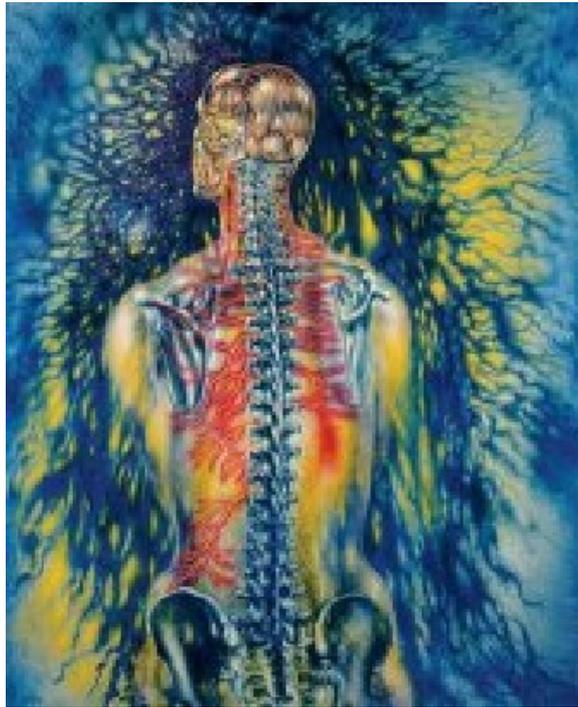


48a A&P: Nervous System - Introduction, Physiology, and Cells





48a A&P: Nervous System - Introduction, Physiology, and Cells Class Outline

5 minutes

Attendance, Breath of Arrival, and Reminders

10 minutes

Lecture:

25 minutes

Lecture:

15 minutes

Active study skills:

60 minutes

Total



48a A&P: Nervous System - Introduction, Physiology, and Cells

Class Reminders

ABMP Exam Coach

- “Access your ABMP account” using instructions on page A-74
- Familiarize yourself with ABMP Exam Coach, especially the “Study Subjects” section
- Preview the preparation assignments for MBLEx Prep classes (74a, 75a, 80a, 81a, 84a, 86a, 87a)

Assignments:

- 50b Business: Marketing. B-55 for ABMP.com ‘Website Builder’ instructions
- 53a Internship Orientation Review Questions (due before class starts)
- 55a Review Questions (due before class starts)

Quizzes:

- 51b Kinesiology Quiz (brachialis, brachioradialis, flexor digitorum superficialis, and extensor digitorum)

Preparation for upcoming classes:

- 49a A&P: Nervous System - Synaptic Transmission and Central Nervous System
- 49b Side-lying and Pregnancy Massage: Guided Full Body
 - Bring 2 pillows (standard size)
 - Bring 4 pillowcases (standard size)
- 49b Pregnancy Massage: These classes cannot be made up in the make-up room. To schedule a sit-in, please contact the Student Administrator.



Classroom Rules

Punctuality - everybody's time is precious

- Be ready to learn at the start of class; we'll have you out of here on time
- Tardiness: arriving late, returning late after breaks, leaving during class, leaving early

The following are not allowed:

- Bare feet
- Side talking
- Lying down
- Inappropriate clothing
- Food or drink except water
- Phones that are visible in the classroom, bathrooms, or internship

You will receive one verbal warning, then you'll have to leave the room.

Brachioradialis

Trail Guide, Page 133



Anterior View

Brachioradialis is superficial on the lateral side of the forearm.

Its long, oval belly forms a helpful dividing line between the flexors and extensors.

It is the only muscle that runs the length of the forearm but does not cross the wrist joint.



Anterior View

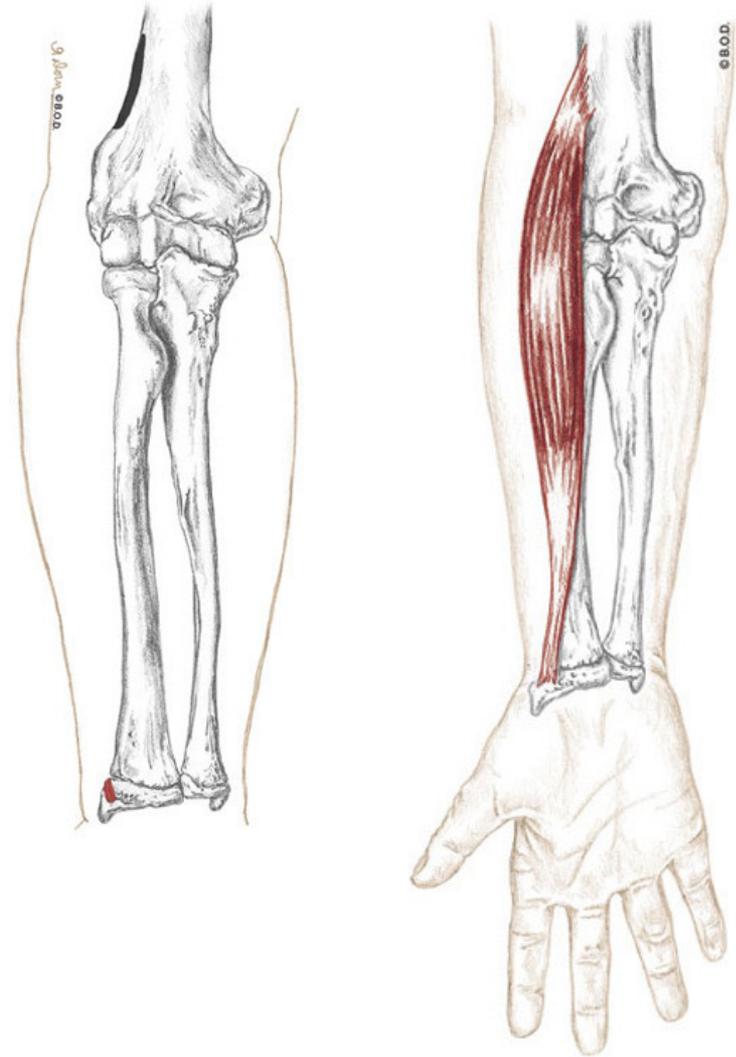
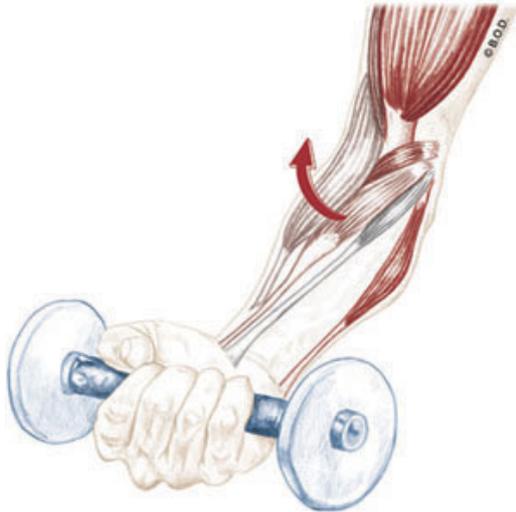
Brachioradialis, page 133

A Flex the elbow (humeroulnar joint)

Assist to **pronate and supinate** the forearm when these movements are resisted

O Proximal two-thirds of the lateral supracondylar ridge of the humerus

I Styloid process of the radius



Anterior View

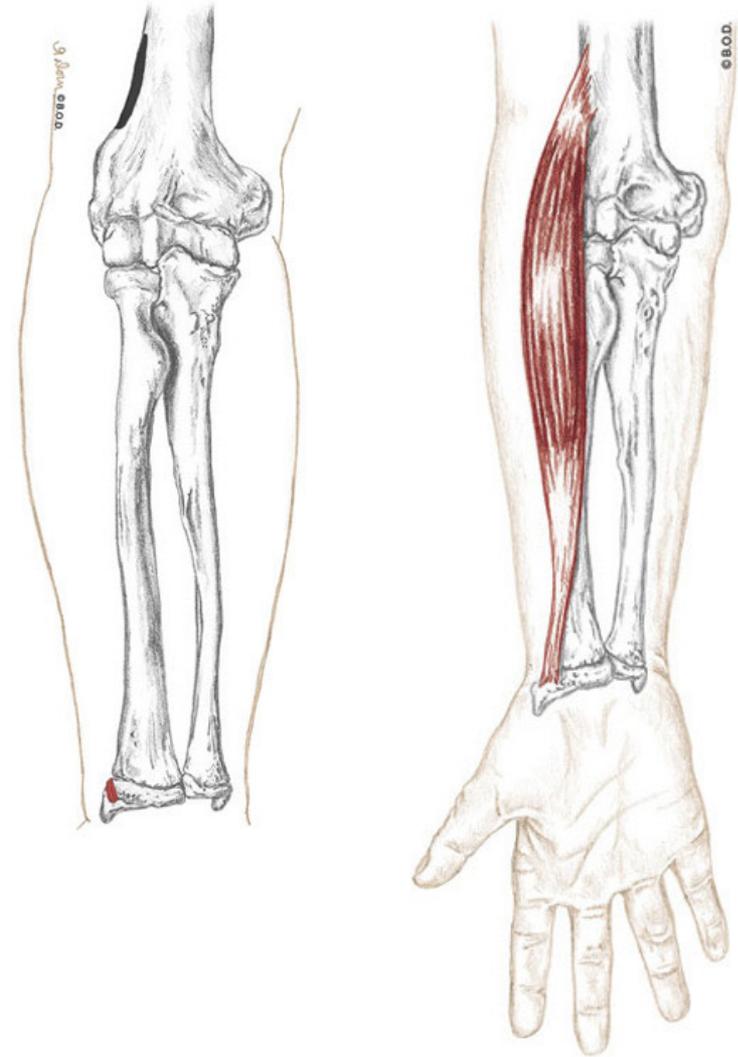
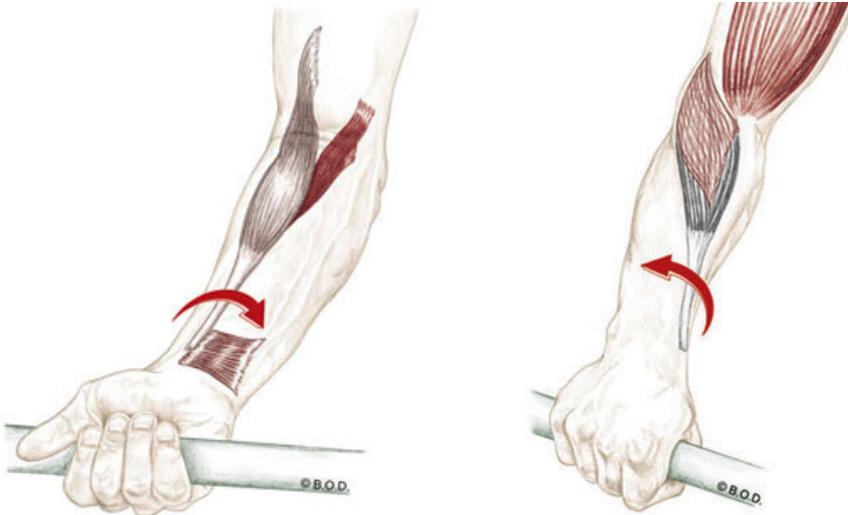
Brachioradialis, page 133

