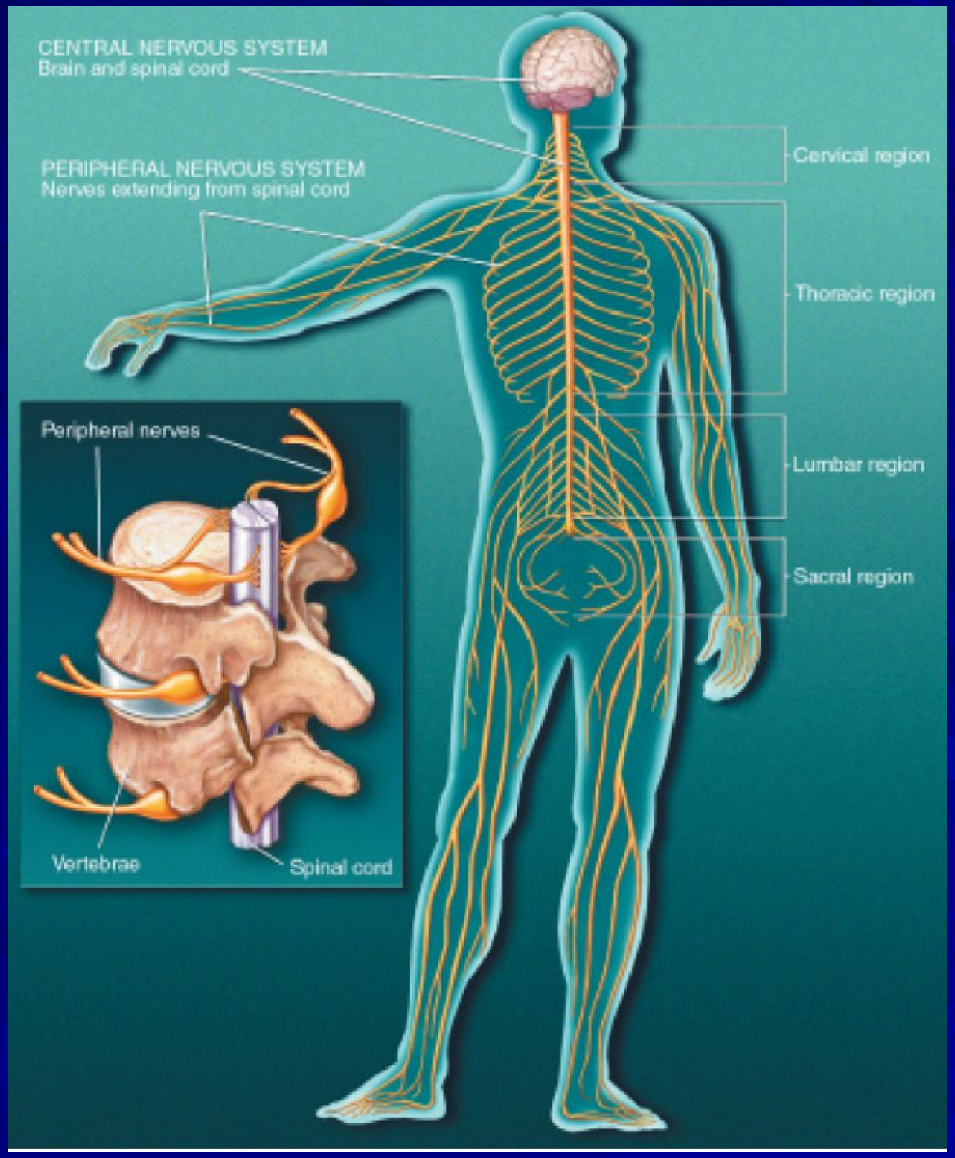
The Central Nervous System (CNS)

- spinal cord
- brain

The Peripheral Nervous System (PNS)

- spinal and cranial nerves
- sensory receptors
- nerve ganglia

Overview of the Nervous System



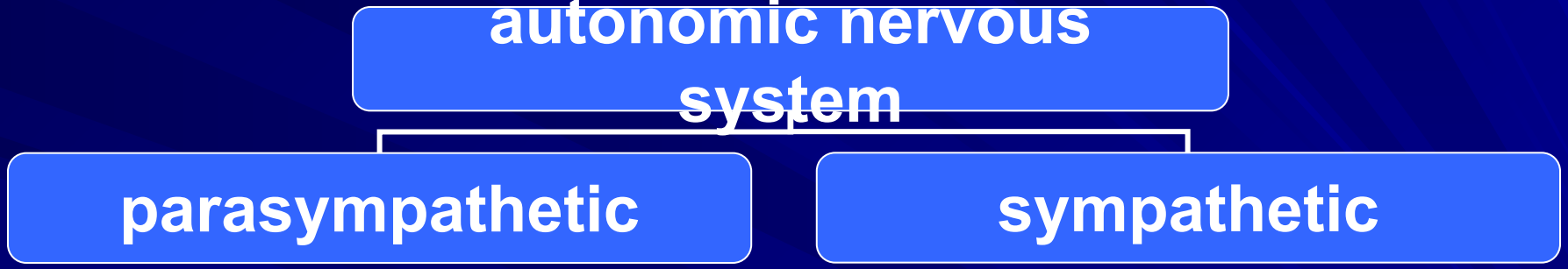
Functional subdivisions of the nervous system

