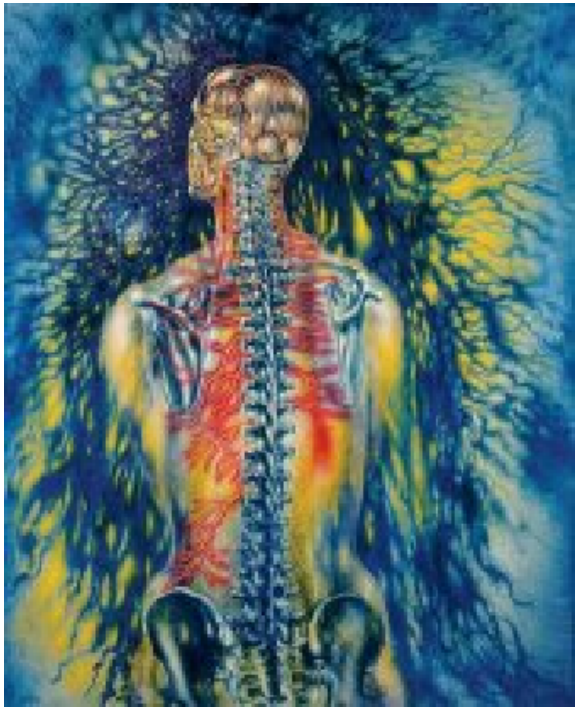
48a A&P: Nervous System - Introduction, Physiology, and Cells



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

Early Warning:

- By class 63b, you must be signed-up for and logged into MassagePrep.training
- You will receive an email from our receptionist with instructions for signing up.

Assignments:

- 50b Business: Marketing: it is recommended that you watch the webinar listed in the Class Schedule.
- 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)

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

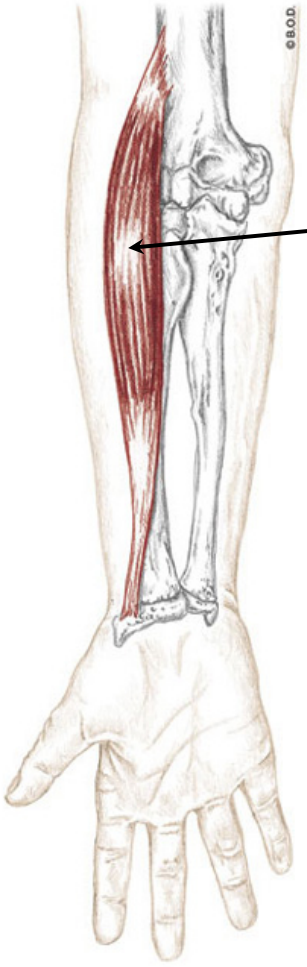
The following are not allowed:

- 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

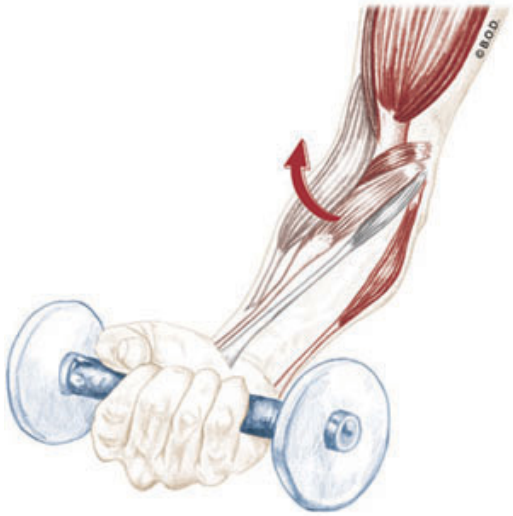
Brachioradialis, page 133

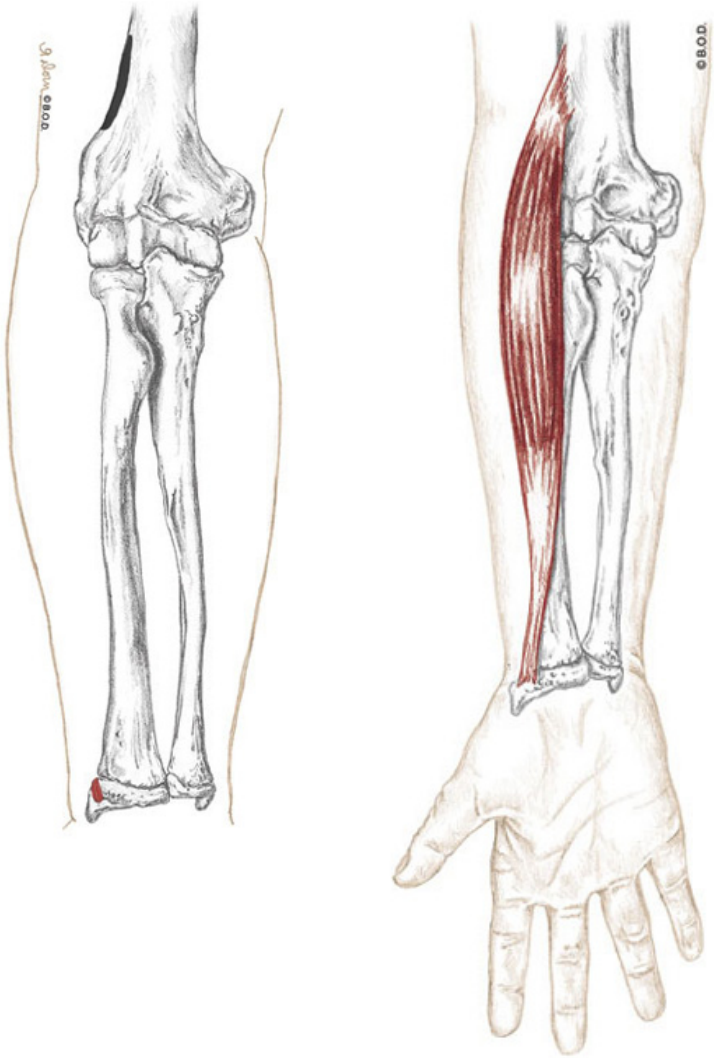
A Flex the elbow (humeroulnar joint)

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

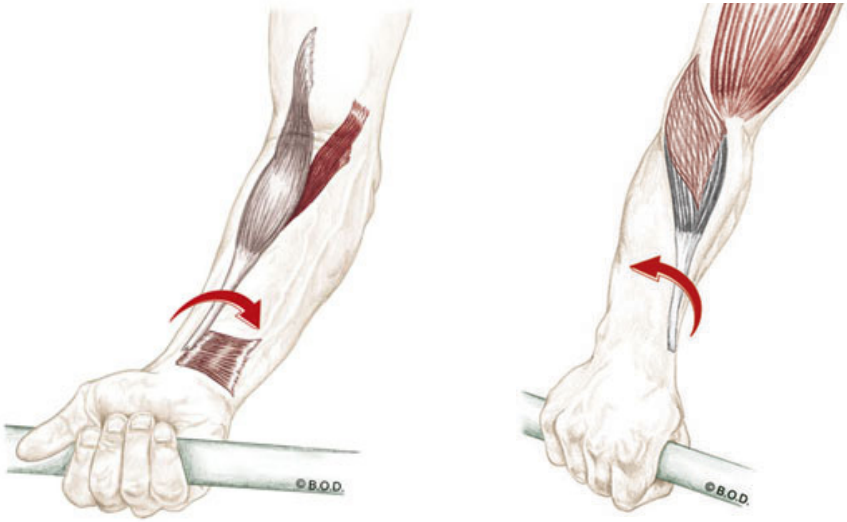
Brachioradialis, page 133

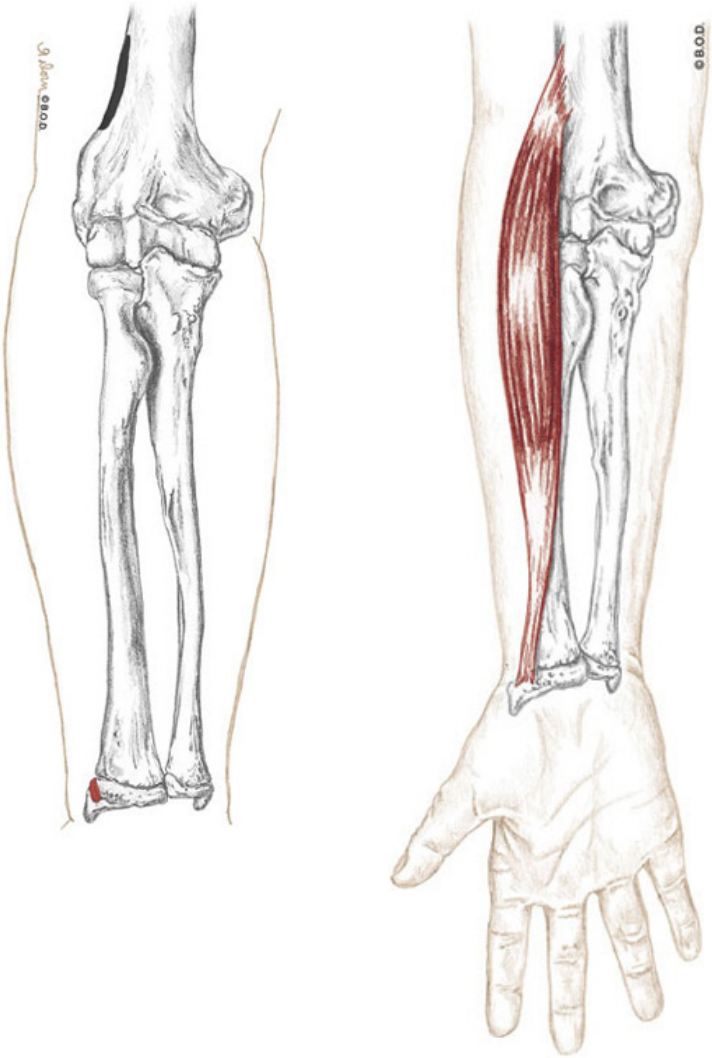
A Flex the elbow (humeroulnar joint)