A Flex the elbow (humeroulnar joint)

Assist to **pronate and supinate** the forearm when these movements are resisted

O Proximal two-thirds of the lateral supracondylar ridge of the humerus

I Styloid process of the radius



Anterior View

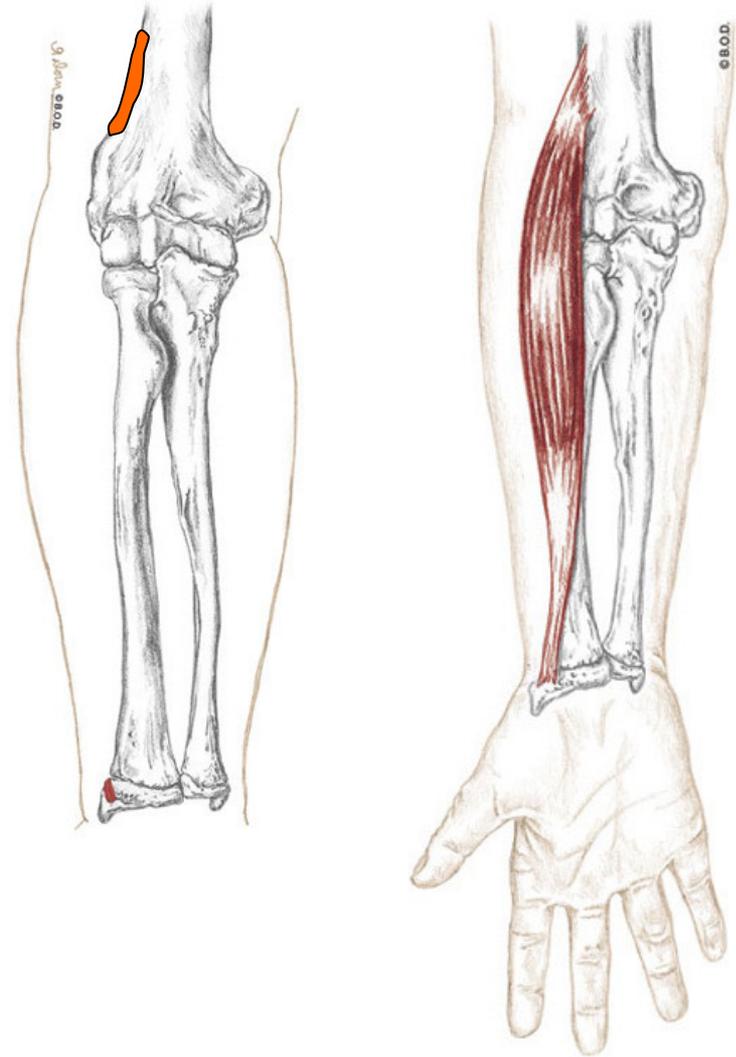
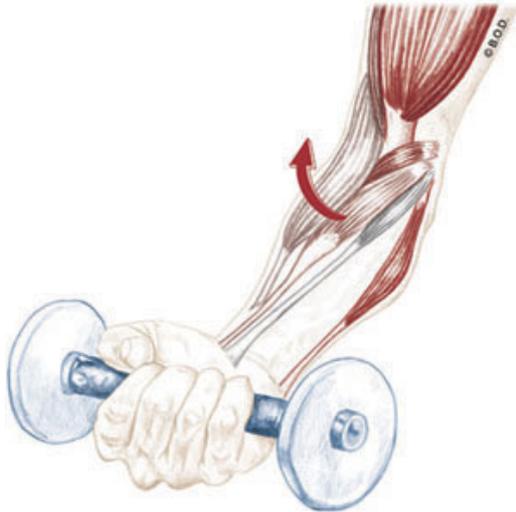
Brachioradialis, page 133

A Flex the elbow (humeroulnar joint)

Assist to **pronate and supinate** the forearm when these movements are resisted

O Proximal two-thirds of the lateral supracondylar ridge of the humerus

I Styloid process of the radius



Anterior View

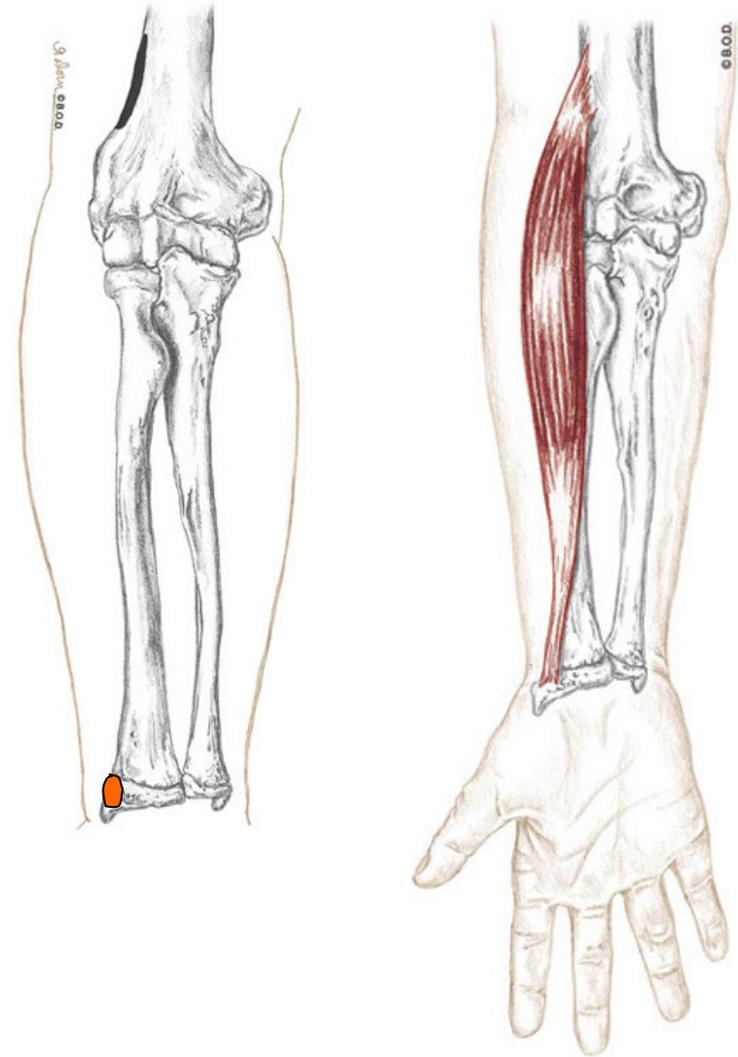
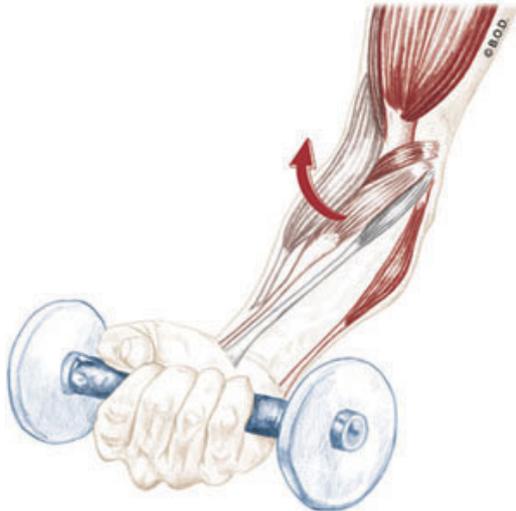
Brachioradialis, page 133

A Flex the elbow (humeroulnar joint)

Assist to **pronate and supinate** the forearm when these movements are resisted

O Proximal two-thirds of the lateral supracondylar ridge of the humerus

I Styloid process of the radius



Anterior View



48a A&P: Nervous System -
Introduction, Physiology, and Cells

Packet E - 97



Introduction

The body uses two systems to monitor and stimulate changes needed to maintain homeostasis: endocrine and nervous.

Endocrine System

Nervous System



Introduction

The endocrine system responds more slowly and uses hormones as chemical messengers to cause physiologic changes.

Endocrine System

1. Slow response
2. Hormones

Nervous System



Introduction

The nervous system responds to changes more rapidly and uses nerve impulses to cause physiologic changes.

Endocrine System

1. Slow response
2. Hormones

Nervous System

1. Rapid response
2. Nerve impulses (and neurotransmitters too)



Introduction

It is the nervous system that is the body's master control and communications system. It also monitors and regulates many aspects of the endocrine system.

Endocrine System

1. Slow response
2. Hormones

Nervous System

1. Rapid response
2. Nerve impulses (and neurotransmitters too)
3. Body control
4. Body communications
5. Monitors and regulates the endocrine system



Introduction

Every thought, action, and sensation reflects nerve activity.

