Biology 201: Structures & Functions of the Nervous System

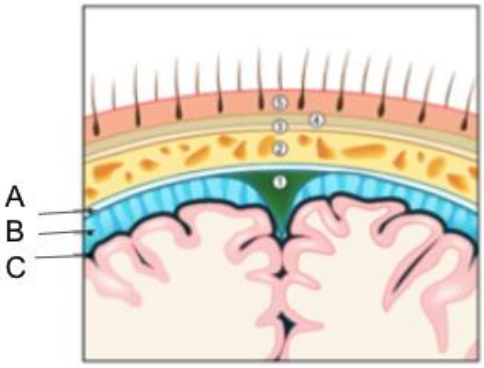
1) Label the layers of the meninges (A, B, and C) and the structures of the brain (1, 2, 3, 4, and 5).

Word Bank:

| | |
|---|---|
| Superior sagittal sinus | Pia mater |
| Dura mater | Bone |
| Periosteum | Arachnoid mater |
| Skin | Aponeurosis |

A: Dura mater
B: Arachnoid matter
C: Pia mater

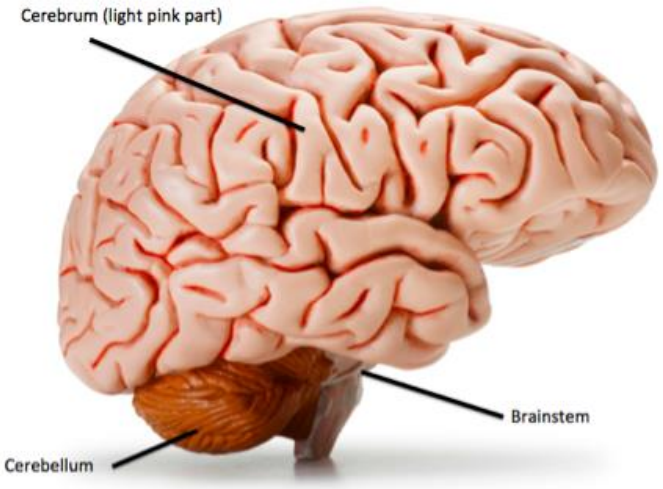
1: Superior sagittal sinus
2: Bone
3: Periosteum
4: Aponeurosis
5: Skin




Source Lesson: Brain: Sections, Regions & Physiological Processes

2) Label the three primary sections of the brain.

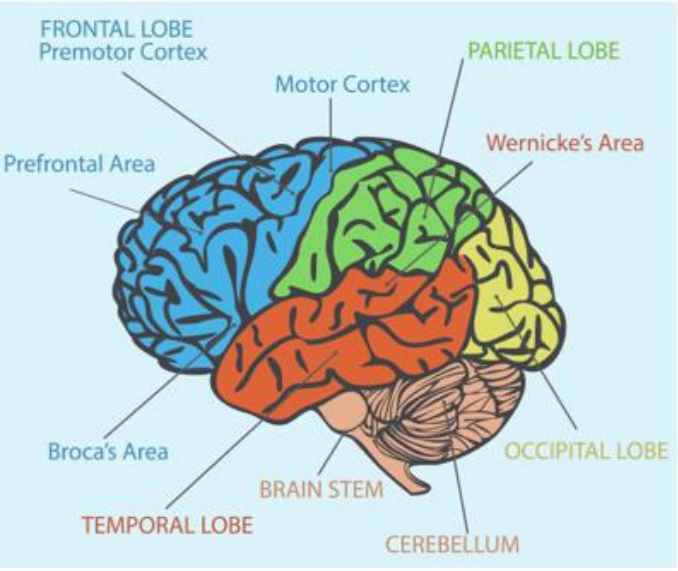
Cerebrum
Brainstem
Cerebellum




Source Lesson: Brain: Sections, Regions & Physiological Processes

3) Label the lobes and regions of the brain.