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

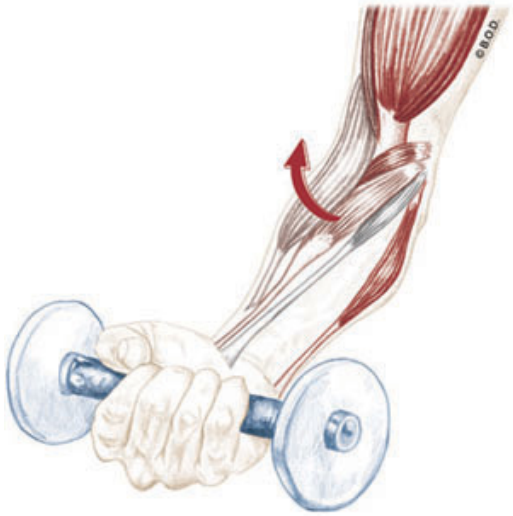
Brachioradialis, page 133

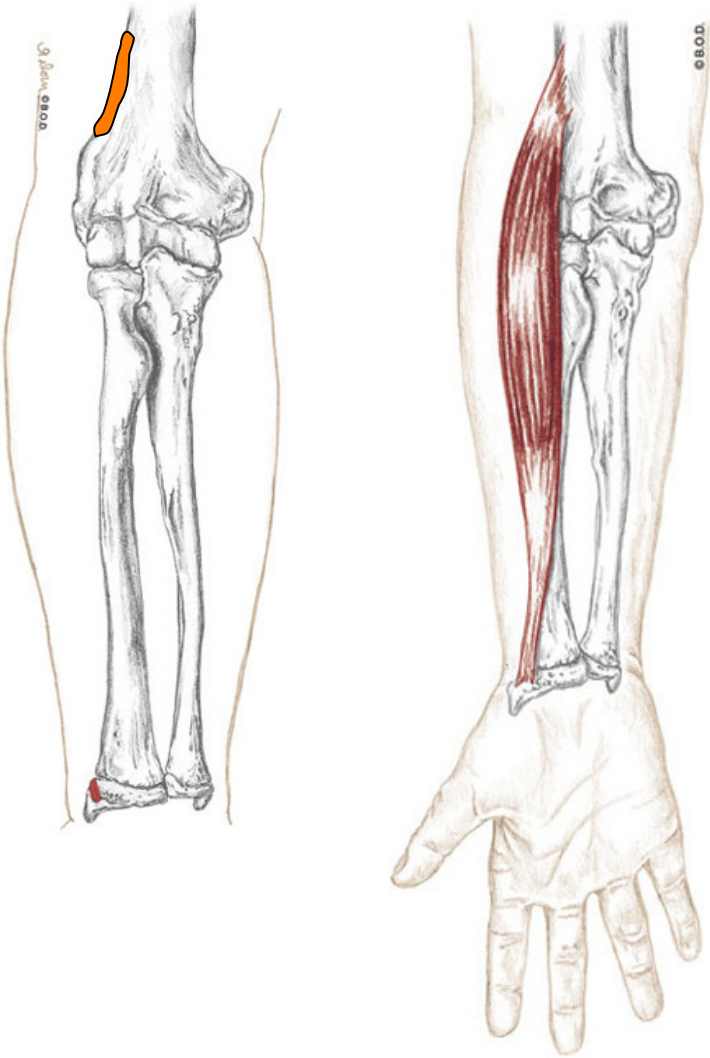
A Flex the elbow (humeroulnar joint)

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

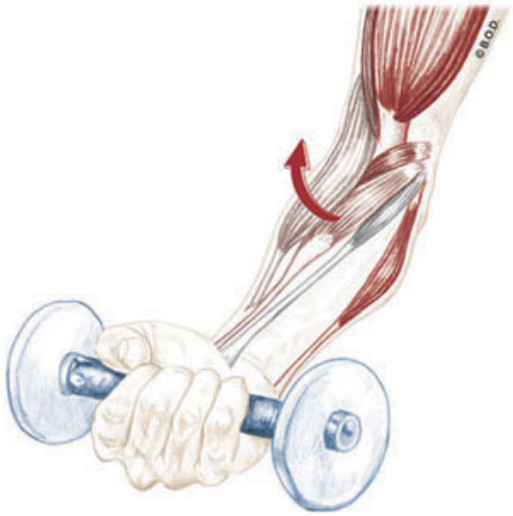
Brachioradialis, page 133

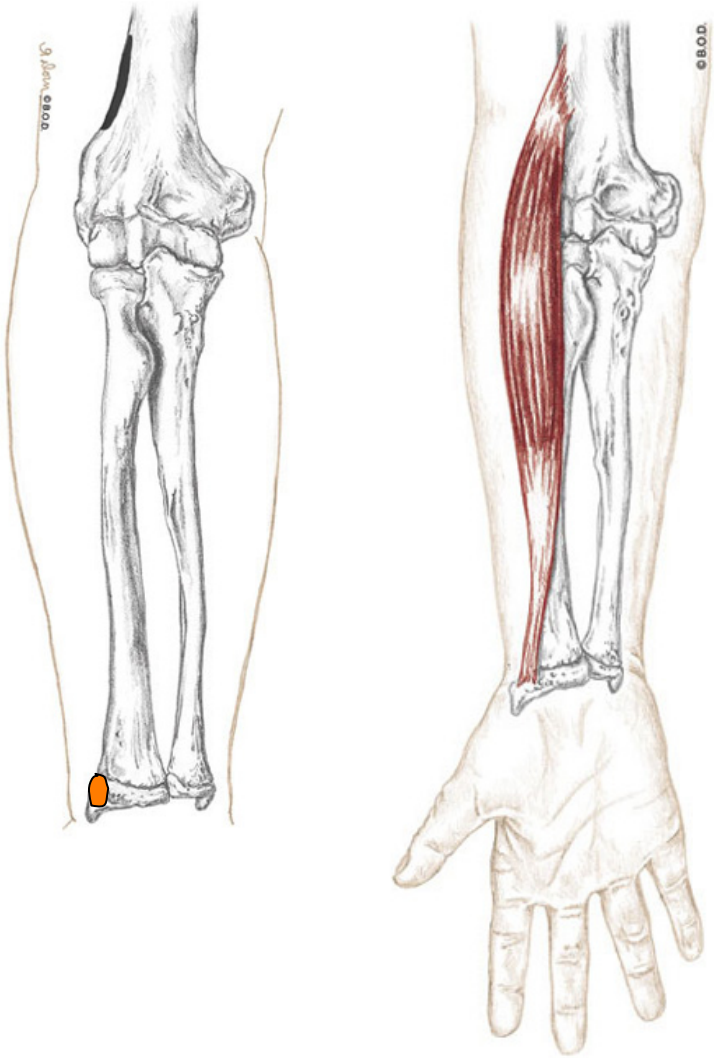
A Flex the elbow (humeroulnar joint)

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

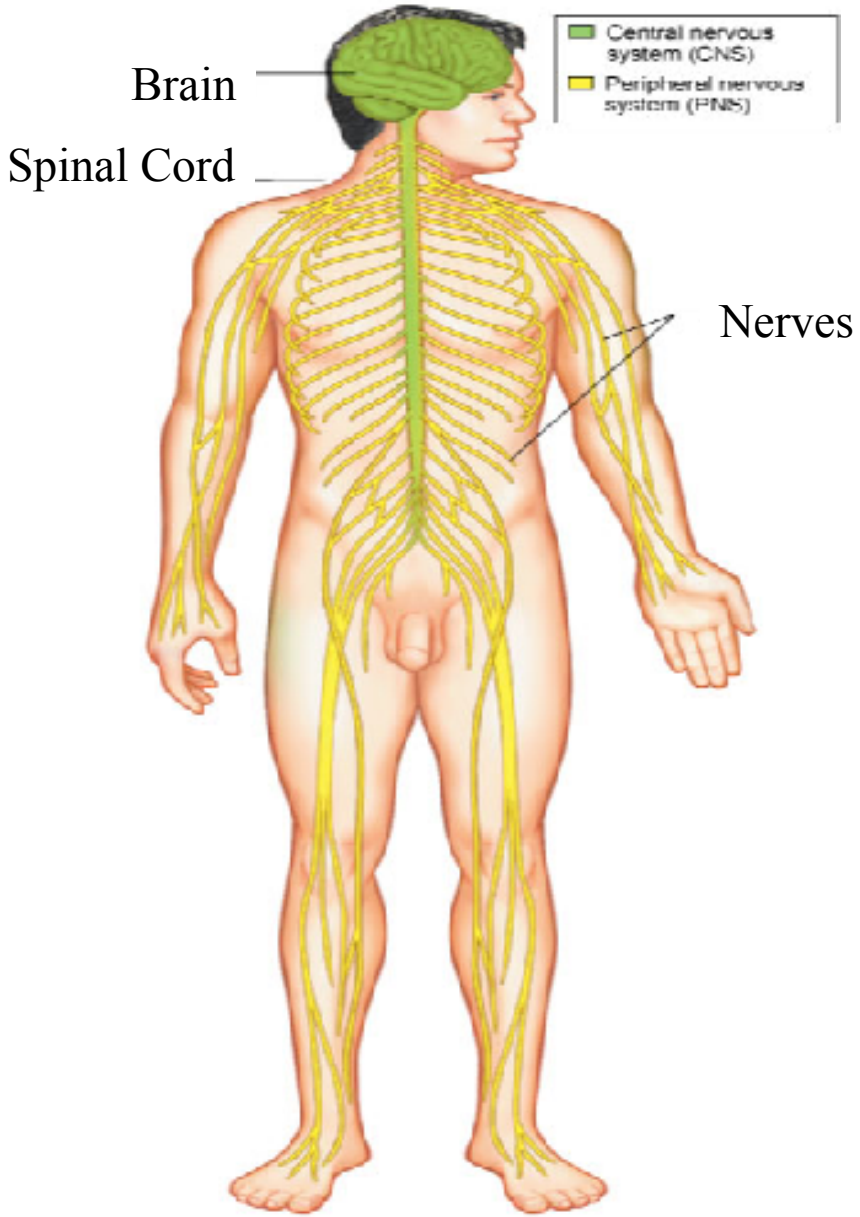
Every thought, action, and sensation reflects nerve activity.

