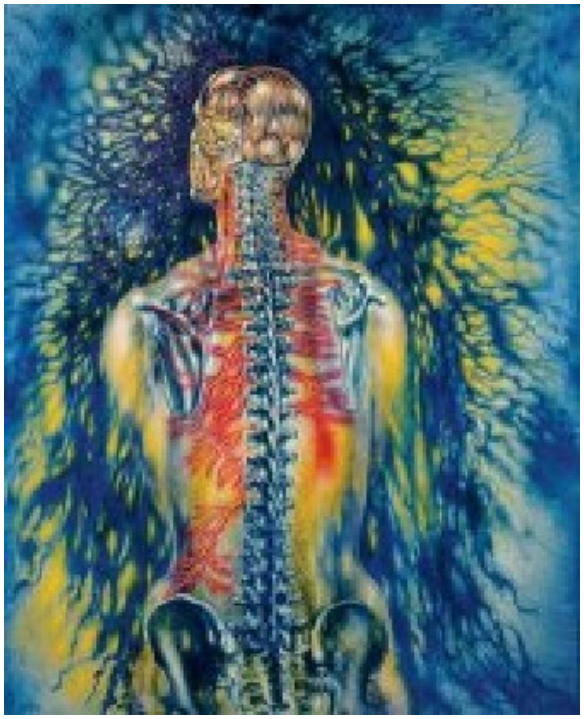
51a A&P: Nervous System - Autonomic Nervous System and Sensory Receptors



51a A&P: Nervous System - Autonomic Nervous System and Sensory Receptors

Class Outline

5 minutes	Attendance, Breath of Arrival, and Reminders
10 minutes	Lecture:
25 minutes	Lecture:
15 minutes	Active study skills:
60 minutes	Total

51a A&P: Nervous System - Autonomic Nervous System and Sensory Receptors

Class Reminders

ABMP Exam Coach

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

Assignments:

- 53a Internship Review Questions - due before class starts
- 55a Review Questions – due before class starts

Quizzes and Exams:

- 52a Kinesiology Quiz
  (brachialis, brachioradialis, flexor digitorum superficialis, and extensor digitorum)

Preparation for upcoming classes:

- 52a Pathology: Nervous System
  Werner: Chapter 4
  Packet E: 117-122.
  RQ - Packet A: 179-180.
  RQ - Packet A: 190-191.
- 52b Integration Massage: Deep Swedish
  Packet D: 1-4.
- 56a/b Internship: This class 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

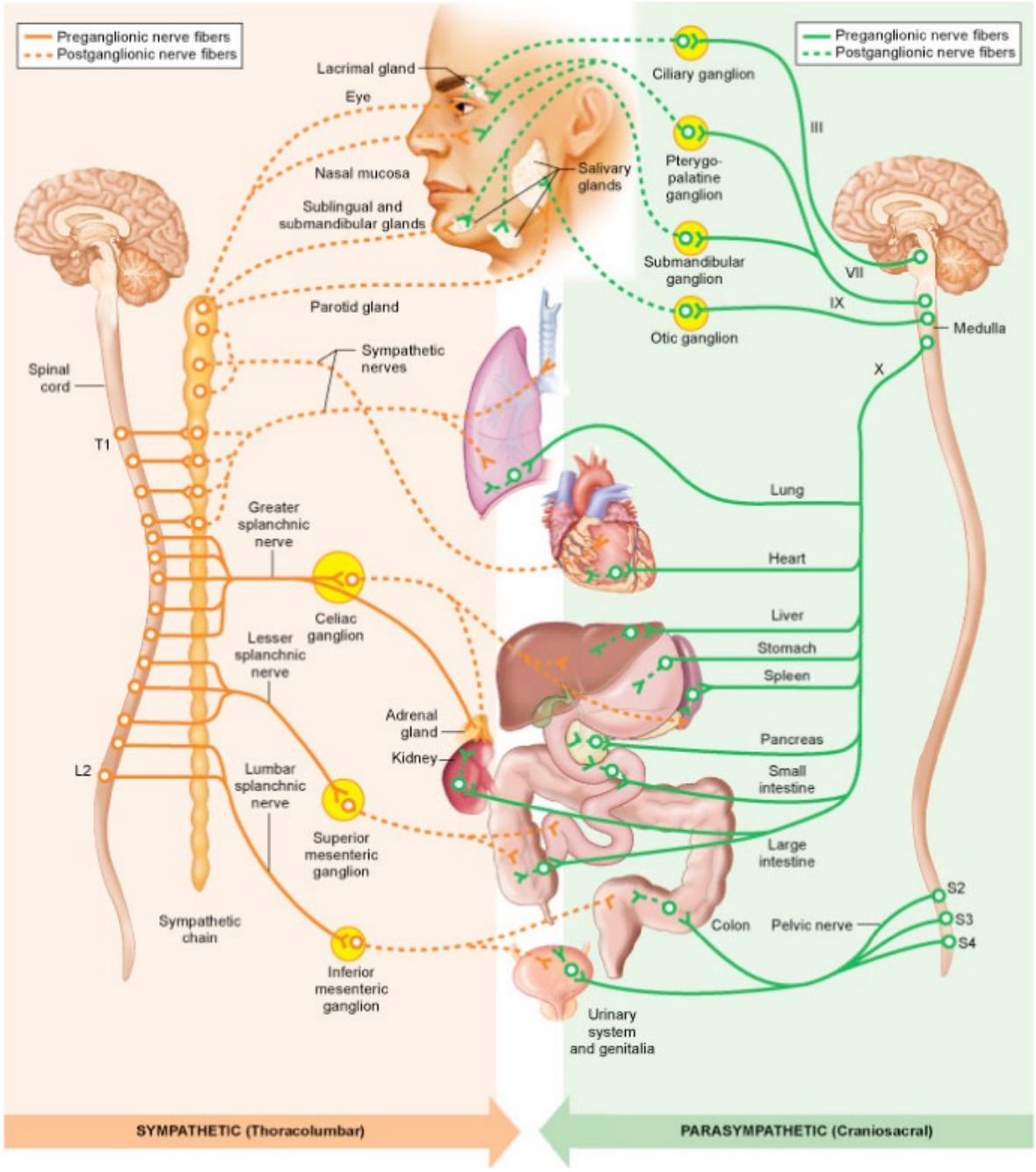
You will receive one verbal warning, then you'll have to leave the room.