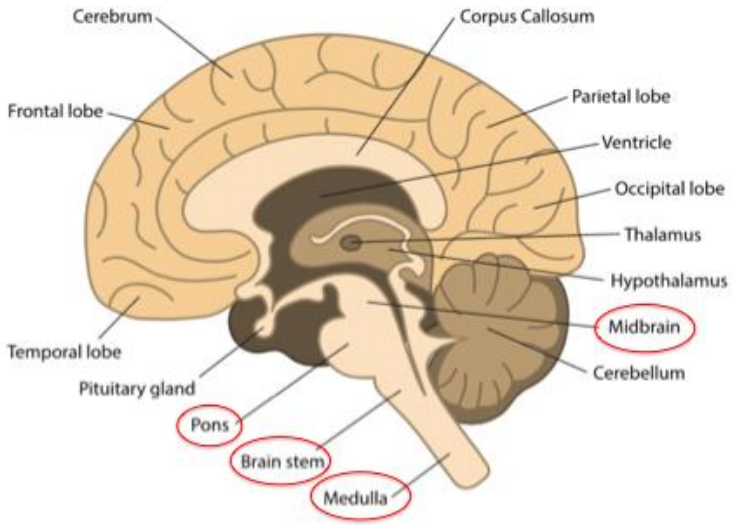
| | |
|---|---|
| Temporal lobe | Cerebellum |
| Frontal lobe (premotor cortex) | Motor cortex |
| Parietal lobe | Prefrontal area |
| Broca’s area | Wernicke's Area |
| Occipital lobe | Brain stem |




Source Lesson: Brain: Sections, Regions & Physiological Processes

4) Label the structures of the brain.

| | |
|---|---|
| Cerebellum | Pons |
| Brain stem | Frontal lobe |
| Temporal lobe | Medulla |
| Pituitary gland | Cerebellum |
| Midbrain | Corpus callosum |
| Parietal lobe | Ventricle |
| Hypothalamus | Cerebrum |




Source Lesson: Brain: Sections, Regions & Physiological Processes

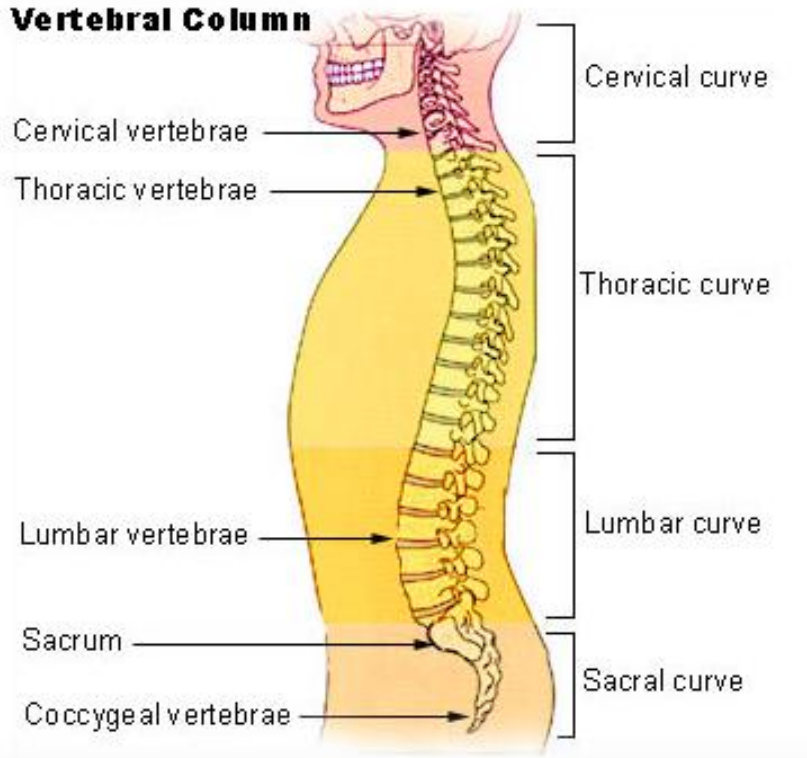
5) Fill in the table below with the region/lobe of the brain responsible for the listed function.

| Region/Lobe of the Brain | Function |
|---|---|
| 1) Frontal Lobe | Cognitive functions and voluntary activity, thinking, planning, problem-solving, emotions, decision making, personality, behavioral control, and organizing |
| 2) Parietal Lobe | Information processing about things such as taste, touch, temperature, and movement |
| 3) Occipital Lobe | Vision |
| 4) Temporal Lobe | Memory, sound, sight, touch, and the connection between memory and our senses |
| 5) Broca's Area | Language production & assists with planning movement |
| 6) Prefrontal Area/Cortex | Expression of personality, decision making, directing social & cognitive behavior |
| 7) Premotor Cortex | Prepare the body's muscles for the movements they are going to make |
| 8) Motor Cortex | Planning, executing, and controlling voluntary movements |
| 9) Wernicke's Area | Speech comprehension |

Source Lesson: Brain: Sections, Regions & Physiological Processes

6) Label the parts and sections of the spinal cord.