We are what our brain has experienced.

If all past sensory input could be completely erased, we would be unable to walk, talk, or communicate. We would remember no pain or pleasure.



Anatomy

Brain

Spinal cord

Cranial nerves

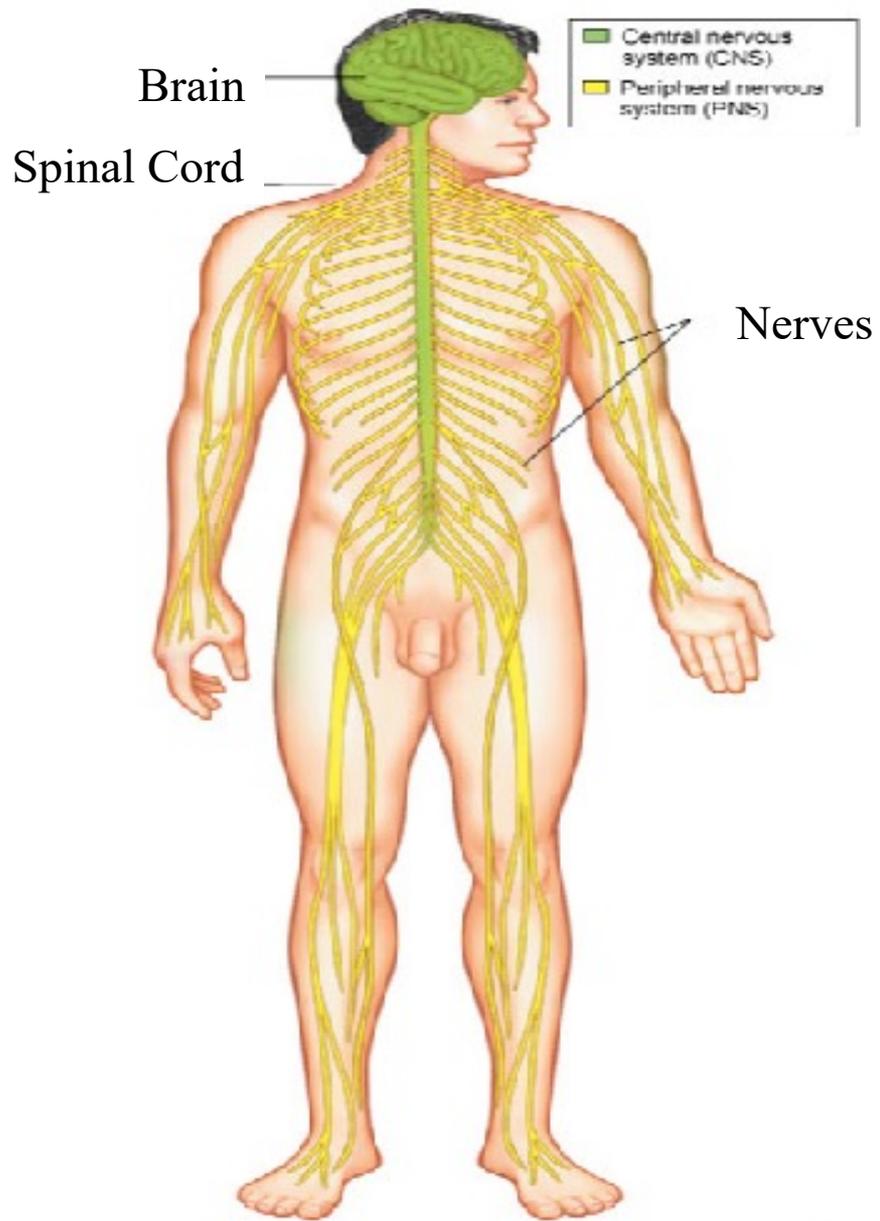
Spinal nerves

Cerebrospinal fluid

Meninges

Sense organs

Neurotransmitters





Physiology

Sensory input

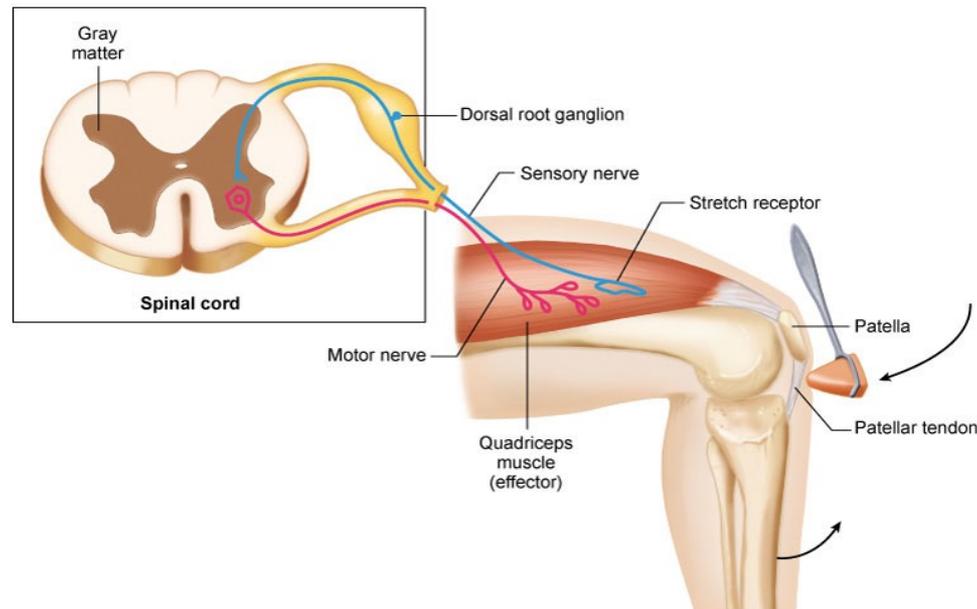
Interpretive functions

Motor output

Higher mental functioning and emotional responsiveness

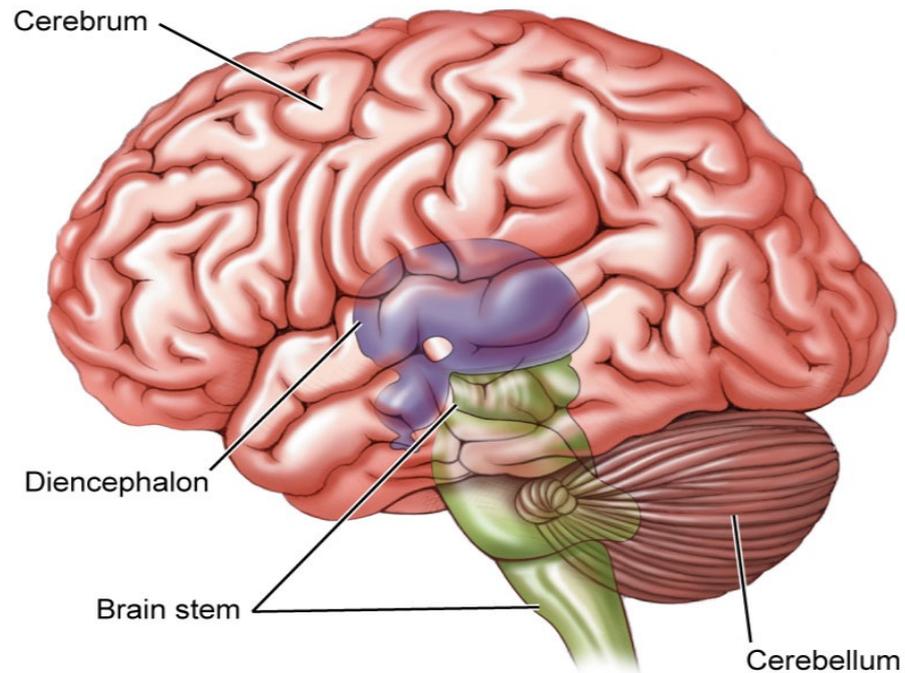
Physiology

Sensory input Sensory receptors detect changes, or stimuli, inside the body such as lowered blood sugar levels, or outside the body such as an increase in temperature. Sensory neurons carry nerve impulses into the spinal cord and brain.



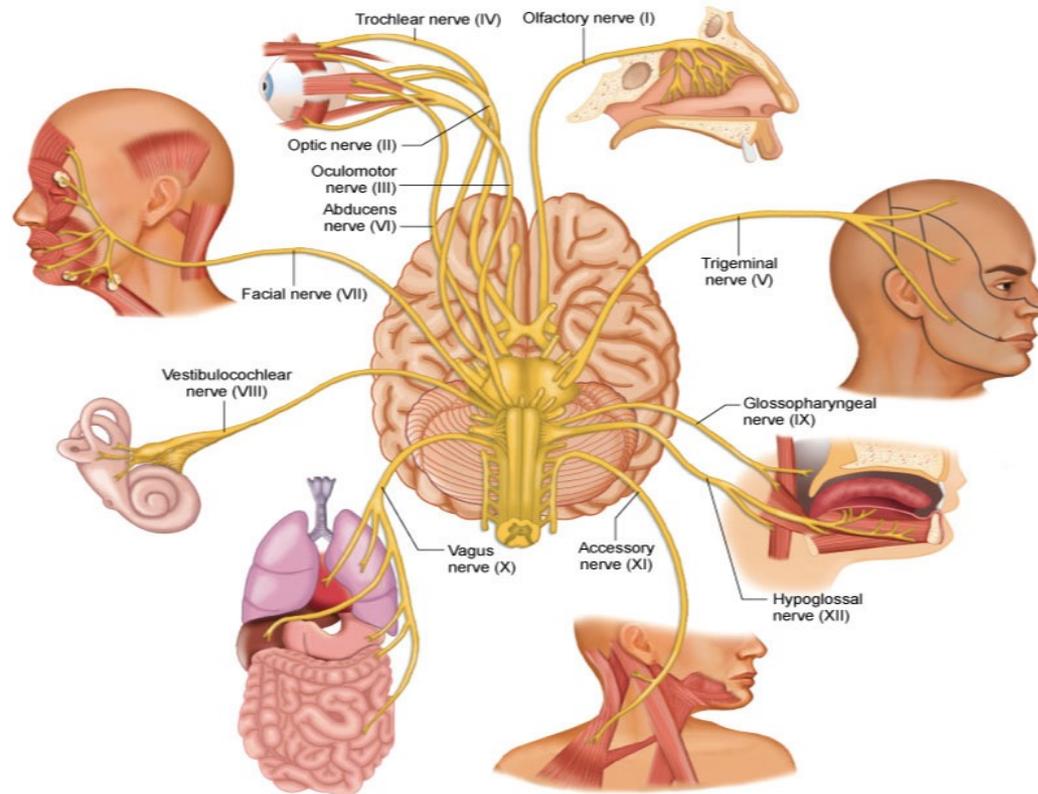
Physiology

Interpretive functions The spinal cord and brain integrate sensory information. They analyze it, store some of it, and decide on appropriate responses.