51a A&P: Nervous System - Autonomic Nervous System and Sensory Receptors

Packet E - 113

Autonomic Nervous System

Autonomic nervous system Division of the PNS that supplies impulses to smooth muscle, cardiac muscle, and glands. Has two divisions: sympathetic and parasympathetic.


Preganglionic nerve fibers
Postganglionic nerve fibers
Lacrimal gland
Eye
Nasal mucosa
Sublingual and submandibular glands
Salivary glands
Parotid gland
Sympathetic nerves
Spinal cord
T1
L2
Greater splanchnic nerve
Celiac ganglion
Lesser splanchnic nerve
Adrenal gland
Kidney
Lumbar splanchnic nerve
Superior mesenteric ganglion
Sympathetic chain
Inferior mesenteric ganglion
Ciliary ganglion
Pterygo-palatine ganglion
Submandibular ganglion
Otic ganglion
III
VII
IX
X
Medulla
Lung
Heart
Liver
Stomach
Spleen
Pancreas
Small intestine
Large intestine
Colon
Pelvic nerve
S2
S3
S4
Urinary system and genitalia
SYMPATHETIC (Thoracolumbar)
PARASYMPATHETIC (Craniosacral)

Autonomic Nervous System

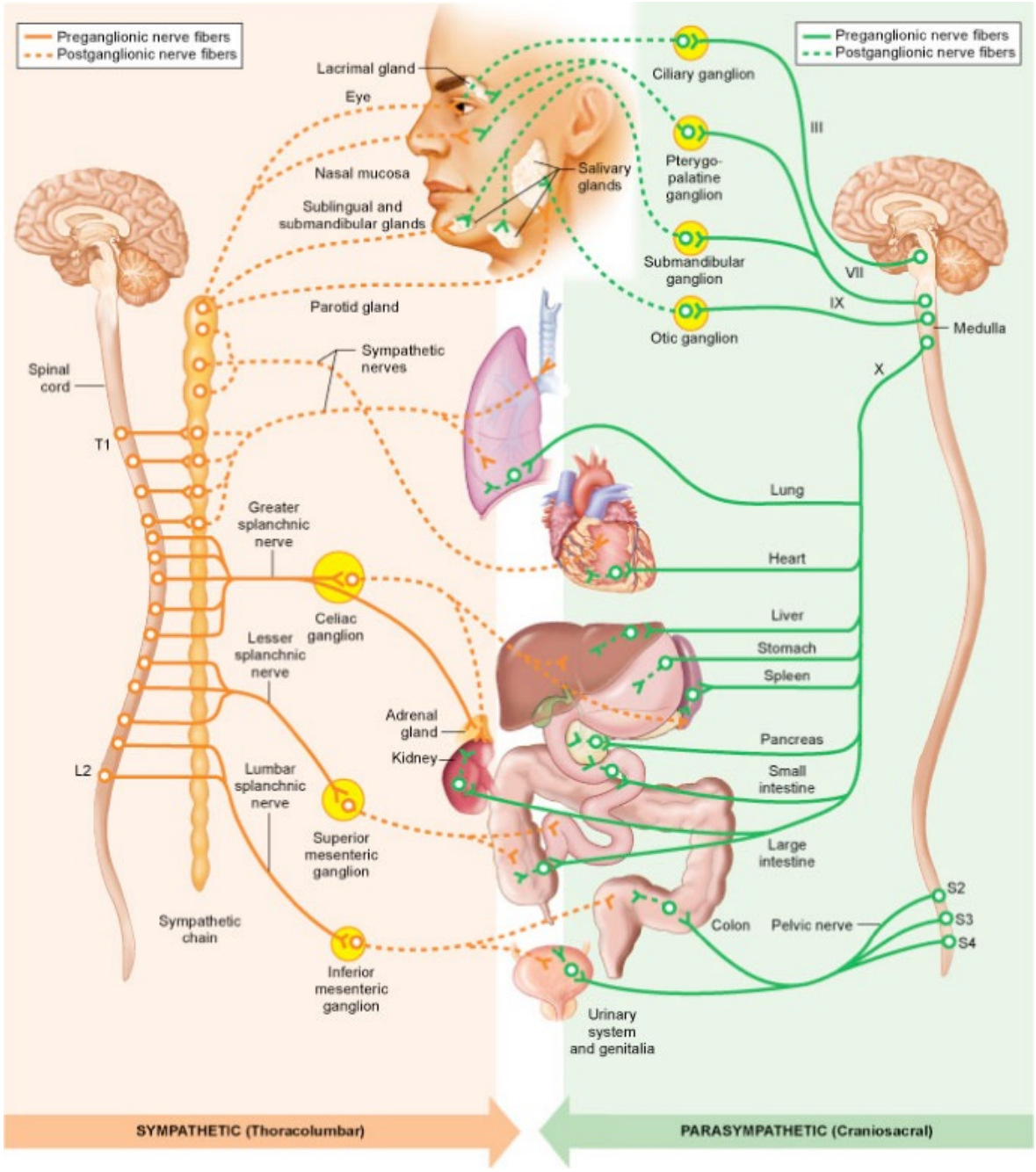
Parasympathetic division (AKA: craniosacral outflow) Part of the ANS that conserves the body's energy resources.