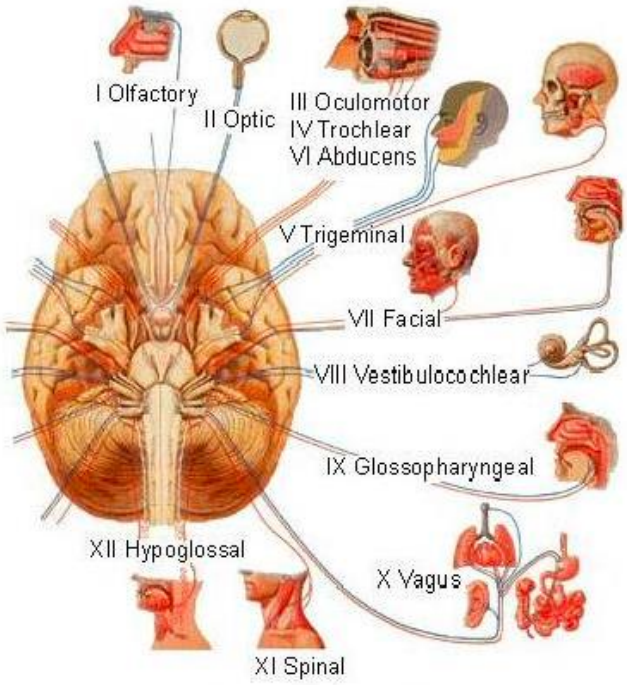
Coccygeal vertebrae
Thoracic vertebrae
Lumbar curve
Thoracic curve
Lumbar vertebrae
Lumbar vertebrae
Sacral curve
Sacrum
Cervical curve




Source Lesson: Spinal Cord: Structure, Function & Transmission of Information

7) Fill in the diagram below.

| | |
|---|---|
| Spinal | Trigeminal |
| Hypoglossal | Facial |
| Vestibulocochlear | Oculomotor |
| Trochlear | Glossopharyngeal |
| Vagus | Abducens |
| Olfactory | Spinal |
| Optic | |




Source Lesson: Spinal Cord: Structure, Function & Transmission of Information

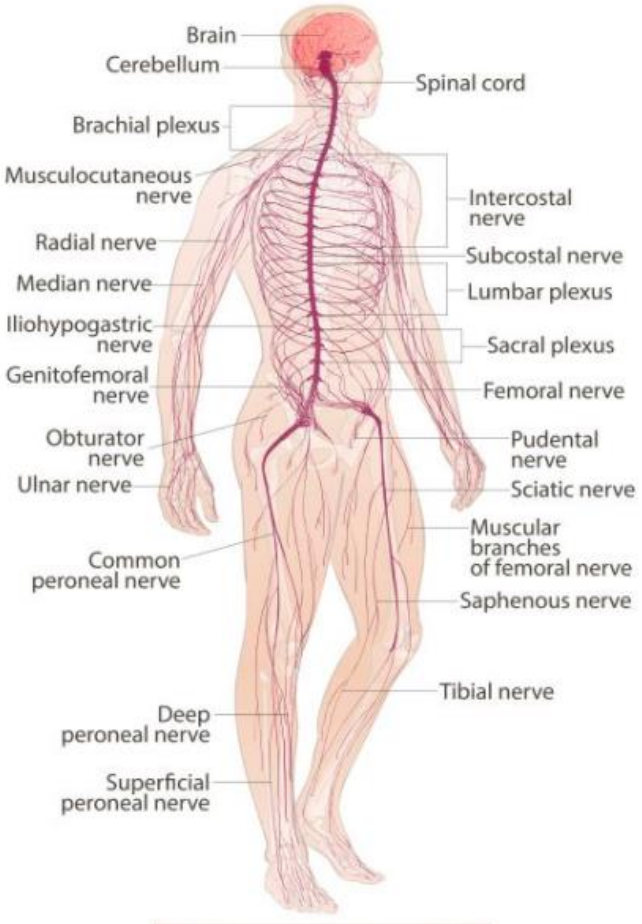
8) Fill in the missing boxes in the table below.