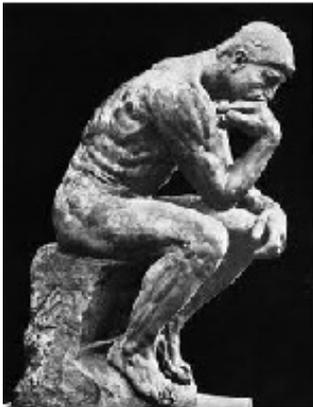
Physiology

Motor output Motor neurons carry nerve impulses from the brain and spinal cord to smooth muscle, cardiac muscle, skeletal muscle, and glands.

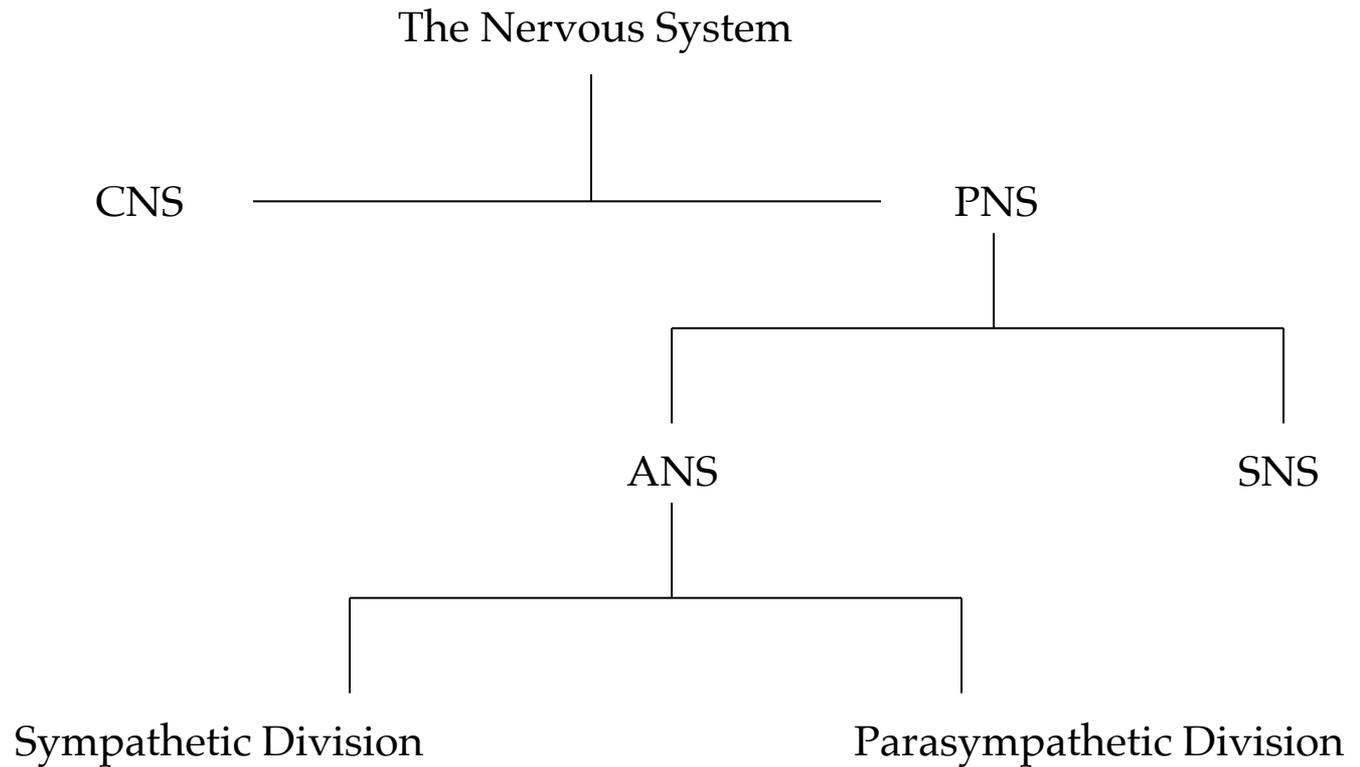


Physiology

Higher mental functioning and emotional responsiveness Examples:
cognition, memory, joy, excitement, anger, anxiety.

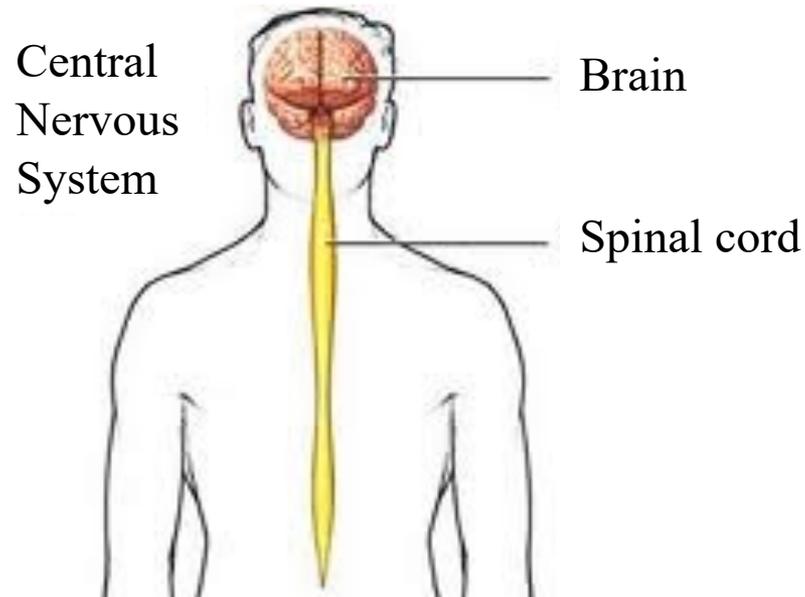


Basic Organization



Basic Organization

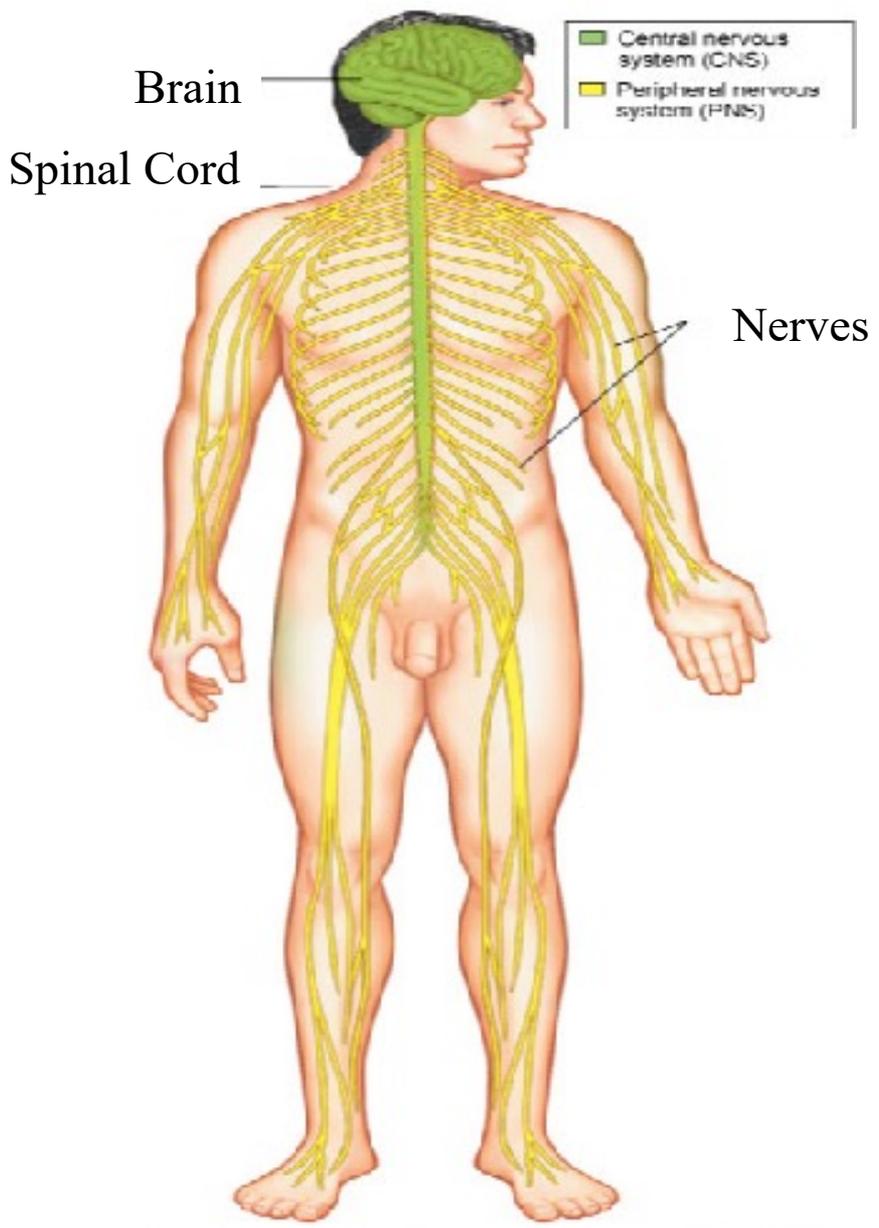
Central nervous system (AKA: CNS) Body system primarily concerned with interpreting incoming sensory information and issuing instructions in the form of motor responses. Includes: brain, meninges, cerebrospinal fluid, and spinal cord.