Rest and Digest!

Autonomic Nervous System

Sympathetic division (AKA: thoracolumbar outflow) Part of the ANS that spends the body's energy resources during physical exertion or emotional stress.

Fight, Flight, Freeze!


Preganglionic nerve fibers
Postganglionic nerve fibers
Lacrimal gland
Eye
Nasal mucosa
Sublingual and submandibular glands
Salivary glands
Parotid gland
Sympathetic nerves
Spinal cord
T1
L2
Greater splanchnic nerve
Celiac ganglion
Lesser splanchnic nerve
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Sympathetic chain
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Ciliary ganglion
Pterygo-palatine ganglion
Submandibular ganglion
Otic ganglion
III
VII
IX
X
Medulla
Lung
Heart
Liver
Stomach
Spleen
Pancreas
Small intestine
Large intestine
Colon
Pelvic nerve
S2
S3
S4
Urinary system and genitalia
SYMPATHETIC (Thoracolumbar)
PARASYMPATHETIC (Craniosacral)

Autonomic Nervous System

Sympathetic	Body Activity	Parasympathetic
Increased	Heart rate	Decreased
Stronger	Heart contraction	Weaker
Increased	Respiratory rate	Maintained
Dilation	Bronchi	Constriction
Released from the liver	Glucose	N/A
Increased	Blood sugar	N/A
Blood vessel constriction	Skin and viscera	Blood vessel dilation
Increased	Blood pressure	N/A

Autonomic Nervous System

Sympathetic	Body Activity	Parasympathetic
Pallor	Skin color	N/A
Blood vessel dilation	Skeletal muscle	N/A
Blood vessel dilation	Heart muscle	Blood vessel dilation
Blood vessel dilation	External genitalia	Blood vessels constriction
Dilation	Pupils	Constriction
Far-sightedness	Vision	Near-sightedness
Increased	Perspiration	N/A
N/A	Tears	Stimulated

Autonomic Nervous System

Sympathetic	Body Activity	Parasympathetic
Inhibited	Salivation	Stimulated
Inhibited	Pancreatic secretions	Stimulated
N/A	Insulin secretions	Stimulated
Decreased	Peristalsis/motility	Increased
Constriction	G.I. sphincters	Relaxation
Inhibited	Urination	Stimulated
Released by adrenals	Epinephrine	N/A
Released by adrenals	Norepinephrine	N/A