| Name | Function (S/M/B) | Central Connection Nuclei | Peripheral Connection (Ganglion or Muscle) |
|---|---|---|---|
| 1) Olfactory | Smell (S) | Olfactory bulb | Olfactory epithelium |
| Optic | Vision (S) | 2) Hypothalamus/thalamus/midbrain | Retina (retinal ganglion cells) |
| Oculomotor | 3) Eye movements (M) | Oculomotor nucleus | Extraocular muscles, levator palpebrae superioris, ciliary ganglion (autonomic) |
| Trochlear | Eye movements (M) | 4) Trochlear nucleus | Superior oblique muscle |
| 5) Trigeminal | Sensory/motor - face (B) | Trigeminal nuclei in the midbrain, pons, and medulla | Trigeminal |
| Abducens | 6) Eye movements (M) | Abducens nucleus | 7) Lateral rectus muscle |
| 8) Facial | Motor - face, Taste (B) | Facial nucleus, solitary nucleus, superior salivatory nucleus | Facial muscles, Geniculate ganglion, Pterygopalatine ganglion (autonomic) |
| Auditory (Vestibulocochlear) | 9) Hearing/balance (S) | Cochlear nucleus, Vestibular nucleus/cerebellum | Spiral ganglion (hearing), Vestibular ganglion (balance) |
| 10) Glossopharyngeal | 11) Motor - throat Taste (B) | Solitary nucleus, inferior salivatory nucleus, nucleus ambiguus | Pharyngeal muscles, Geniculate ganglion, Otic ganglion (autonomic) |
| 12) Vagus | Motor/sensory - viscera (autonomic) (B) | 13) Medulla | Terminal ganglia serving thoracic and upper abdominal organs (heart and small intestines) |
| Spinal Accessory | 14) Motor - head and neck (M) | Spinal accessory nucleus | 15) Neck muscles |
| 16) Hypoglossal | Motor - lower throat (M) | 17) Hypoglossal nucleus | Muscles of the larynx and lower pharynx |

Source Lesson: Peripheral Nervous System: Structures & Function

9) Label the structures of the nervous system.

Obturator nerve
Musculocutaneous nerve
Spinal cord
Sacral plexus
Muscular branches of femoral nerve
Cerebellum
Iliohypogastric nerve
Genitofemoral nerve
Deep peroneal nerve
Lumbar plexus
Superficial peroneal nerve
Femoral nerve
Common peroneal nerve
Pudendal nerve
Radial nerve
Saphenous nerve
Brain
Median nerve
Brachial plexus
Ulnar nerve
Intercostal nerve
Tibial nerve
Subcostal nerve
Sciatic nerve




Source Lesson:  Peripheral Nervous System: Structures & Function

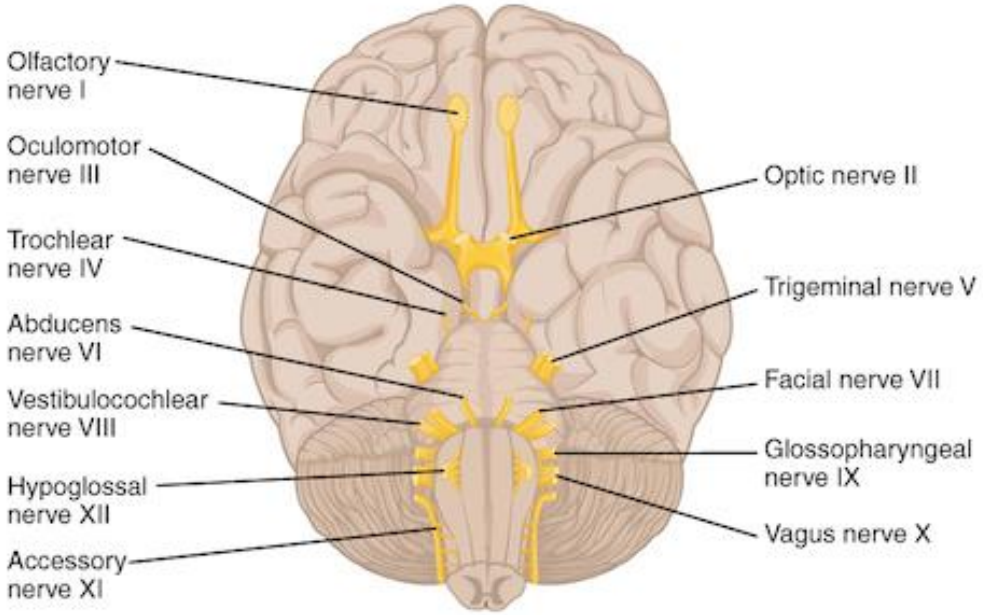
10) Fill in the table below with the cranial nerve associated with the functions.