Basic Organization

Peripheral nervous system (AKA: PNS) Composed of the cranial and spinal
_____nerves_____ emerging from the CNS.



CNS in green

PNS in yellow





Basic Organization

Somatic nervous system (AKA: SNS) Voluntary division of the PNS that transmits information from bones, muscles, joints , skin, and special senses of vision, hearing, taste, and smell into the CNS. Carries impulses from the CNS to skeletal muscles.



Basic Organization

Autonomic nervous system (AKA: ANS) Involuntary,
division of PNS supplying impulses to smooth muscle, cardiac muscle,
and glands. Has sympathetic and parasympathetic divisions.

Sympathetic division of the ANS - Fight, Flight, or Freeze

Parasympathetic division of the ANS - Rest and Digest



Cells of the Nervous System

Neuroglia

Neuron



Cells of the Nervous System

Neuroglia (AKA: glia, glial cells) Connective tissue that supports, nourishes, protects, insulates, and organizes neurons. Types: astrocyte, ependymocyte, microglia, oligodendrocyte, Schwann cell, satellite cell.

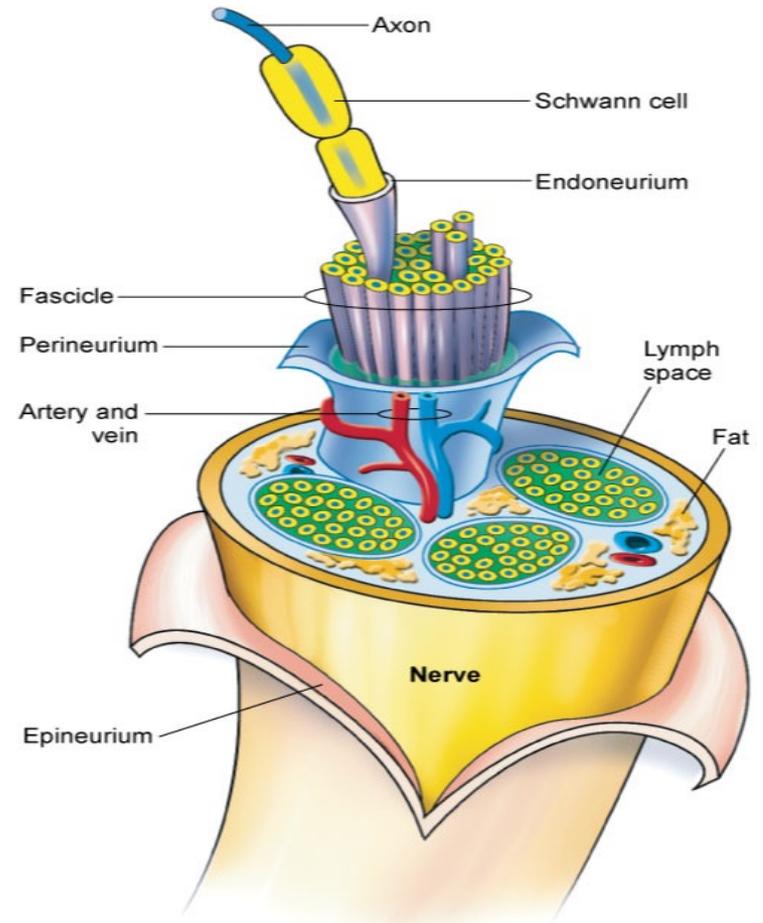
Cells of the Nervous System

Neuron Impulse-conducting cell. Properties:

Excitability

Conductibility

Secretability





Cells of the Nervous System

Excitability The ability to respond to a stimulus and convert it to a nerve impulse.

Conductibility The ability to transmit the impulses to other neurons, muscles, and glands.

Secretability The ability to release neurotransmitters that help conduct an impulse.

Parts of a Neuron

Cell body

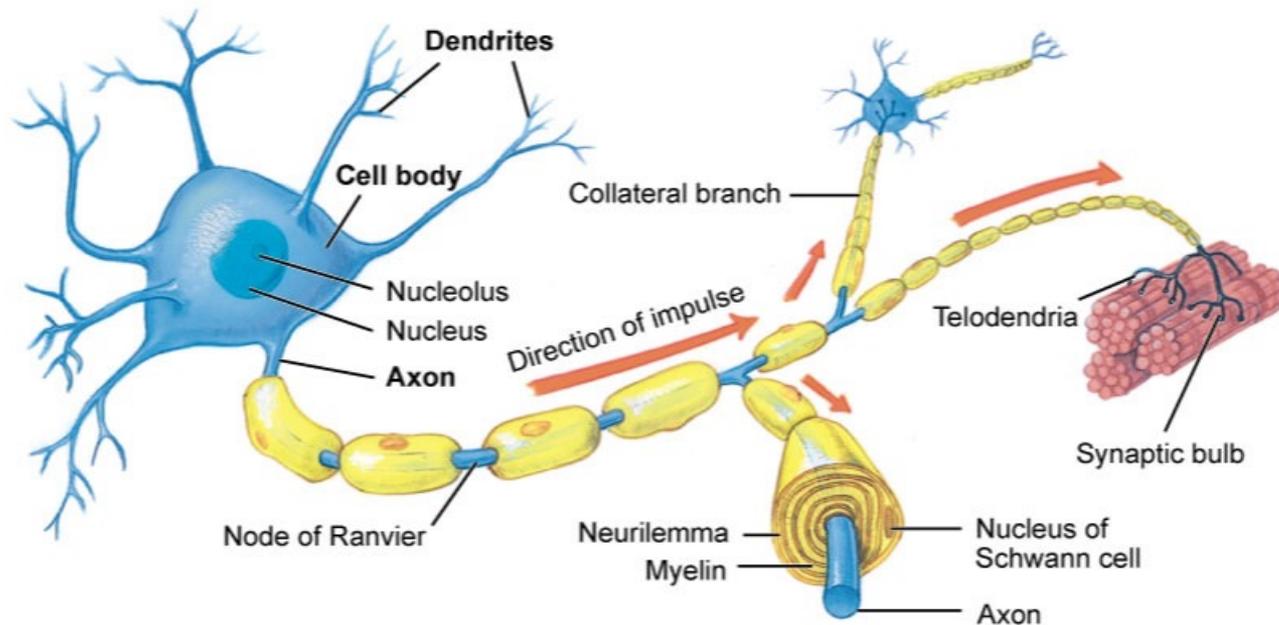
Dendrite

Axon



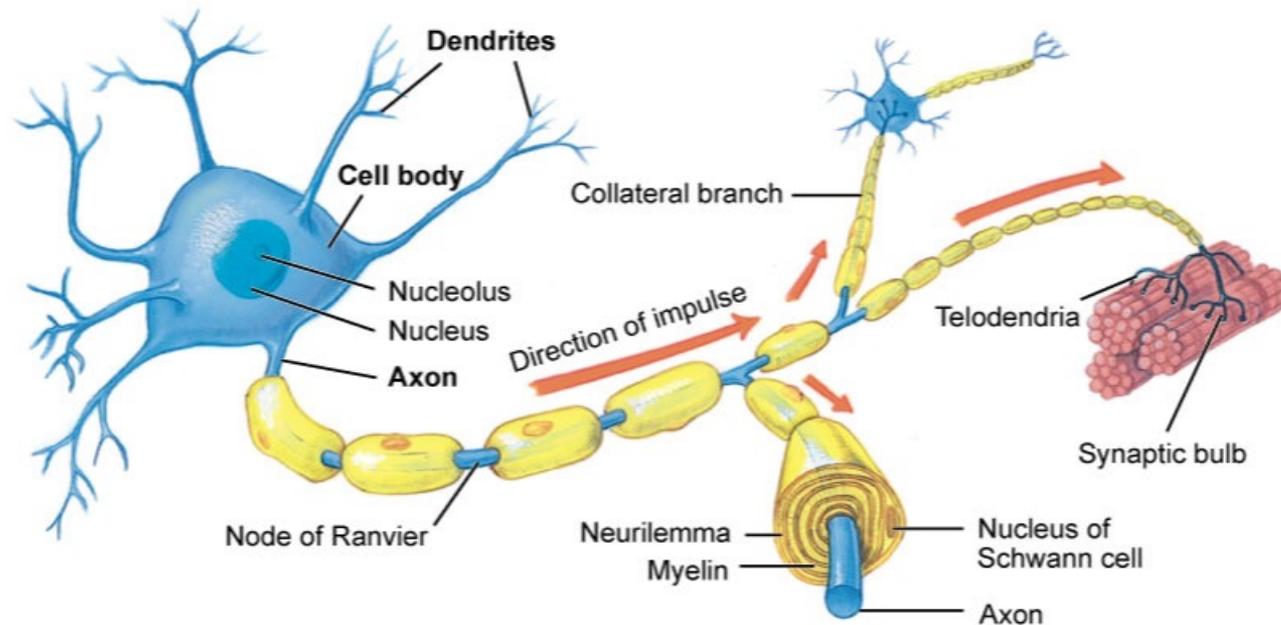
Parts of a Neuron

Cell body (AKA: cyton) Main region of the neuron containing the nucleus, ribosomes, and other organelles. The gray matter of the nervous system.