Types of Receptors
Classified by location of the stimulus

Exteroceptor

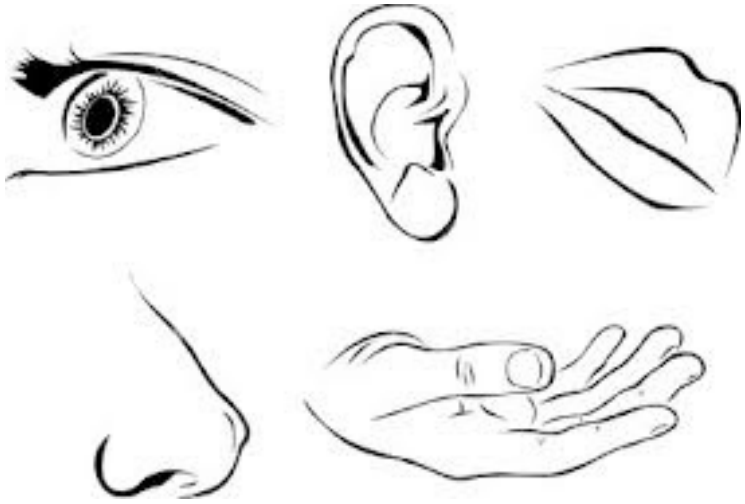
Proprioceptor

Interoceptor

Adaptation

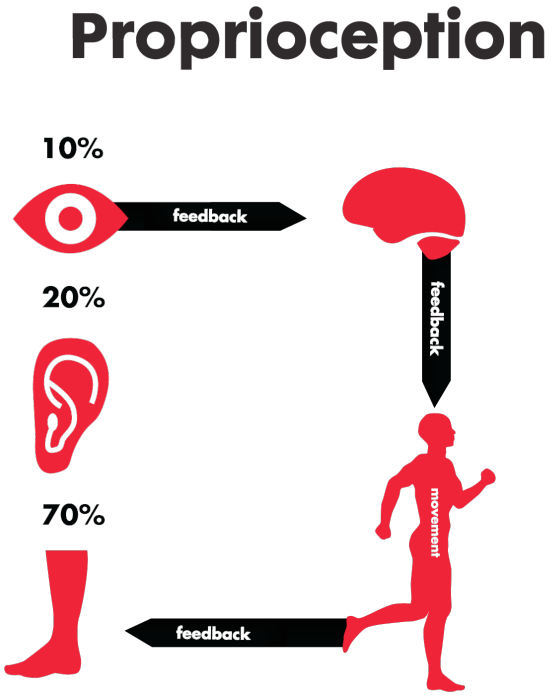
Types of Receptors
Classified by location of the stimulus

Exteroceptor Receptor located in the skin, mucous membranes, and sense organs. Responds to stimuli originating from ___outside___ of the body.



Types of Receptors
Classified by location of the stimulus

Proprioceptor Receptor located in the skin, ears, muscles, tendons, joints, and fascia. Responds to ___movement___ and body position.



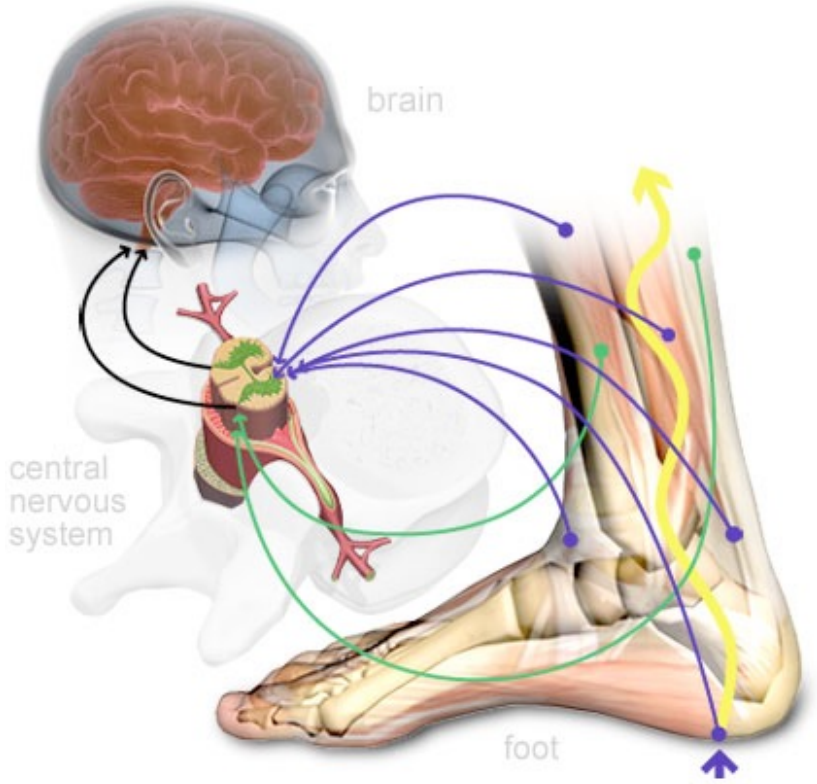
Types of Receptors
Classified by location of the stimulus

Proprioceptor Receptor located in the skin, ears, muscles, tendons, joints, and fascia. Responds to ___movement___ and body position.