| Cranial Nerve Name and Number | Function |
|---|---|
| 1) Olfactory I | Smell |
| 2) Optic II | Vision |
| 3) Oculomotor III | Eye movement |
| 4) Trochlear IV | Eye movement |
| 5) Trigeminal V | Facial sensations (touch, pain, temperature); chewing |
| 6) Abducens VI | Lateral eye movement |
| 7) Facial VII | Facial expression; taste |
| 8) Vestibulocochlear VIII | Hearing; equilibrium |
| 9) Glossopharyngeal IX | Swallowing; salivation; taste |
| 10) Vagus X | Taste; swallowing; decreases heart rate; stimulates digestive, urinary functions |
| 11) Accessory XI | Head, neck, shoulder movements |
| 12) Hypoglossal XII | Swallowing; tongue movement |

Source Lesson: Major, Cranial & Spinal Nerves

11) Label the cranial nerves in the image below.

Olfactory I
Optic II
Oculomotor III
Trochlear IV
Trigeminal V
Abducens VI
Facial VII
Vestibulocochlear VIII
Glossopharyngeal IX
Vagus X
Accessory XI
Hypoglossal XII




Source Lesson: Major, Cranial & Spinal Nerves

12) Fill in the table below with the correct nerve.

| Nerve | Plexus of Origin | Major Function |
|---|---|---|
| 1) Phrenic | Cervical | Serves the diaphragm muscle |
| 2) Axillary | Brachial | Serves the shoulder, deltoid muscle |
| 3) Radial | Brachial | Serves posterior arm; posterior and lateral forearm; extensor muscles of the posterior forearm |
| 4) Ulnar | Brachial | Serves medial hand; flexor muscles of the anterior forearm |
| 5) Femoral | Lumbar | Serves hip and knee joints; anterior, medial, lateral thigh; anterior and medial thigh muscles |
| 6) Obturator | Lumbar | Serves hip and knee joints; the skin of medial thigh; medial thigh muscles |
| 7) Tibial | Sacral | Serves the posterior leg skin and muscles; knee and foot joints |
| 8) Common Fibular | Sacral | Serves anterior lower leg; anterior and lateral muscles of the leg |

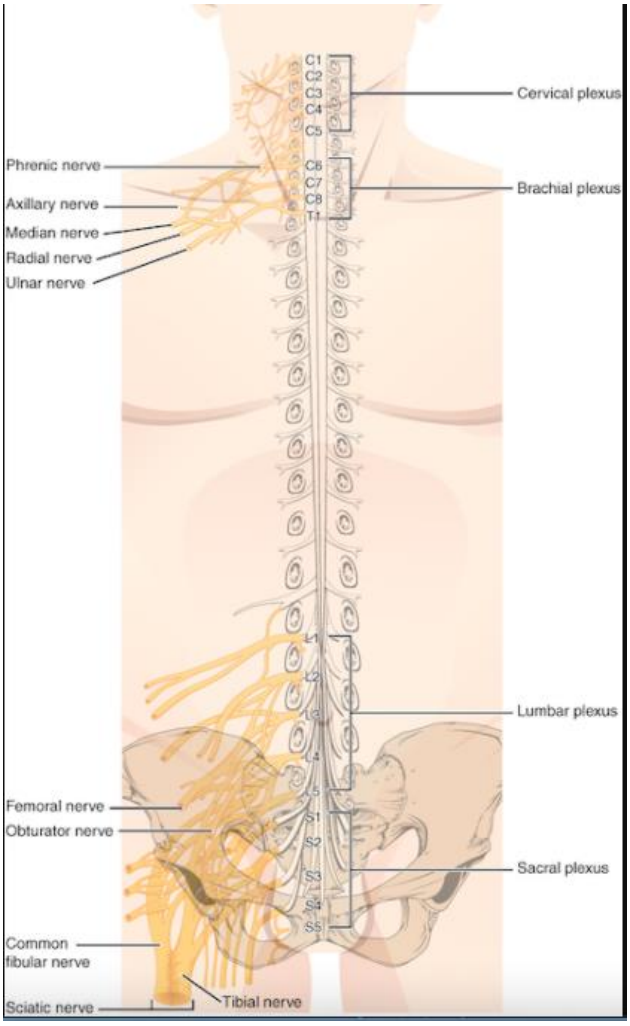
Source Lesson: Major, Cranial & Spinal Nerves