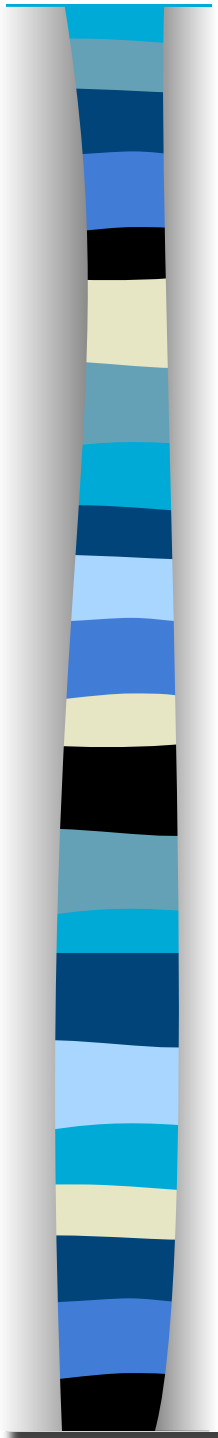
We are what our brain has experienced.

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


Brain
Spinal Cord
Nerves
Central nervous system (CNS)
Peripheral nervous system (PNS)



Physiology

Sensory input

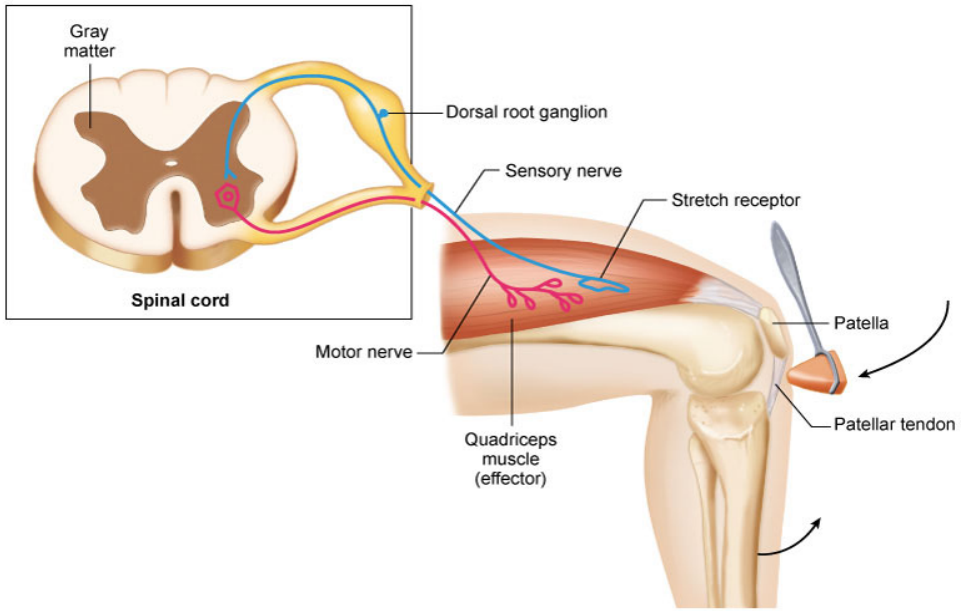
Interpretive functions

Motor output

Higher mental functioning and emotional responsiveness

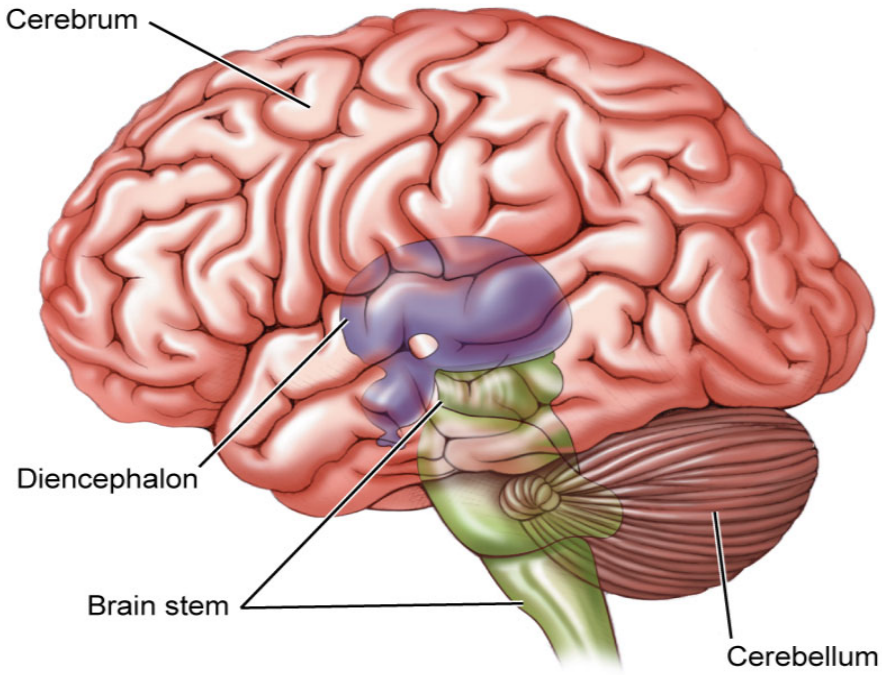
Physiology

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____.



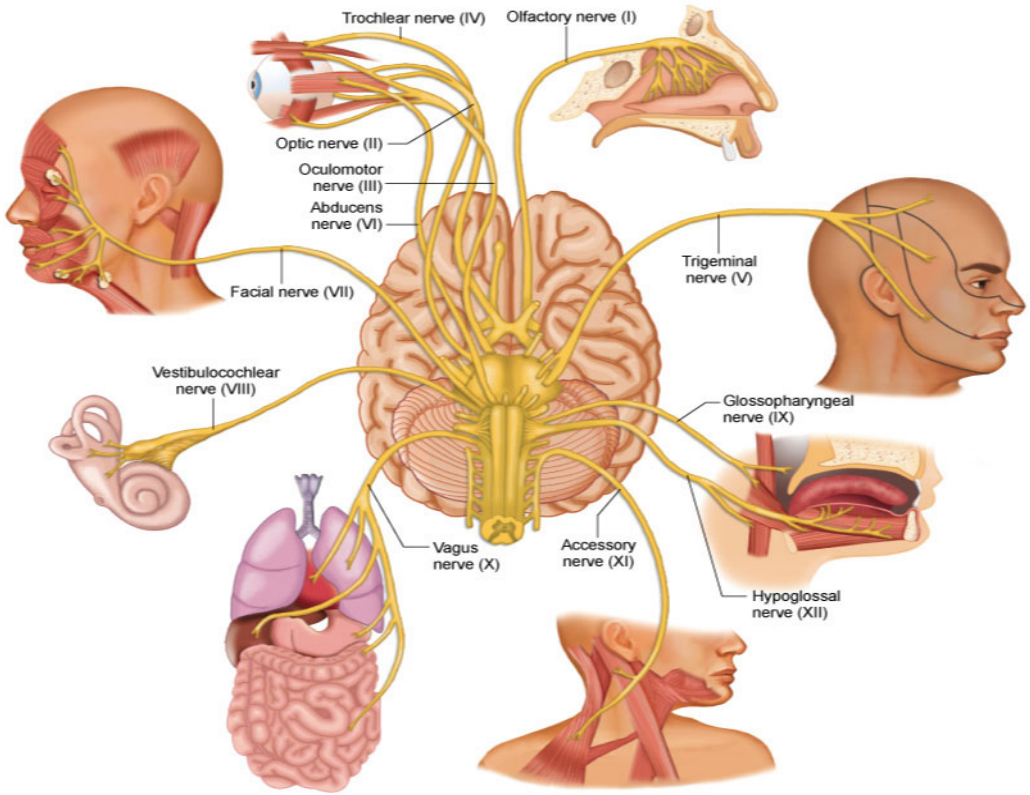
Physiology

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



Physiology

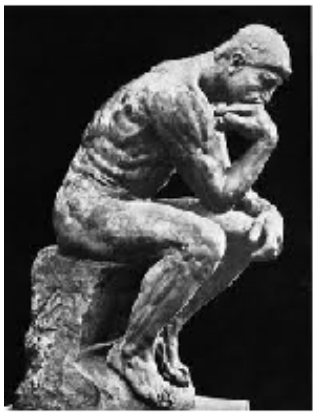
Motor output Motor neurons carry nerve impulses from the brain and spinal cord to smooth muscle, cardiac muscle, skeletal muscle, and __glands__.