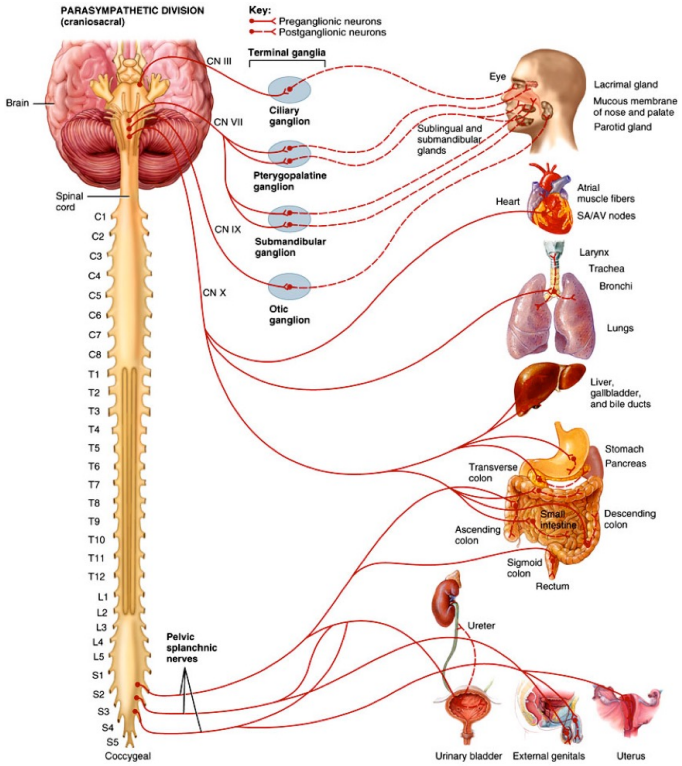
Types of Receptors
Classified by location of the stimulus

Proprioceptor Receptor located in the skin, ears, muscles, tendons, joints, and fascia. Responds to ___movement___ and body position.



Types of Receptors
Classified by location of the stimulus

Interoceptor Receptor located in the viscera. Responds to stimuli such as digestion, excretion, and blood pressure originating within the body.



Types of Receptors
Classified by location of the stimulus

Adaptation decrease in sensitivity to prolonged stimulus.

Types of Receptors
Classified by the types of stimuli they detect

Chemoreceptor

Mechanoreceptor

Stretch receptor

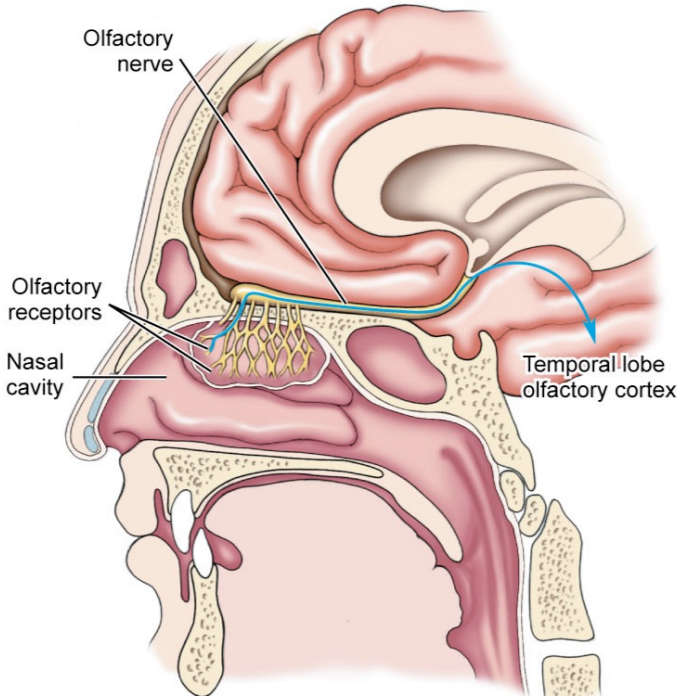
Photoreceptor

Nociceptor

Thermoreceptor

Types of Receptors
Classified by the types of stimuli they detect

Chemoreceptor Activated by chemical stimuli. Detects smells, tastes, and changes in blood chemistry.

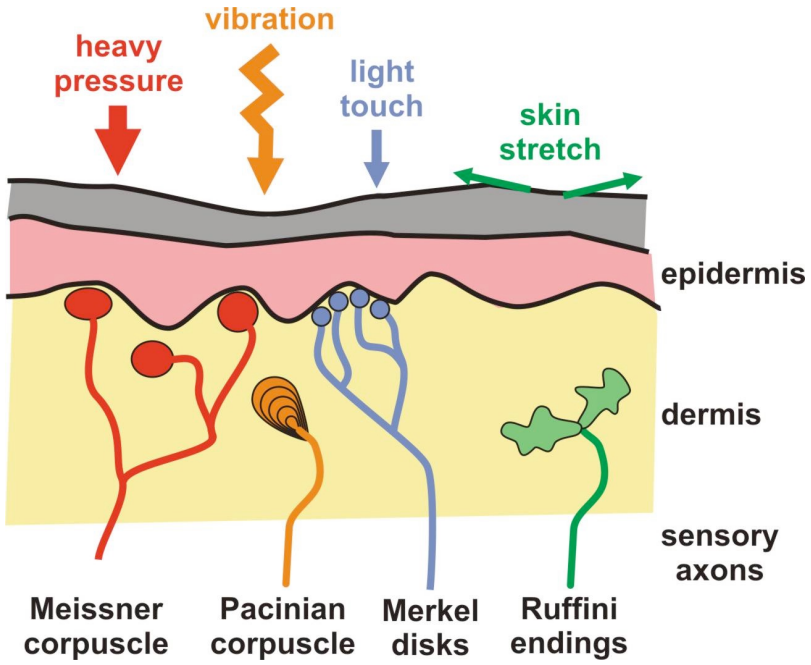


Types of Receptors
Classified by the types of stimuli they detect

Mechanoreceptor Receptor that detects _____pressure_____ and movement.