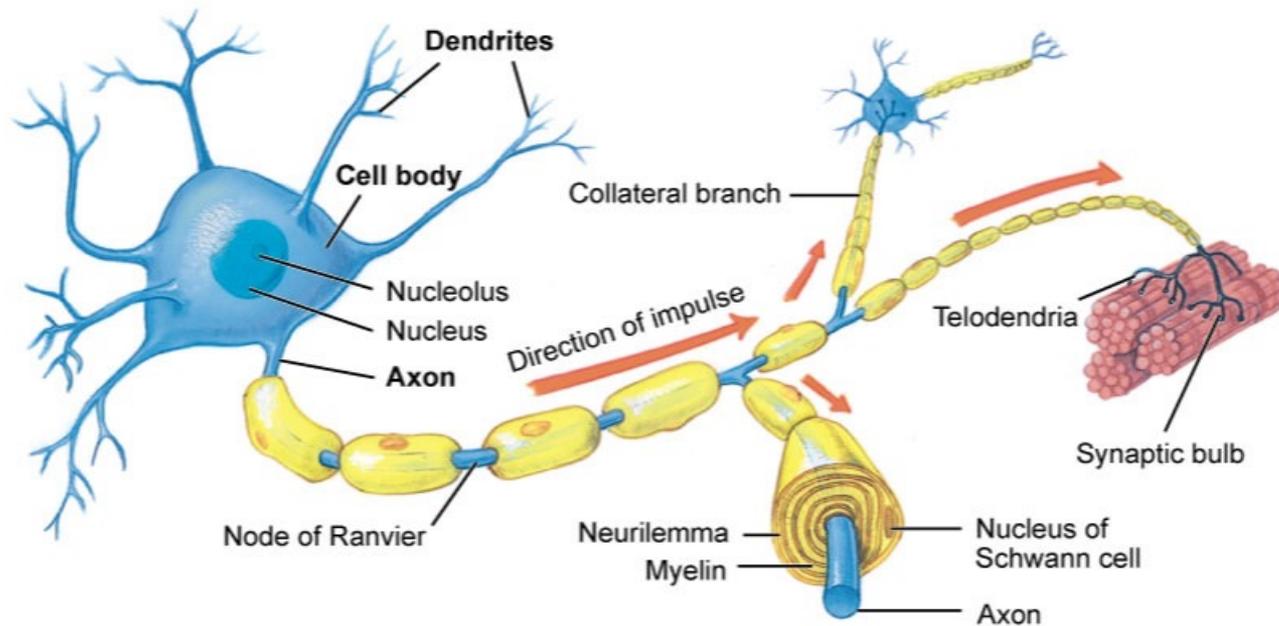
Parts of a Neuron

Dendrite Short, narrow, neural extensions that receive and transmit stimuli _____ toward _____ the neuron's cell body.



Parts of a Neuron

Axon Neural extension that carries nerve impulses away from the neuron toward another neuron, a muscle cell, or gland.





Axon Structures

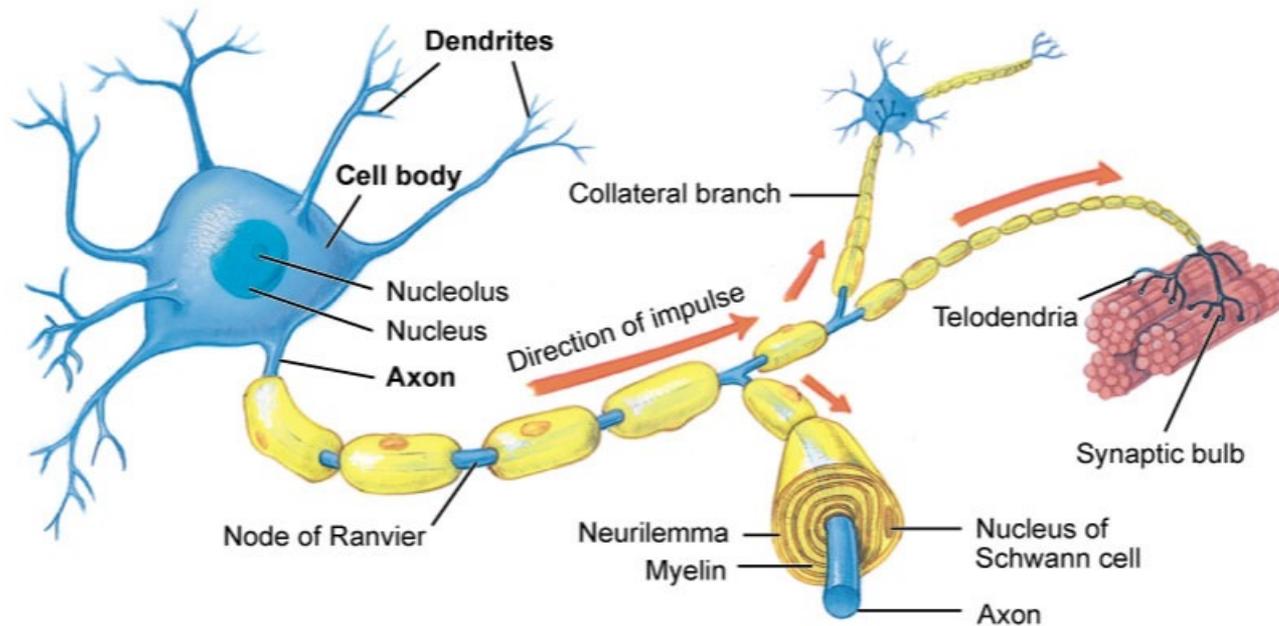
Telodendria

Myelin sheath

Nodes of Ranvier

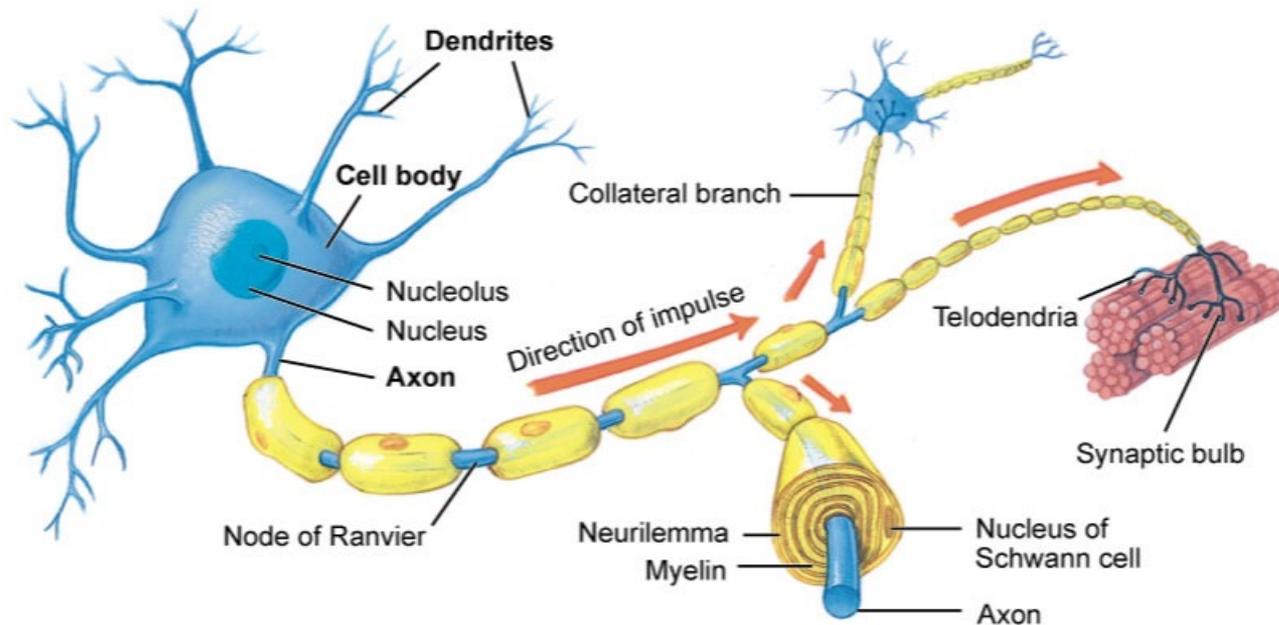
Axon Structures

Telodendria Clusters of short, fine filaments located at the end of each axon.



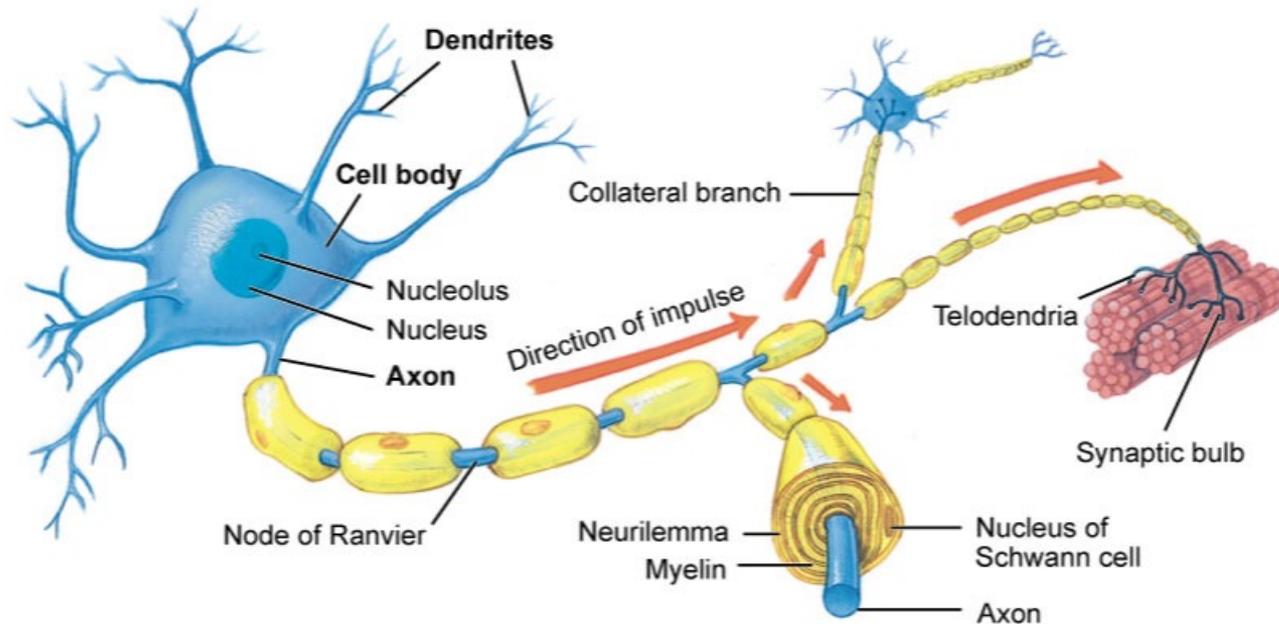
Axon Structures

Myelin sheath _____ Fatty _____ tissue layer surrounding most axons in the PNS. Insulates the neuron and increases nerve impulse speed.