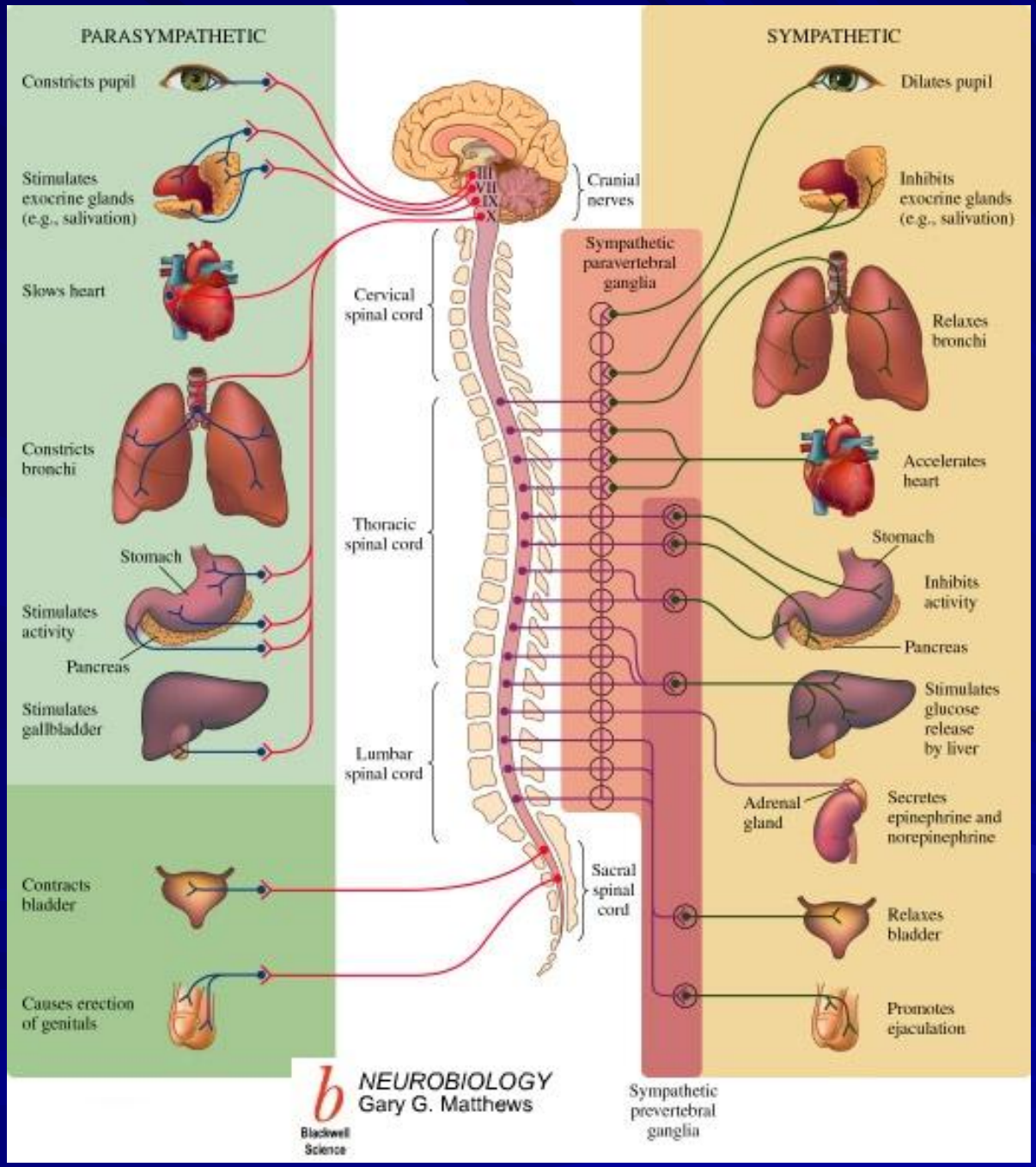
The somatic nervous system

- innervates mainly skeletal muscles and the receptors

The autonomic nervous system

- innervates smooth muscles and glands


autonomic nervous system
parasympathetic
sympathetic


PARASYMPATHETIC
Constricts pupil
Stimulates exocrine glands (e.g., salivation)
Slows heart
Constricts bronchi
Stomach
Stimulates activity
Pancreas
Stimulates gallbladder
Contracts bladder
Causes erection of genitals
III
VII
IX
X
Cranial nerves
Cervical spinal cord
Thoracic spinal cord
Lumbar spinal cord
Sacral spinal cord
Sympathetic paravertebral ganglia
Sympathetic prevertebral ganglia
SYMPATHETIC
Dilates pupil
Inhibits exocrine glands (e.g., salivation)
Relaxes bronchi
Accelerates heart
Stomach
Inhibits activity
Pancreas
Stimulates glucose release by liver
Adrenal gland
Secretes epinephrine and norepinephrine
Relaxes bladder
Promotes ejaculation
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