Found in the skin, blood vessels, ears, muscles, tendons, joints, and fascia.

Detects pressure, blood pressure, vibration, stretching, muscular contraction, proprioception, sound, and equilibrium.



Types of Receptors
Classified by the types of stimuli they detect

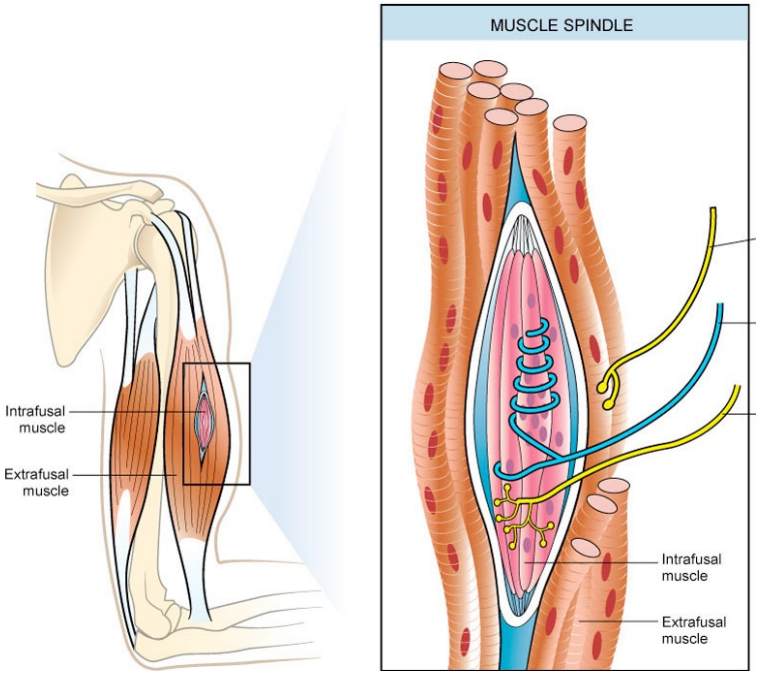
Stretch receptor Receptors that detect stretch in ___muscle___ fibers, tendons, and arteries. Examples:

- Muscle spindle
- Golgi tendon organ
- Baroreceptor

Stretch Receptors

Muscle spindle Stretch receptor located within the muscle ___belly___.

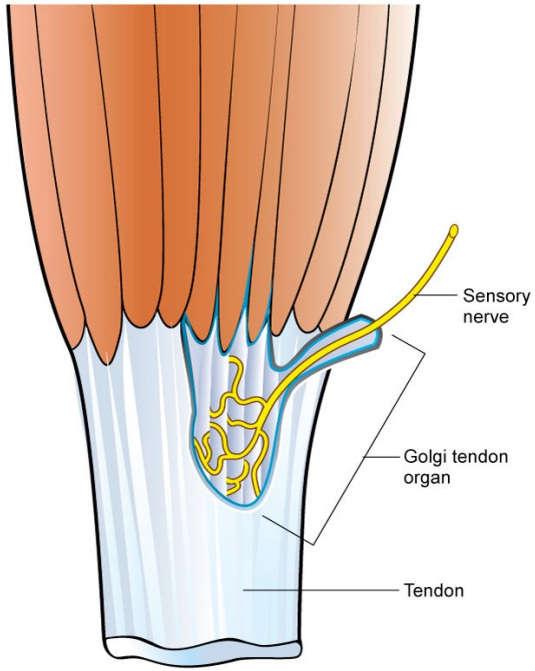
Detects sudden stretching, causing the nervous system to respond by reflexively ___contracting___ the muscle.