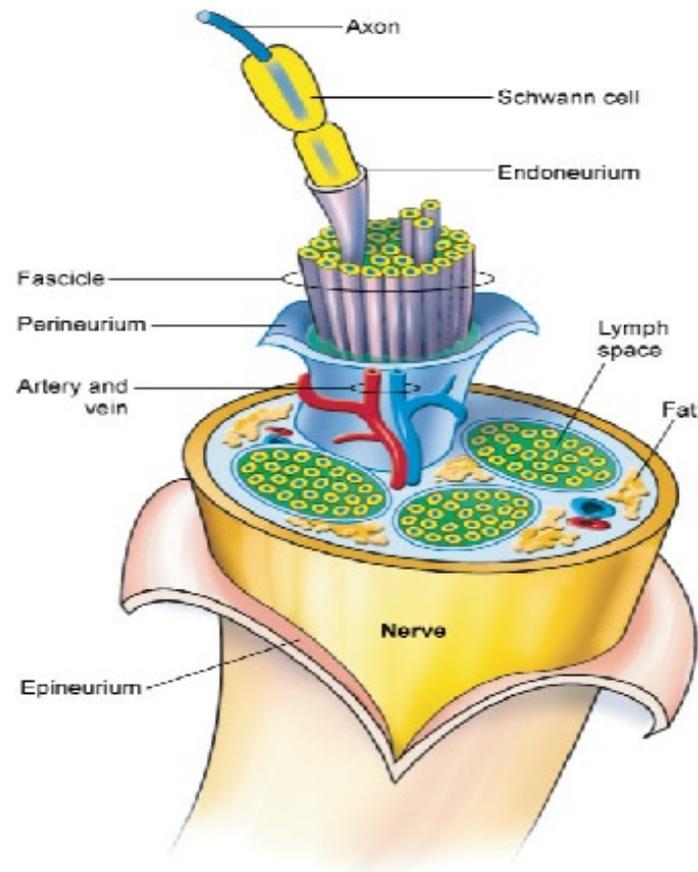
Axon Structures

Nodes of Ranvier Gaps along myelinated axons. Increase speed of a nerve impulse by allowing the impulse to jump from one node to another.



Connective Tissues: Neurons to Nerve

neuron → fascicle → nerve
endoneurium → perineurium → epineurium





Connective Tissues: Neurons to Nerve

Fasciculi (s. fascicle) Bundles of neurons.

Nerve Bundle of fasciculi.

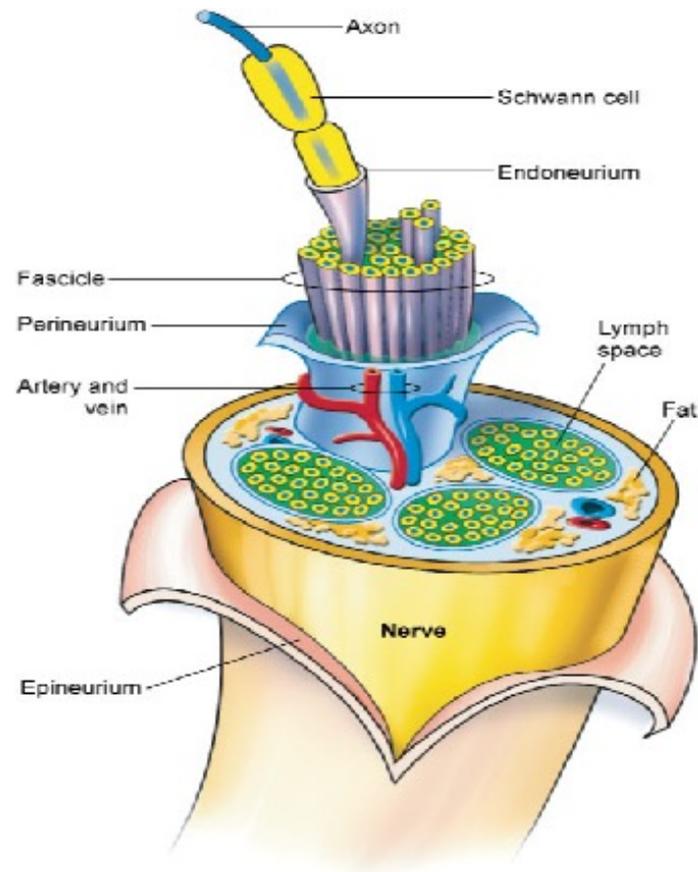
Endoneurium Connective tissue layer for a neuron.

Perineurium Connective tissue layer for a fascicle.

Epineurium Connective tissue layer for a nerve.