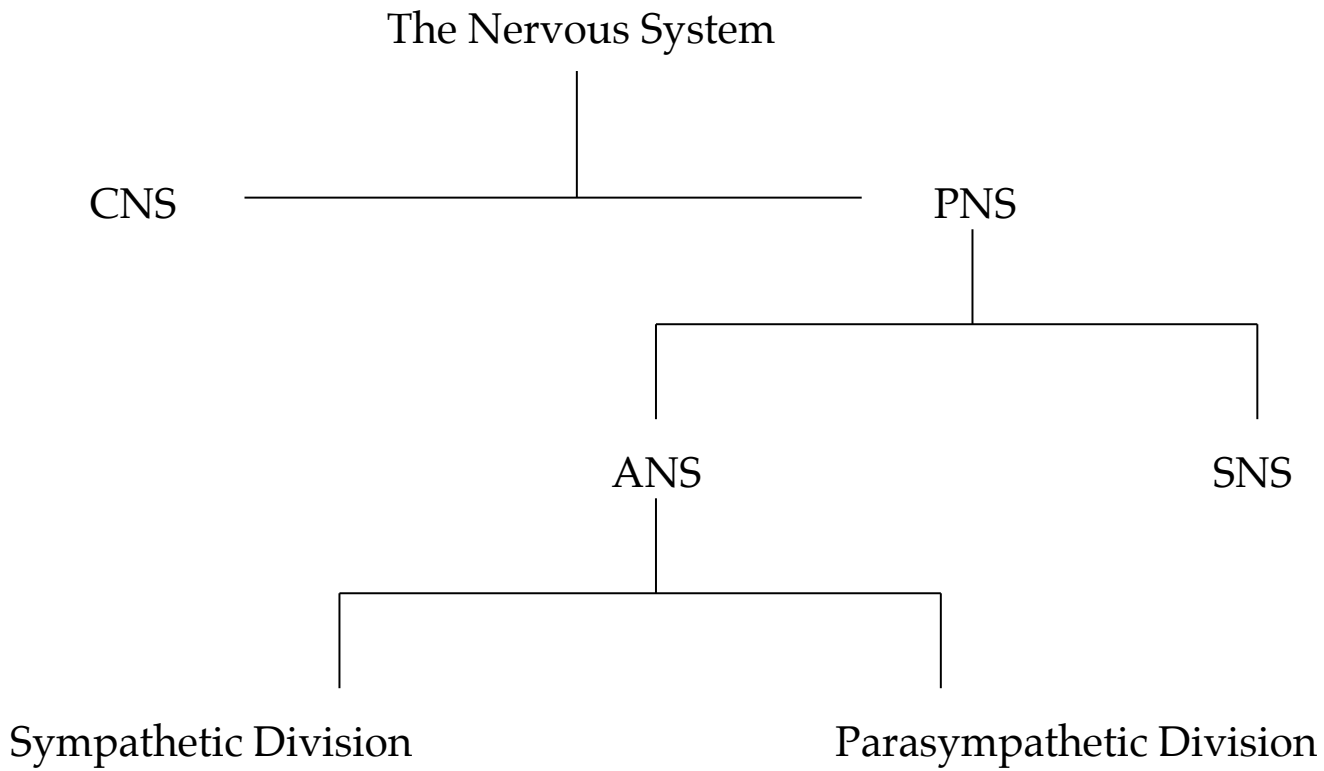
Physiology

Higher mental functioning and emotional responsiveness Examples**:**

cognition, ___memory___, joy, excitement, anger, anxiety.

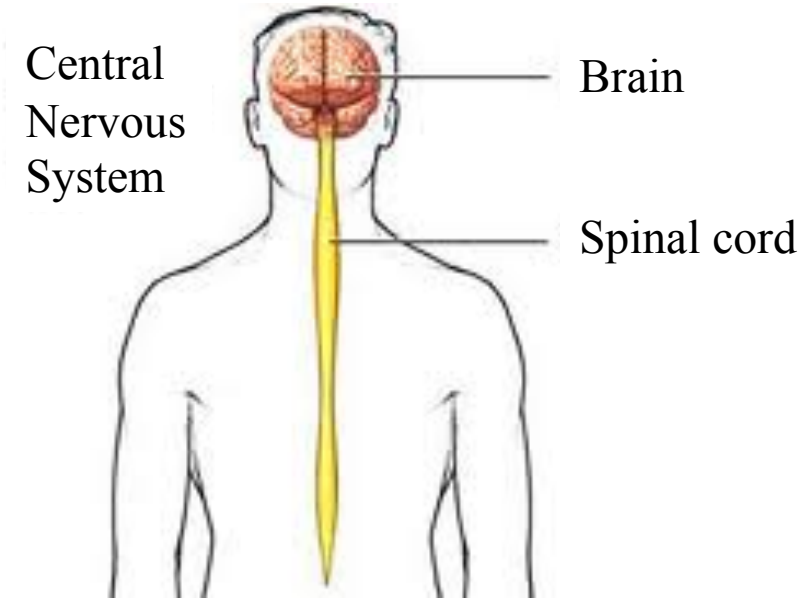


Basic Organization



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.

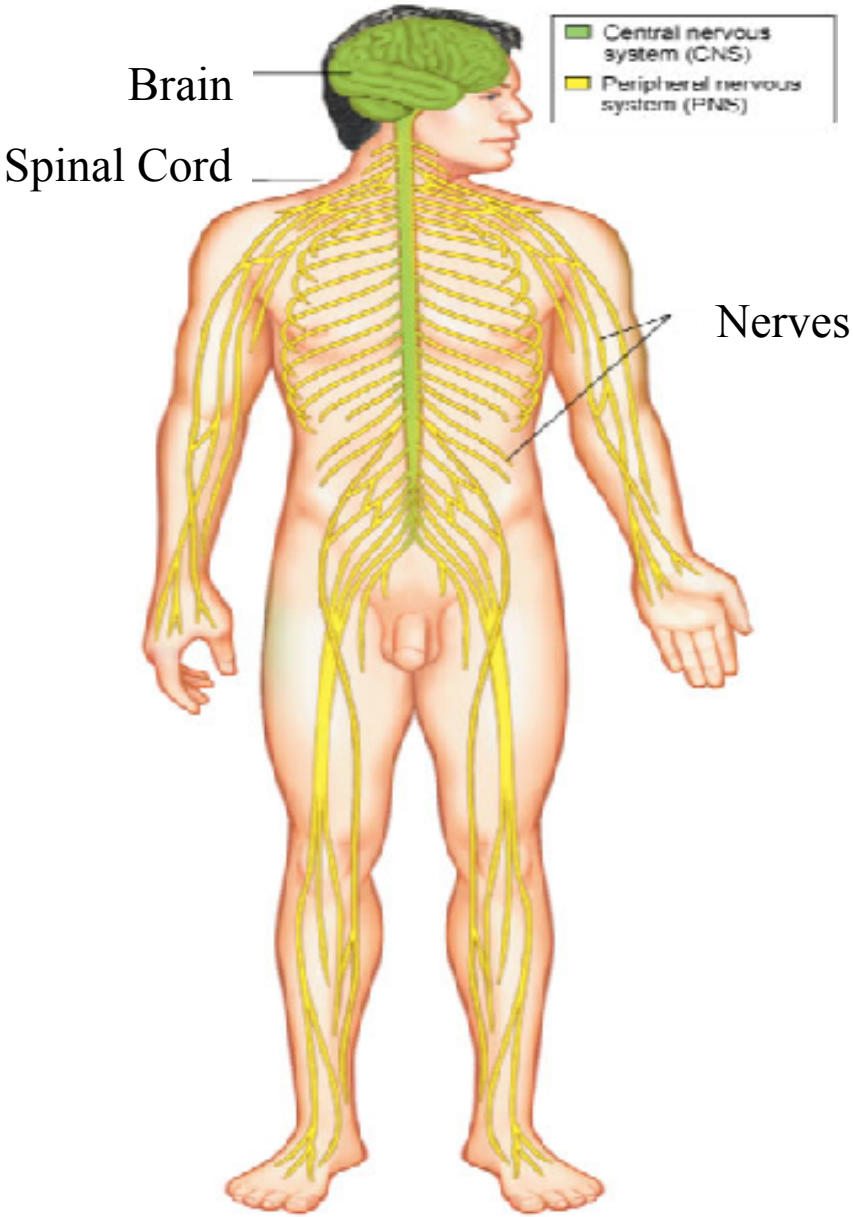


Basic Organization

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.