Stretch Receptors

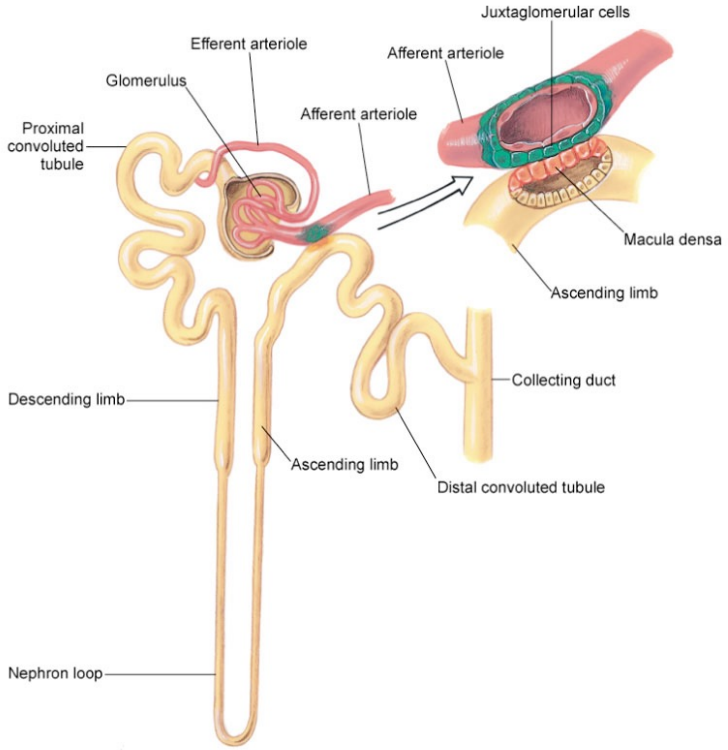
Golgi tendon organ Receptor located at the musculotendinous junction.

Detects ___movement___ and excessive stretch, causing the nervous system to respond by ___inhibiting___ contraction.



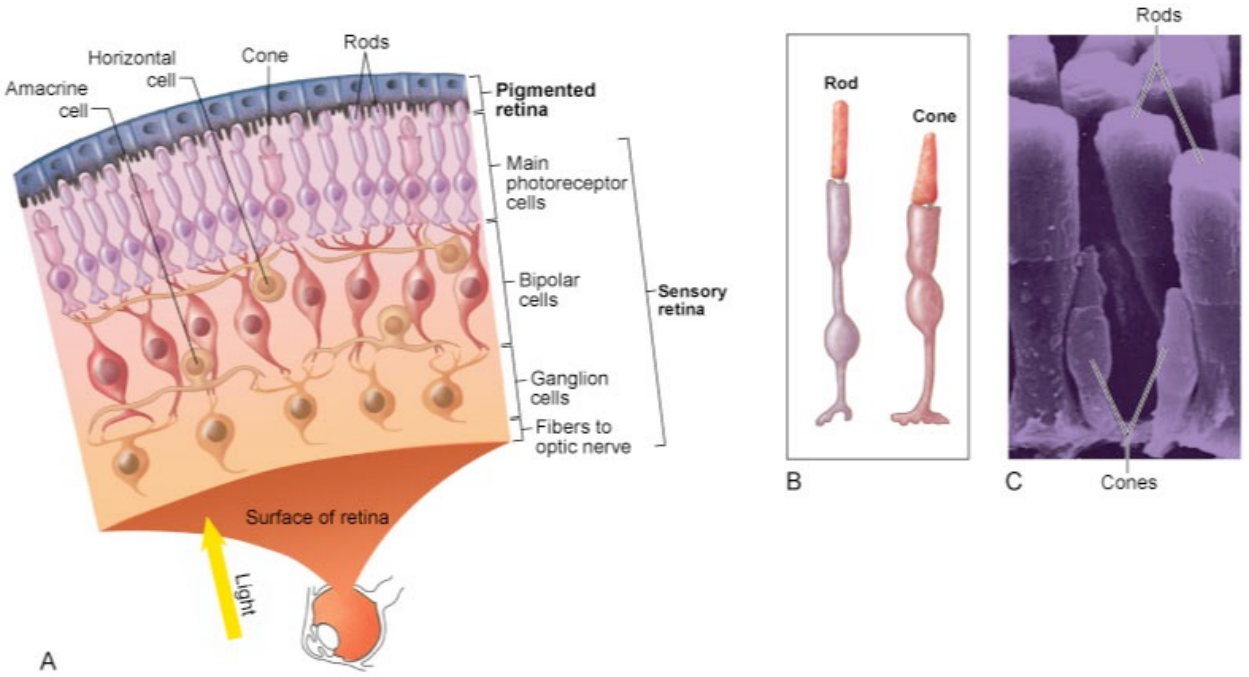
Stretch Receptors

Baroreceptor Detects blood ___pressure___ by monitoring the amount of stretch exerted on certain arterial walls, namely carotid arteries and the aortic arch.



Types of Receptors
Classified by the types of stimuli they detect

Photoreceptor Receptor that is sensitive to ___light___. Examples: rods and cones in the eyes.



Types of Receptors
Classified by the types of stimuli they detect

Photoreceptor Receptor that is sensitive to ___light___. Examples: rods and cones in the eyes.

Fun Facts!