Connective Tissues: Neurons to Nerve

neuron → fascicle → nerve
endoneurium → perineurium → epineurium





Classification of Neurons

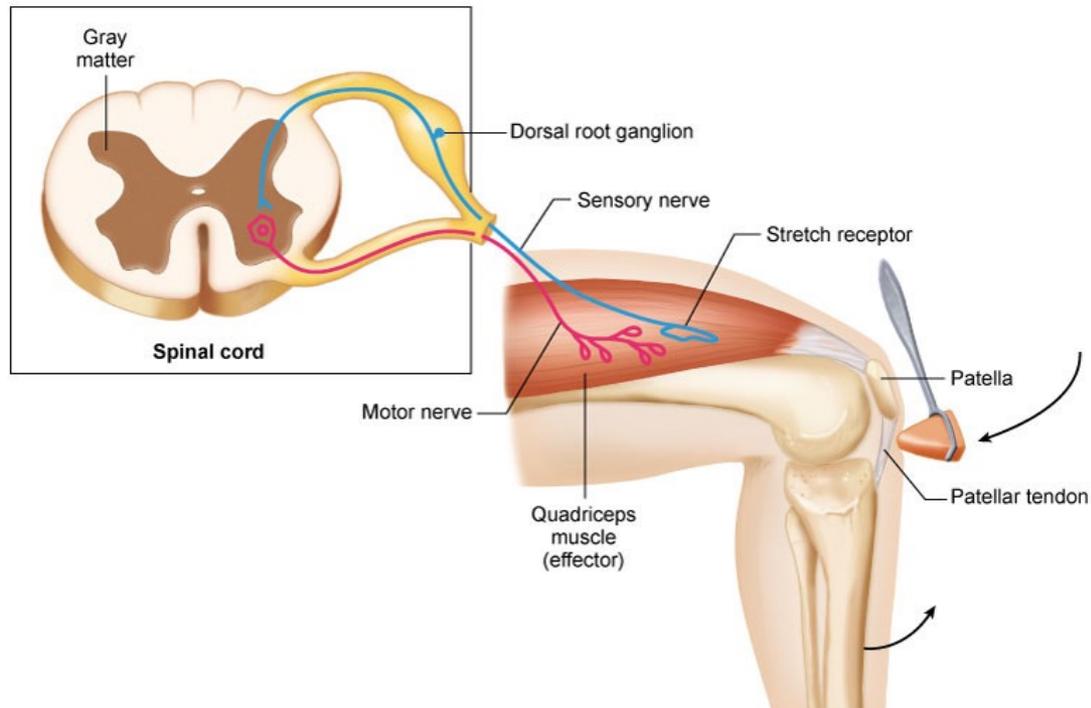
Sensory neuron

Interneuron

Motor neuron

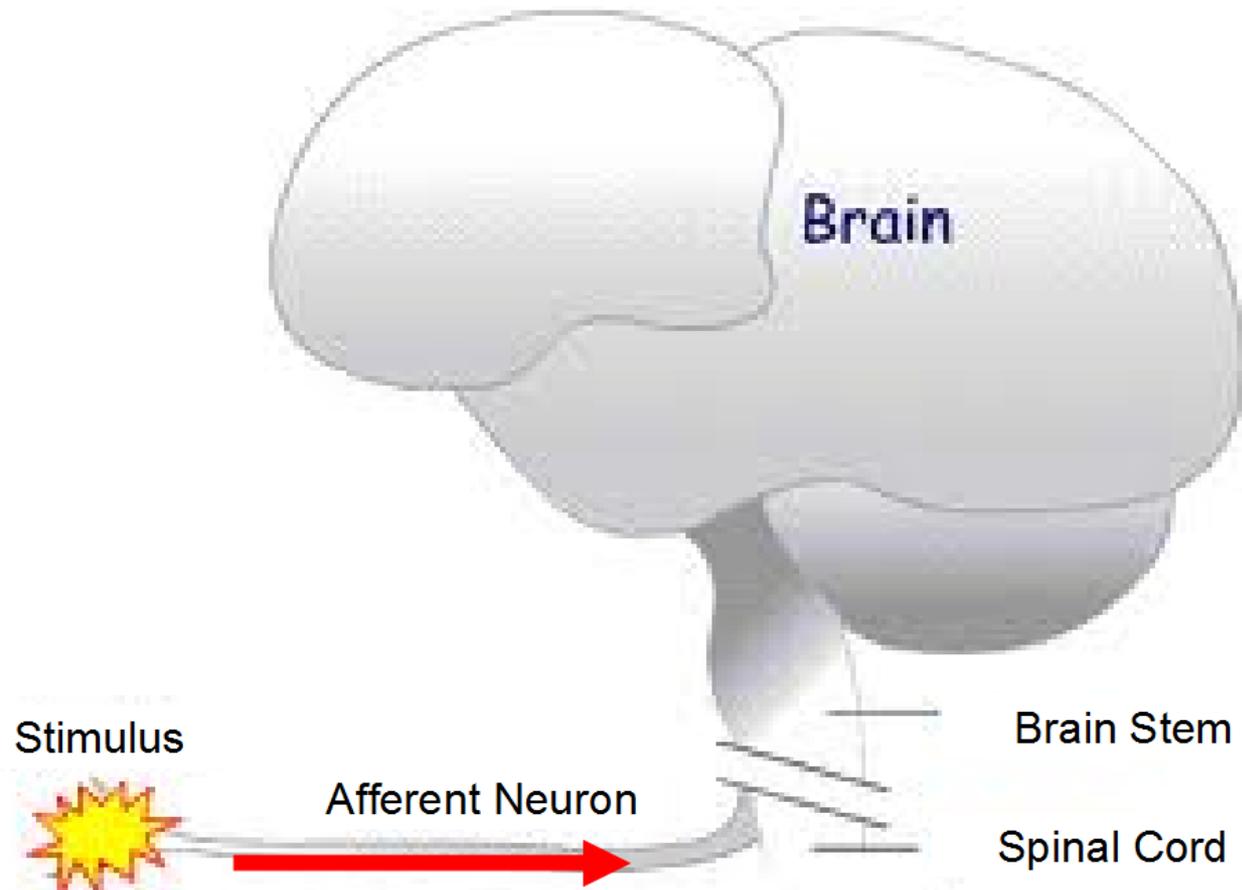
Classification of Neurons

Sensory neuron (AKA: afferent neuron) Carries impulses to the CNS.



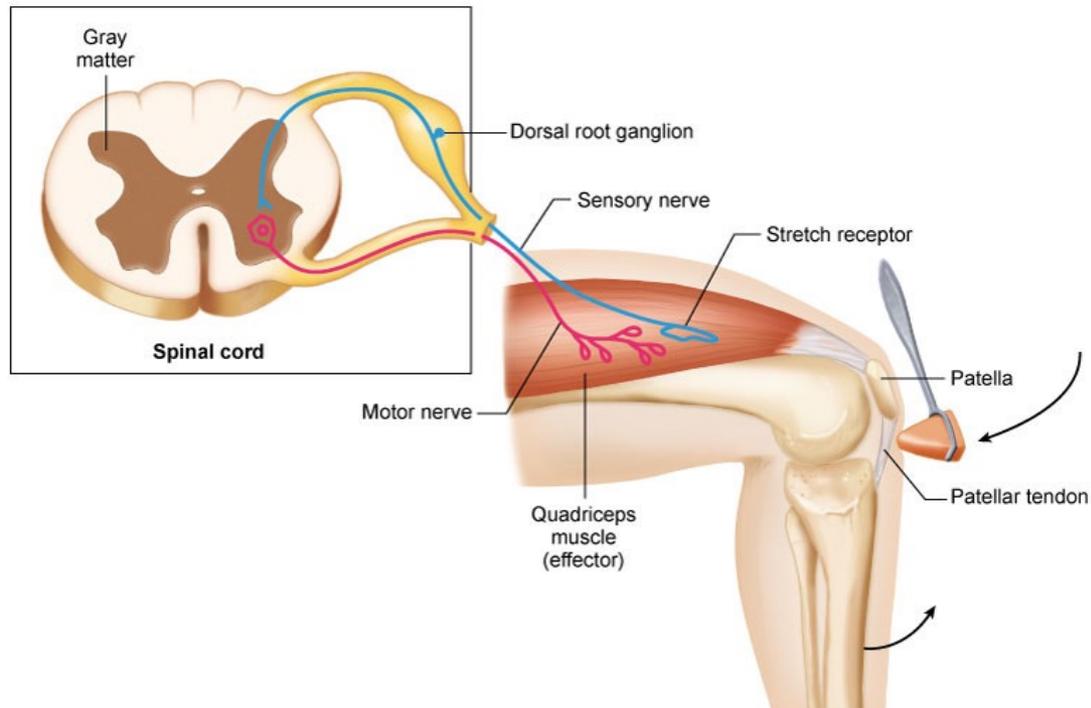
Classification of Neurons

Sensory neuron (AKA: afferent neuron) Carries impulses to the CNS.



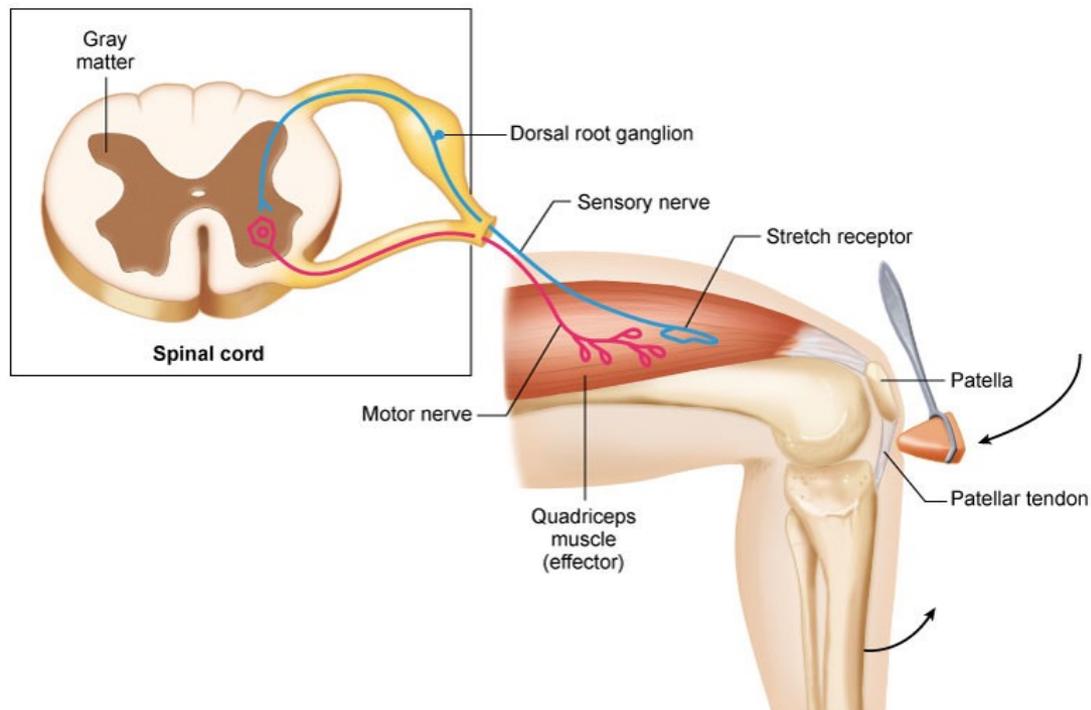
Classification of Neurons

Interneuron (AKA: association neuron) Neuron between a sensory , and motor neuron. Participates in integrative functions.



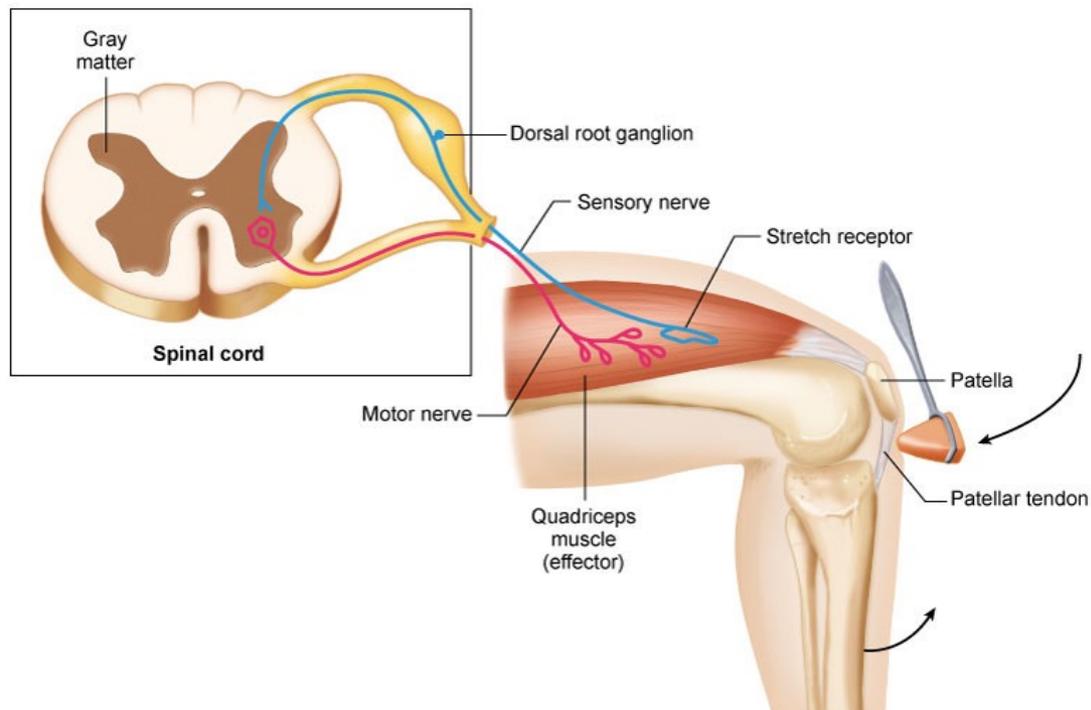
Classification of Neurons

Motor neuron (AKA: efferent neuron) Sends a nerve impulse to effectors.



Classification of Neurons

Effector Any muscle or gland that motor nerves act on.





Nerve Impulses

Nerve impulse (AKA: action potential) An electrical signal that conveys information along a neuron.

48a A&P: Nervous System - Introduction, Physiology, and Cells