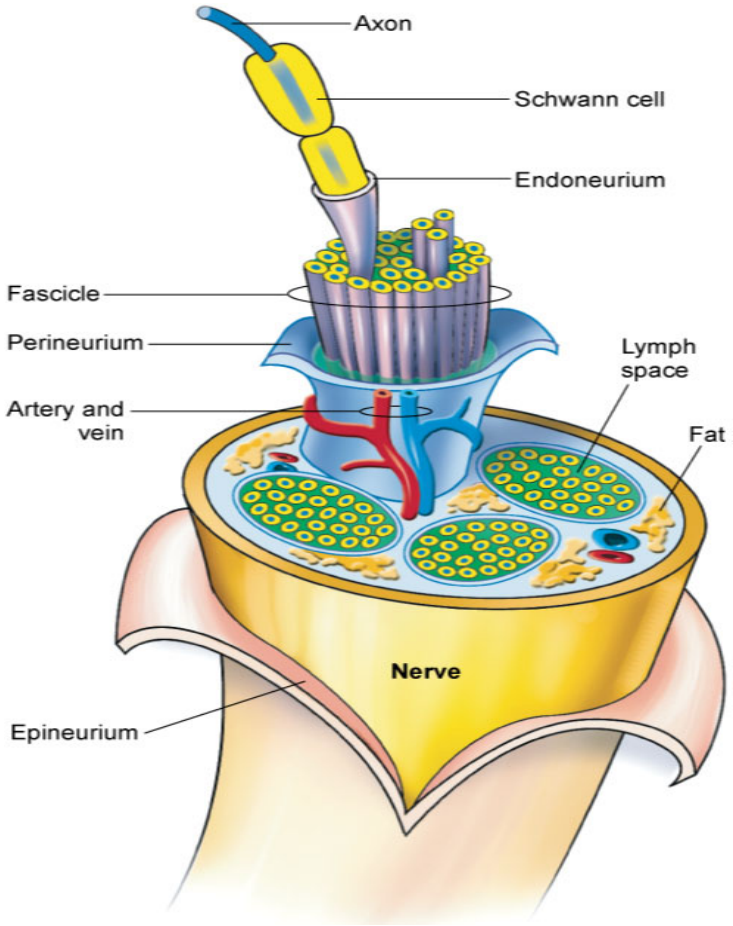
Cells of the Nervous System

Neuron Impulse-conducting cell. Properties:

Excitability

Conductibility

Secretability

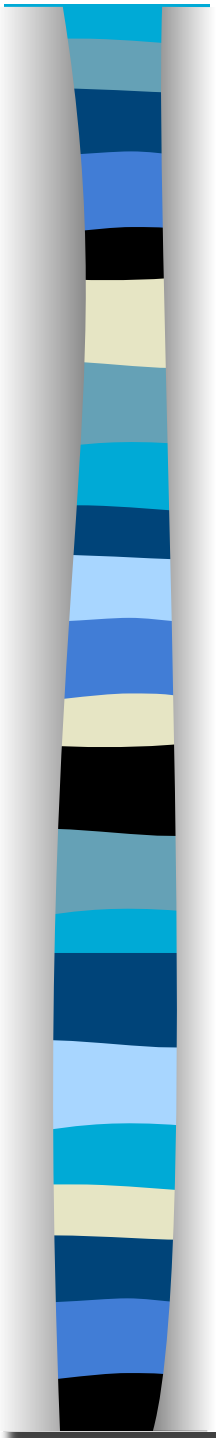


Cells of the Nervous System

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

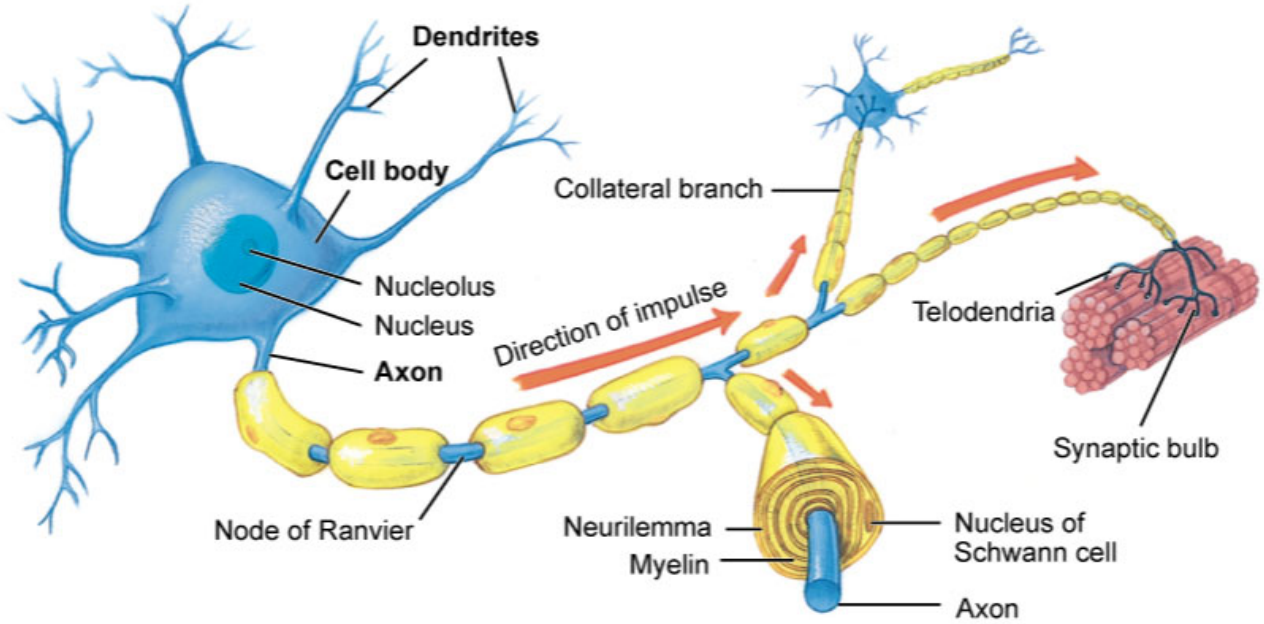
Cell body

Dendrite

Axon

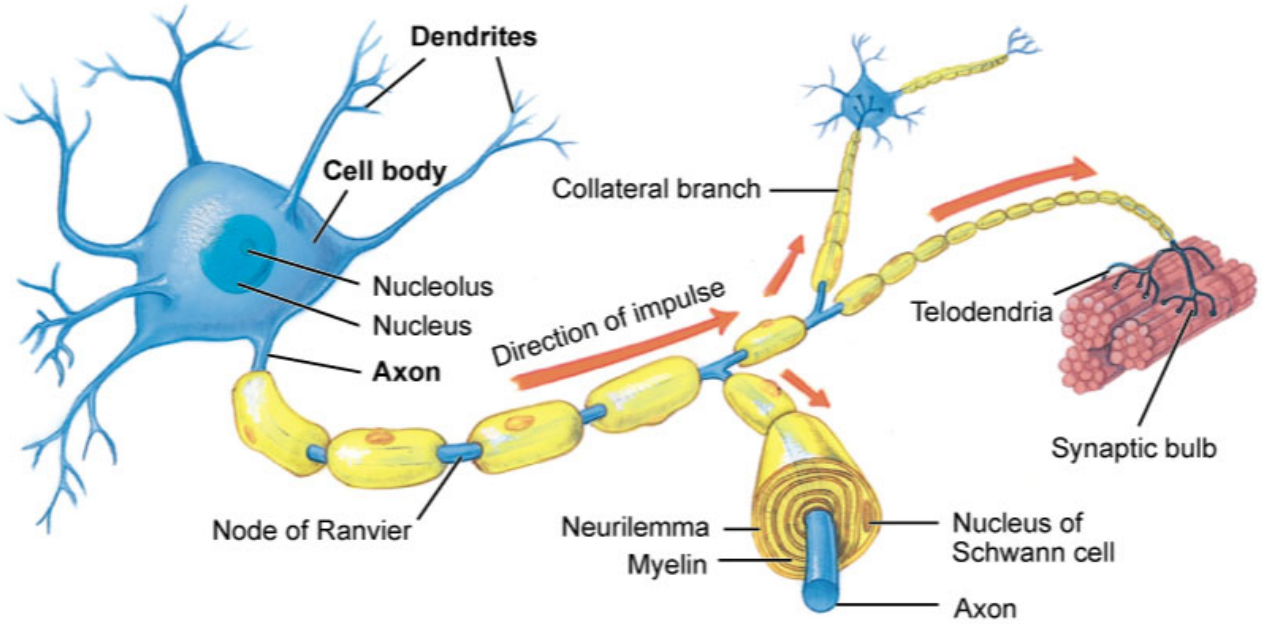
Parts of a Neuron

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



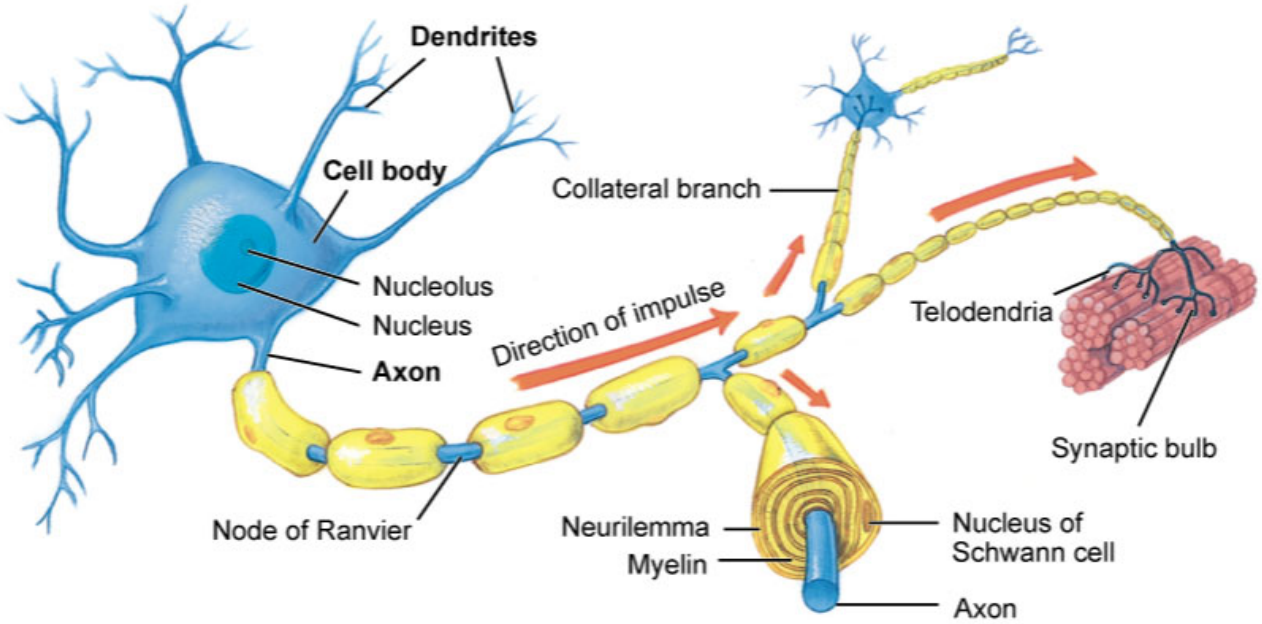
Parts of a Neuron

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

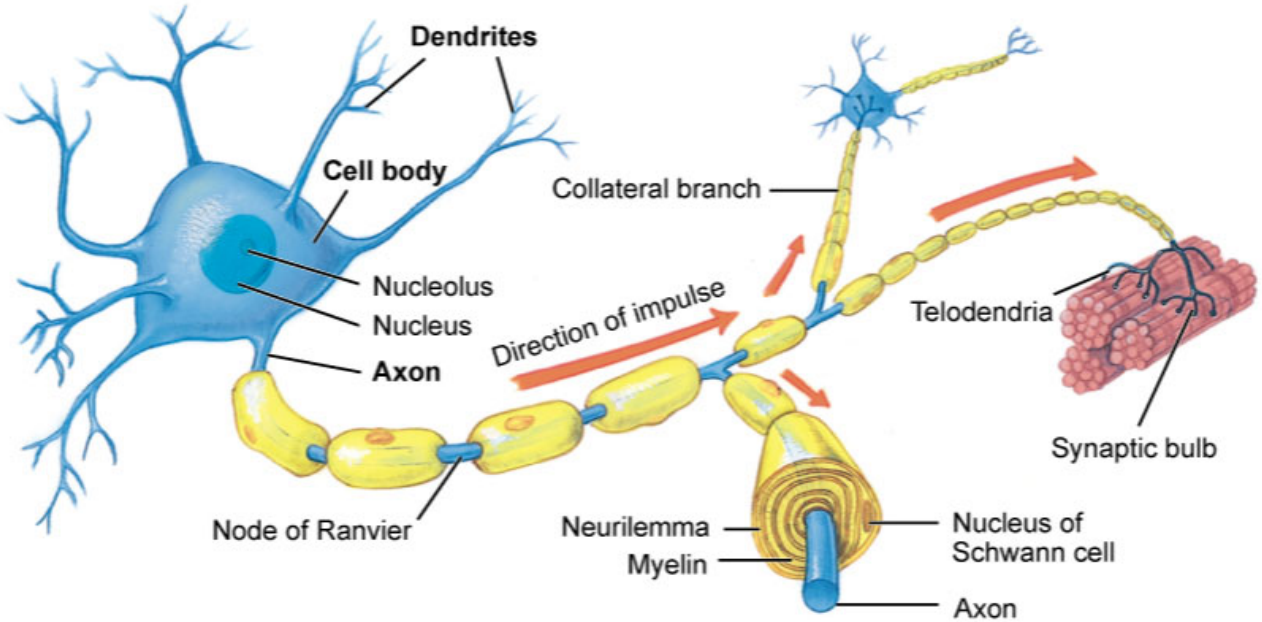
Telodendria

Myelin sheath

Nodes of Ranvier

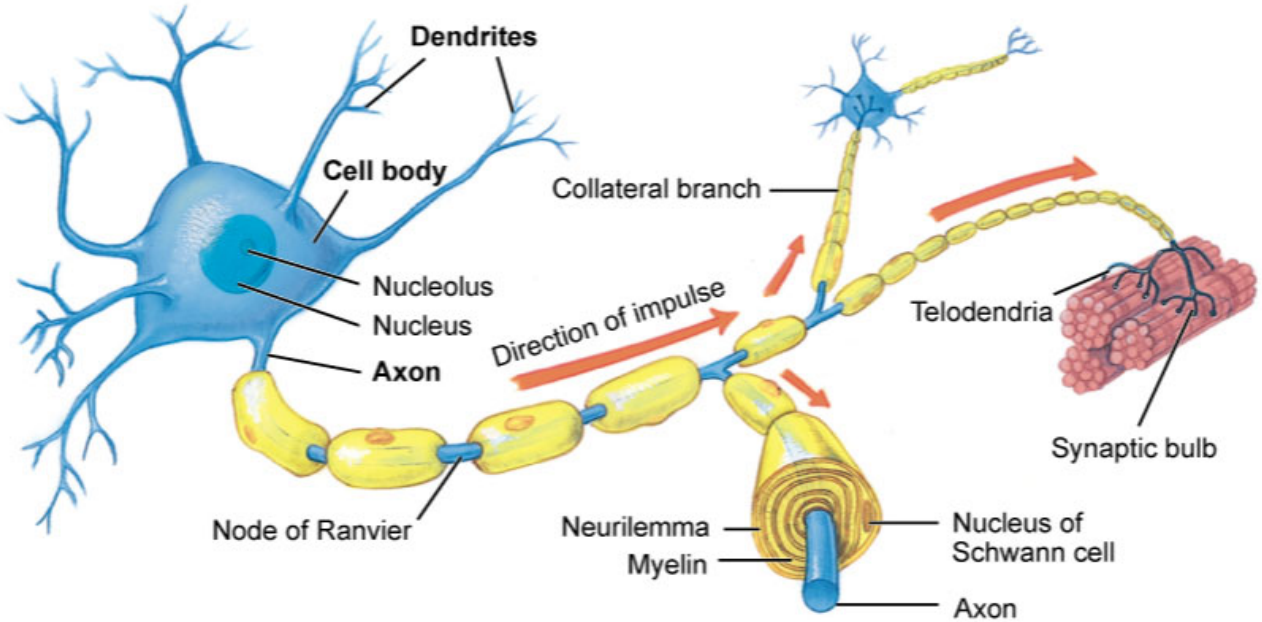