Rods:

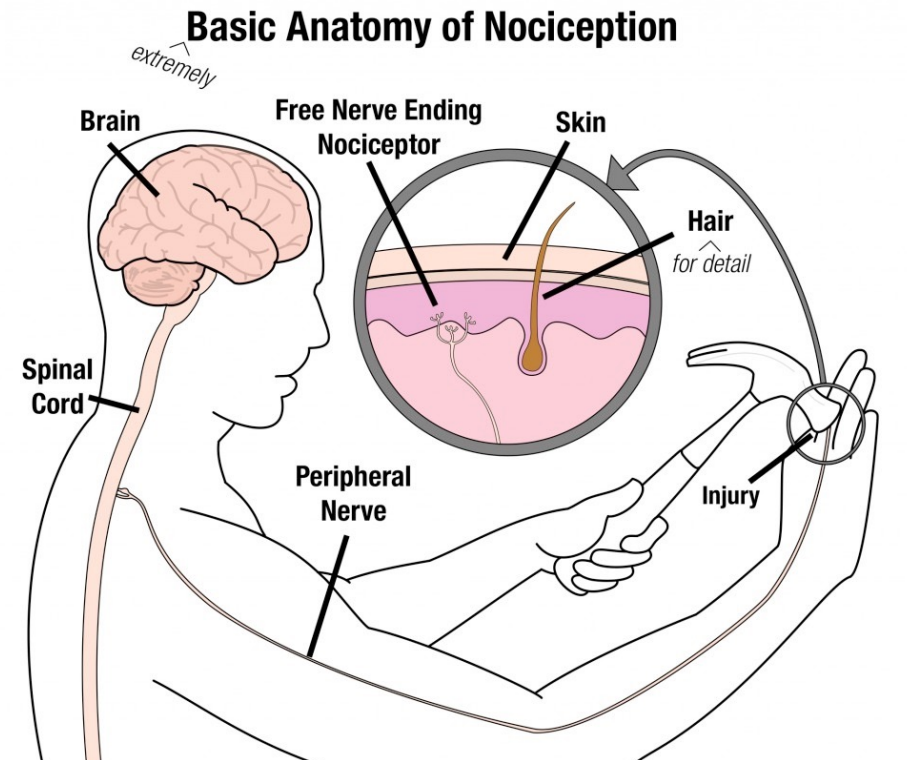
- Black and white vision
- Low light situations such as night vision
- 120 million rod cells per retina

Cones:

- Colors
- Bright light
- 6 million cone cells per retina

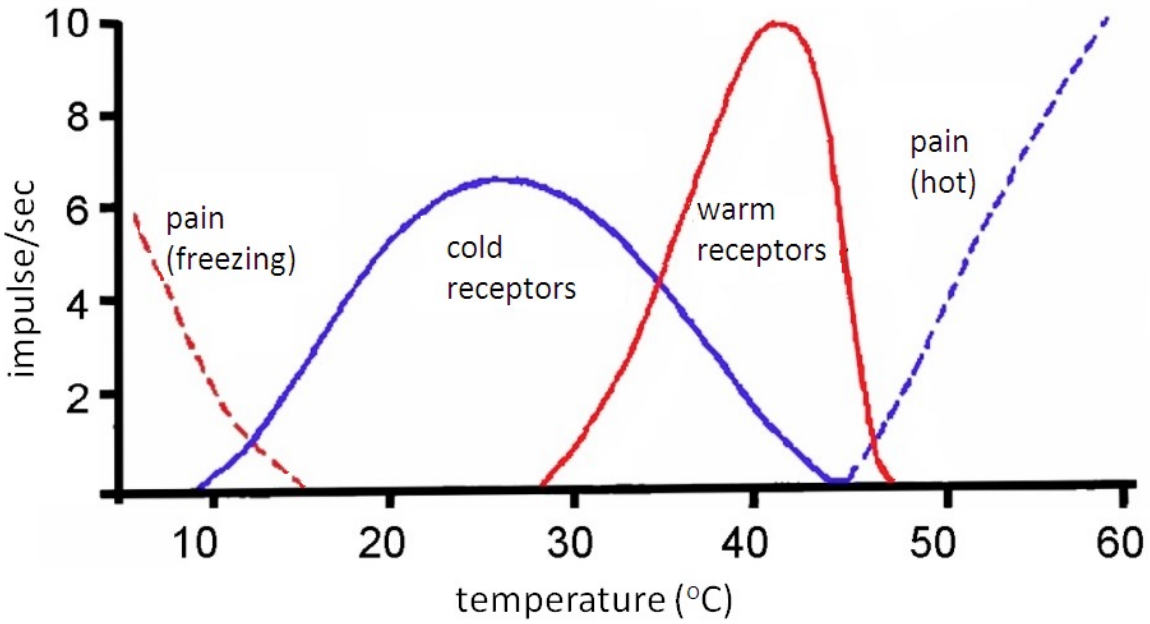
Types of Receptors
Classified by the types of stimuli they detect

Nociceptor (AKA: free nerve ending) Receptor that detects pain.



Types of Receptors
Classified by the types of stimuli they detect

Thermoreceptor Receptor that detects ___temperature___ changes.



50° F 68° F 86° F 104° F 122° F 140° F

51a A&P: Nervous System - Autonomic Nervous System and Sensory Receptors