13) Label the spinal nerves in the image below.

A: Cervical plexus
B: Brachial plexus
C: Phrenic nerve
D: Axillary nerve
E: Median nerve
F: Radial nerve
G: Ulnar nerve
H: Femoral nerve
I: Obturator nerve
J: Common tibial nerve
K: Sciatic nerve
L: Tibial nerve
M: Sacral plexus
N: Lumbar plexus

Word Bank:

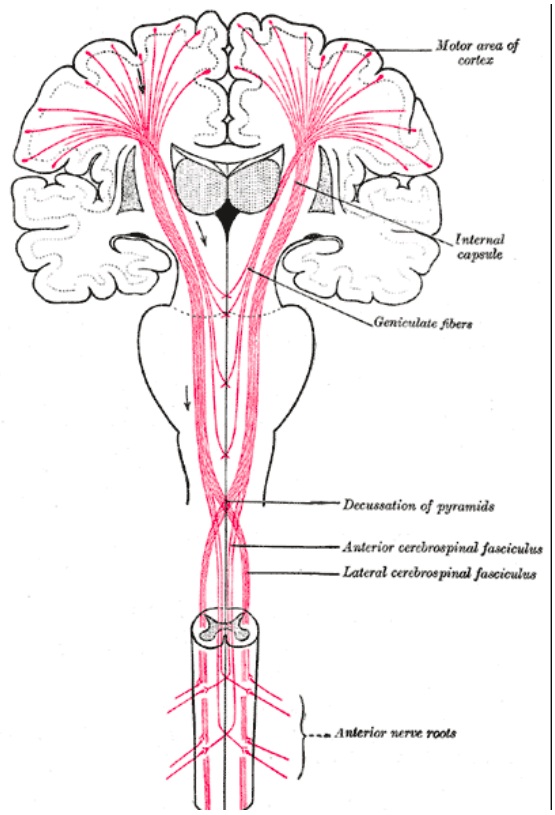
Phrenic nerve
Lumbar plexus
Sacral plexus
Radial nerve
Common tibial nerve
Femoral nerve
Tibial nerve
Axillary nerve
Ulnar nerve
Median nerve
Sciatic nerve
Brachial plexus
Obturator nerve
Cervical plexus




Source Lesson: Major, Cranial & Spinal Nerves

14) Label the parts in the diagram of the cerebrospinal tracts and primary motor cortex shown below.

Anterior nerve rods
Internal capsule
Anterior cerebrospinal fasciculus
Decussation of pyramids
Geniculate fibers
Lateral cerebrospinal fasciculus
Motor area of cortex




Source Lesson: Motor Response Functions of the Nervous System

15) Fill in the missing sections of the table below.

| Organ | Parasympathetic Control | Sympathetic Control |
|---|---|---|
| 1) Eyes | Constricts pupil | 2) Dilates pupil |
| Salivary glands | 3) Stimulates salivation | Inhibits salivation |
| Heart | Slows heart rate | 4) Accelerates heart rate |
| 5) Lungs | 6) Constricts bronchi | Dilates bronchi |
| 7) Stomach | Stimulates digestion | 8) Inhibits digestion |
| Liver | 9) Stimulates bile release | 10) Stimulates glucose release |
| Intestines | 11) Stimulates peristalsis and secretion | Inhibits peristalsis and secretion |
| 12) Bladder | Contracts bladder | 13) Relaxes bladder |

| | | |
|---|---|---|
| 14) Genitals | Erection | Ejaculation |

Autonomic Nervous System: Parasympathetic & Sympathetic Nervous Activity