Axon Structures

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



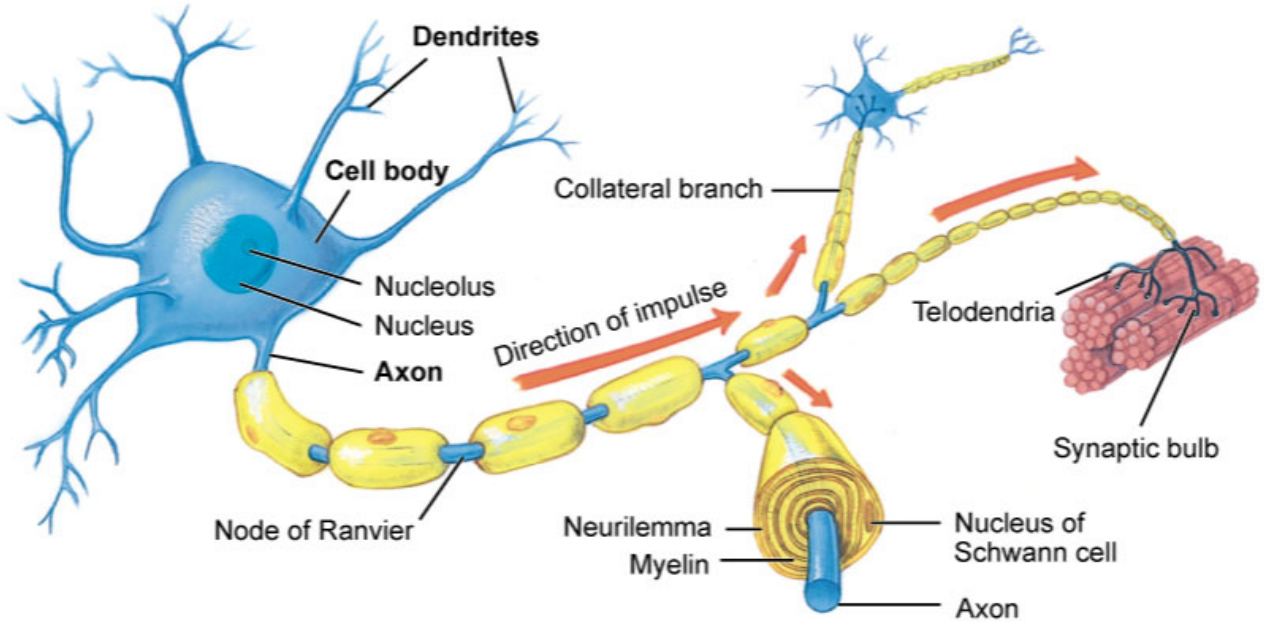
Axon Structures

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



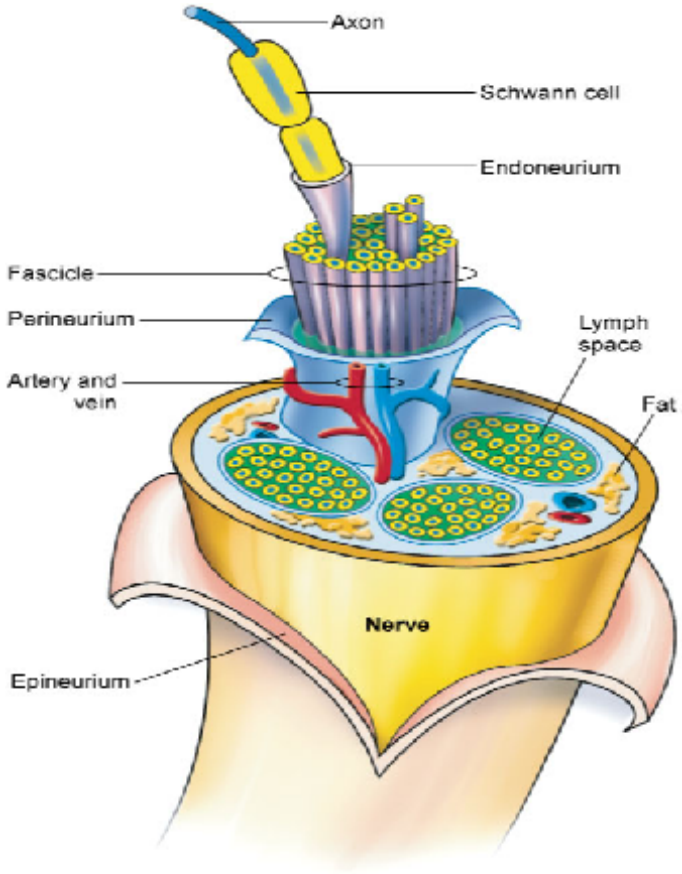
Axon Structures

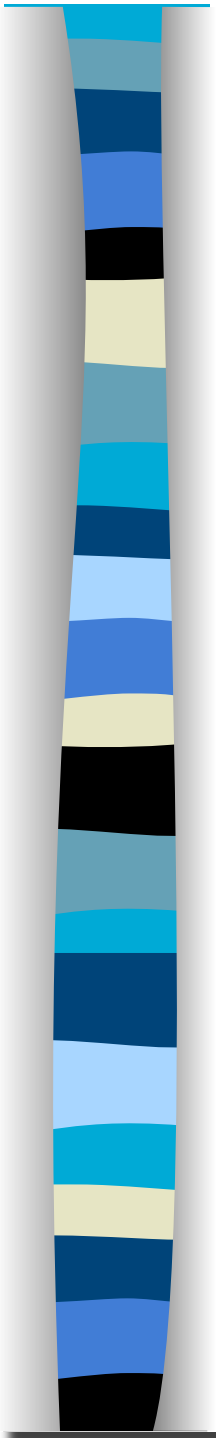
Nodes of Ranvier ___Gaps___ along myelinated axons. Increase speed of a nerve impulse by allowing the impulse to jump from one node to another.



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__.

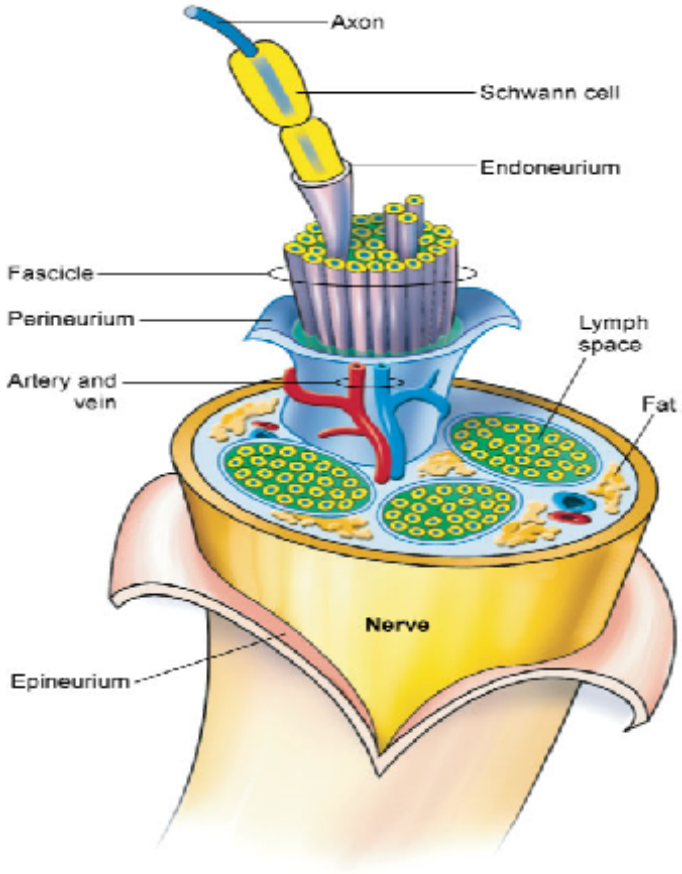
Endoneurium Connective tissue layer for a __neuron__.

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

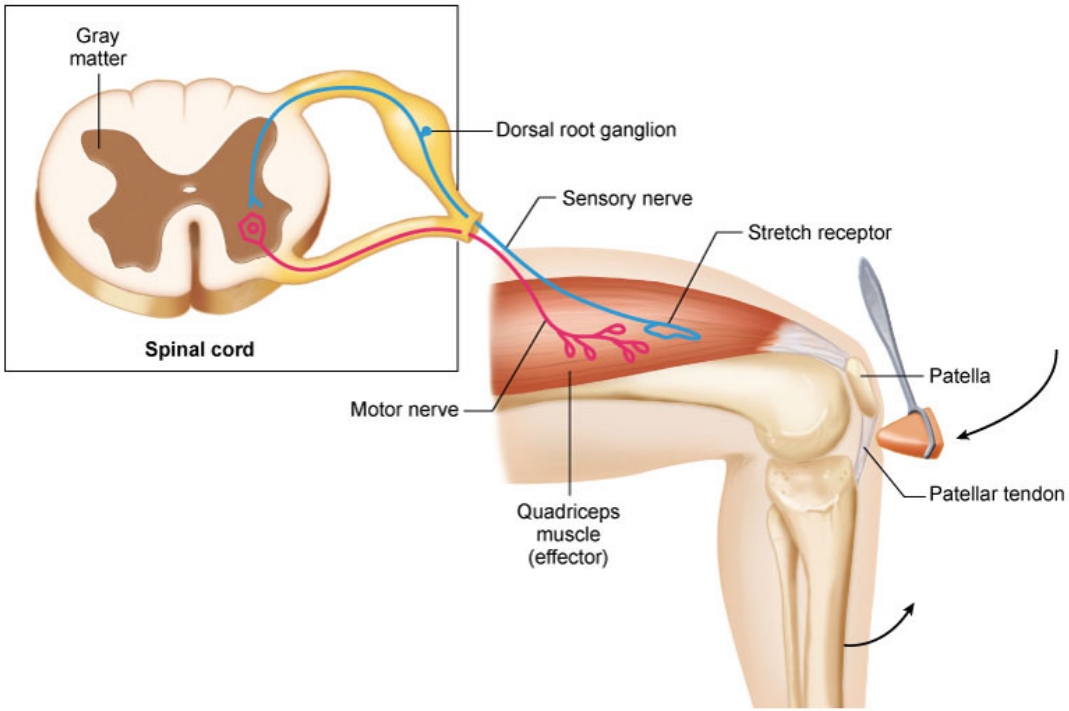
Sensory neuron

Interneuron

Motor neuron

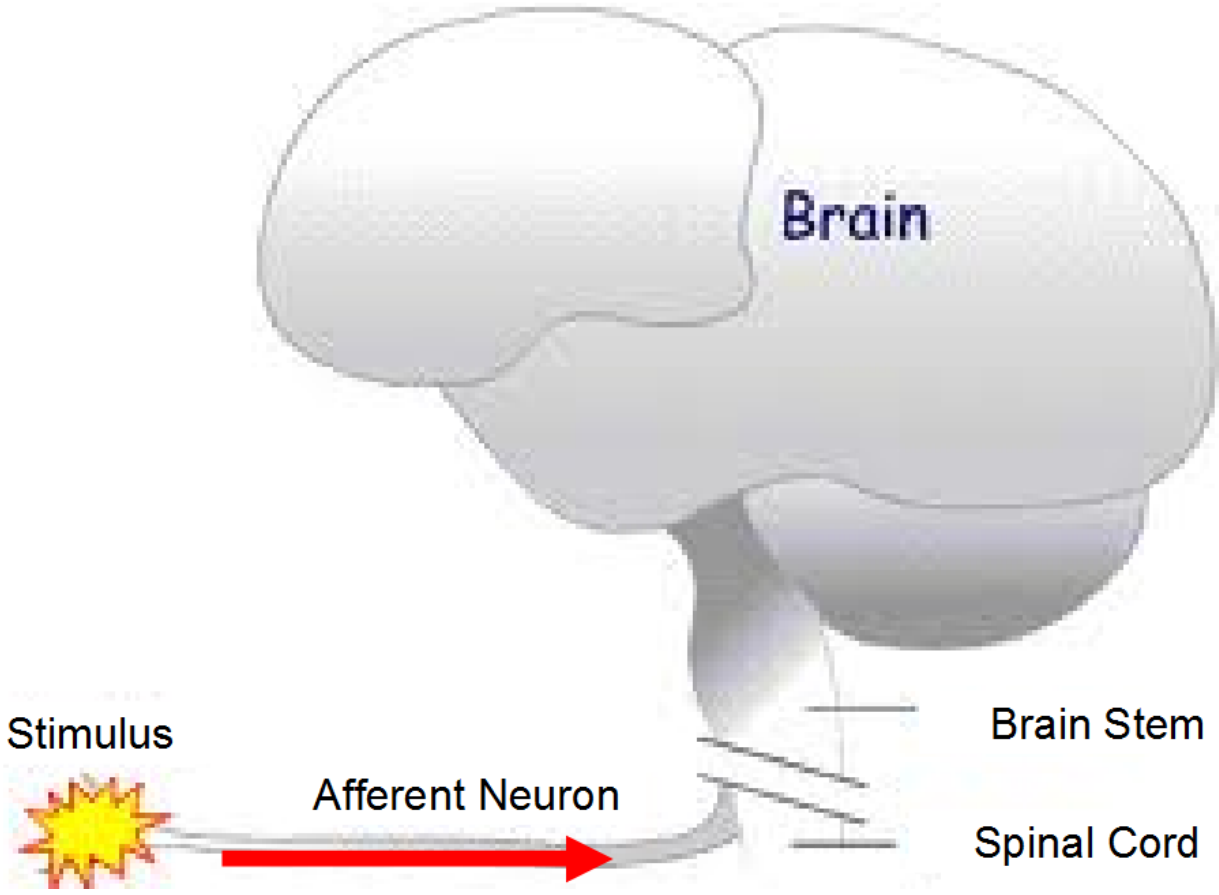
Classification of Neurons

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



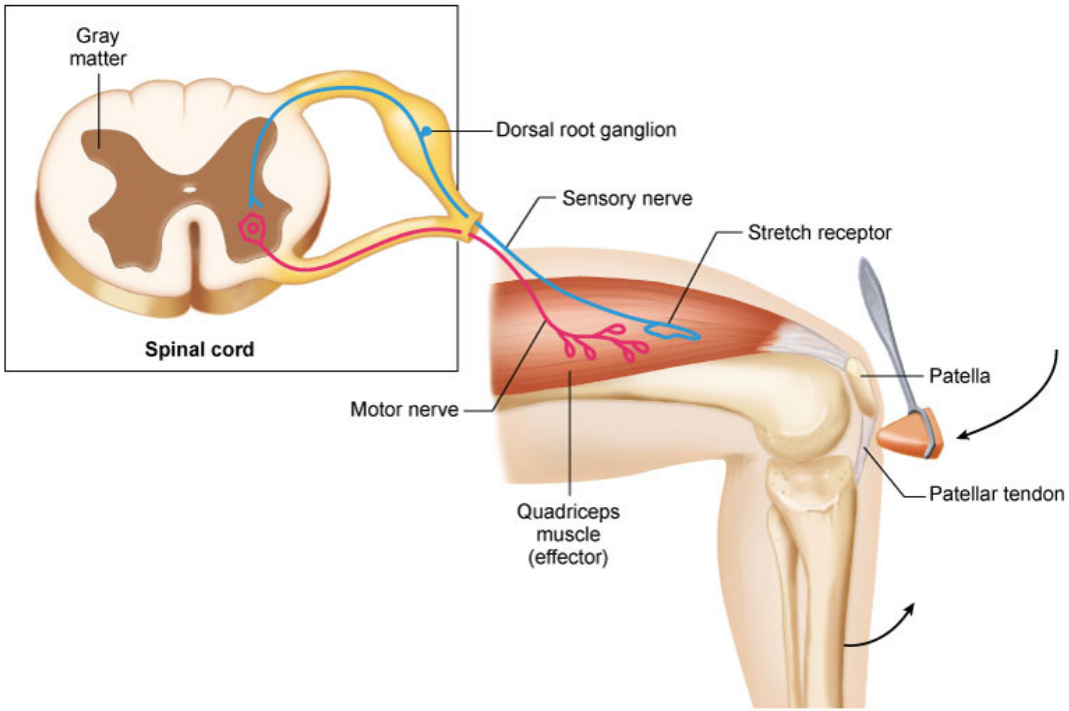
Classification of Neurons

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



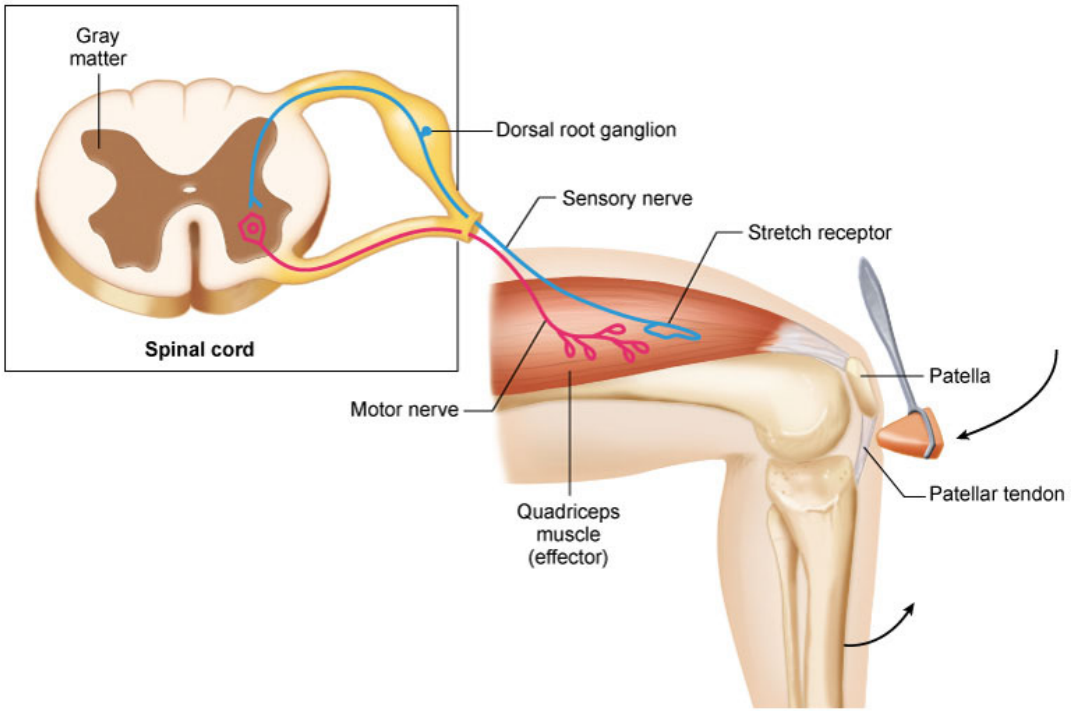
Classification of Neurons

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



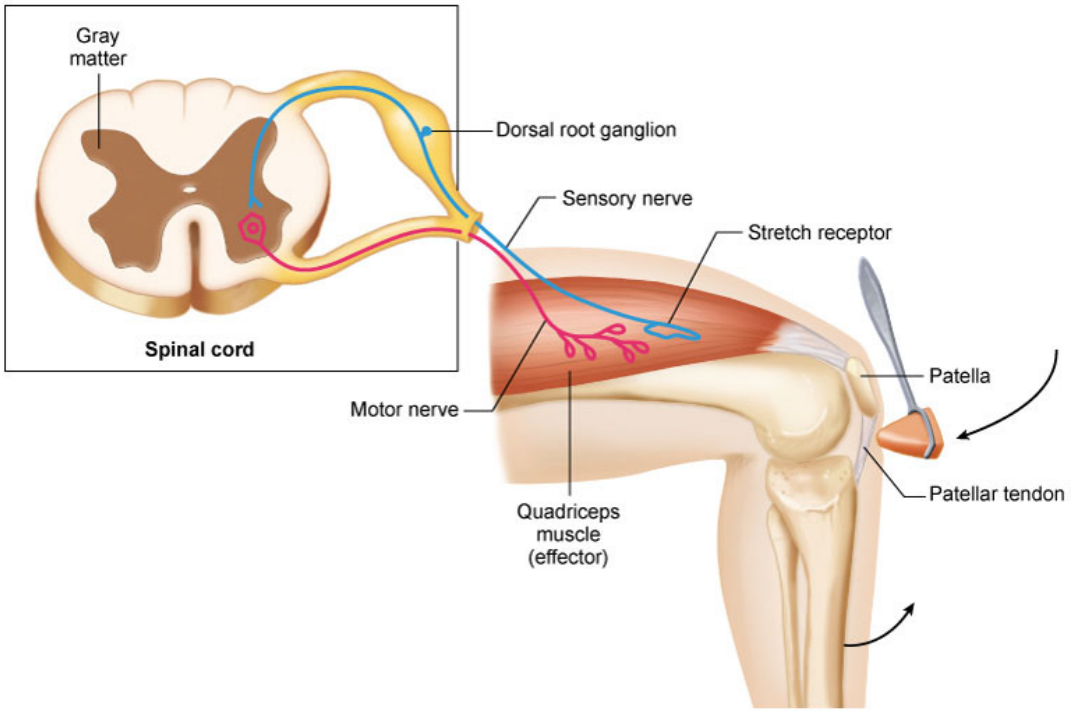
Classification of Neurons

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