

CORNELL NOTES

Directions: You must create a minimum of 5 questions in this column per page (average). Use these to study your notes and prepare for tests and quizzes. Notes will be stamped after each assigned sections (if completed) and turned in to your teacher at the end of the Unit for scoring.

UNIT 6: PHYSIOLOGY

Chapter 29: Nervous and Endocrine Systems

I. How Organ Systems Communicate (29.1)

A. The body's communication system help maintain _____

B. **Homeostasis** depends on ability of different systems in body to _____ with one another

1. _____ must be generated, delivered, interpreted, and acted upon by your body

2. Two systems serve as _____ network

a. _____ **system**- connected network of cells, tissues, and organs

b. **Endocrine system**- collection of physically disconnected _____ that help control growth, development, and response to environment

3. Both systems allow you to respond to _____ in your environment

a. **Stimulus**- something that causes a _____.

b. Changes can be chemical, cellular, or behavioral

C. The **nervous** and **endocrine** systems have different methods and _____ of **communication**

1. **Nervous system**- _____ acting and "hard wired"

a. _____ **Nervous System (CNS)**- **brain** and **spinal cord**- interprets messages and stores some messages for later use

b. _____ **Nervous System (PNS)**- network of **nerves** that transmit messages to CNS and from CNS to other organs in body

2. **Endocrine system**- _____ acting chemical signals carried in your bloodstream throughout the body

a. Control process that occur over _____ periods of time (hair growth, aging, sleep patterns, etc.)

b. Helps regulate homeostatic functions (body _____, blood chemistry, etc.)

II. Neurons (29.2)

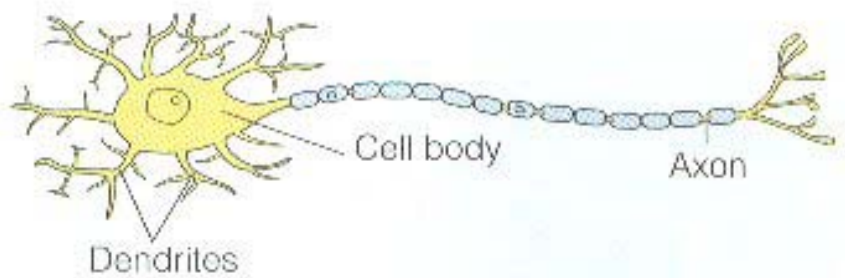
A. Neurons are highly specialized cells

1. **Neuron**- specialized cell that stores information and carries messages (most have _____ parts)

a. _____ **body**- contains nucleus and organelles

b. _____ - branchlike extensions that receive messages

c. _____ - long extension that carries electrical messages away from cell body to other cells



2. Three types of **neurons**

a. _____ **neurons**- detect stimuli and transmit signals to brain and spinal cord

b. _____ - make up brain and spinal cord and receive and process information

c. _____ **neurons**-pass messages from nervous system to organs and muscles

B. Neurons _____ and _____ signals

1. Neurons transmit information in form of _____ and _____ impulses

a. When stimulated, produces **electrical impulse** that travels along _____

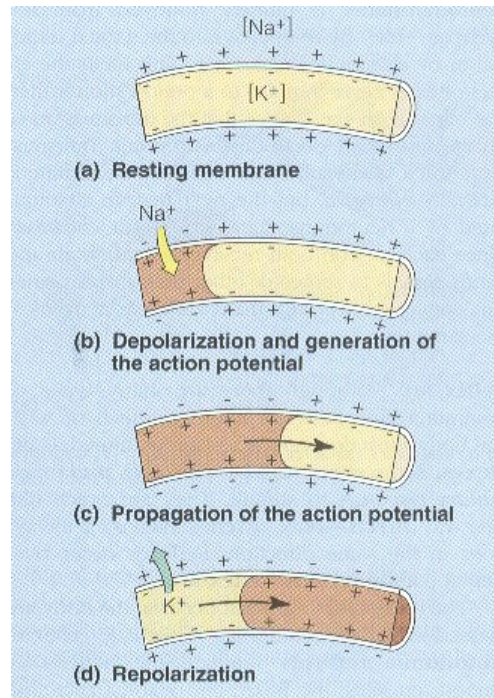
b. Moves to next cell as a _____ **signal**

2. _____ **Potential**- unequal concentrations of ions inside and outside neuron contains potential energy

a. Unequal _____ of ions main reason for resting potential

b. **Sodium-potassium pump**- keeps unequal concentration of ions and maintains _____ potential

3. Transmission within a neuron



a. **Action potential**- moving electrical _____ created by stimulus

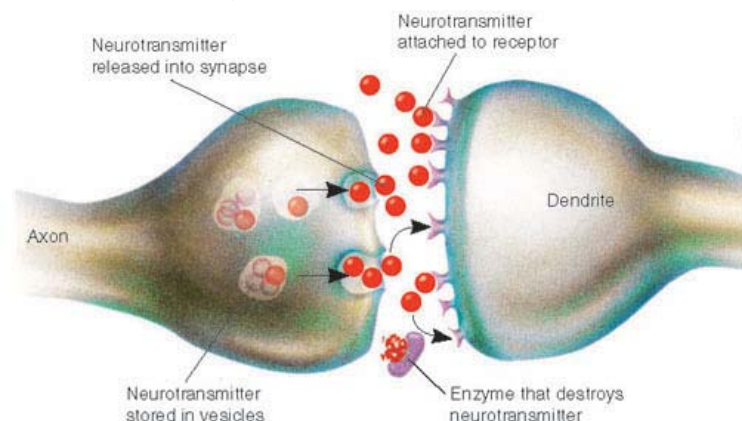
b. **Channels** for ions open and close causing moving area of _____ charged membrane to move down axon

4. Transmission between neurons

a. Signal must cross tiny _____ between neurons called a _____

b. Chemical filled vesicles at end of _____ (axon terminal) release chemicals in synapse

c. _____ - chemical signals that travel across **synapse** and cause adjacent neuron to generate **action potential**



III. The Senses (29.3)

A. The **senses** help to _____ **homeostasis**

1. **Sensory organs** collect information about the world around you and _____ response to maintain homeostasis

2. Also influence your _____ (protective mechanism to help maintain homeostasis)

B. The senses detect _____ and _____ stimuli

1. Humans have highly specialized **sensory organs**

2. _____ **main senses**: vision, hearing, touch, taste, smell

a. **Vision**- most important sense. Contains _____ (rods and cones)

b. **Hearing**- the ear collects _____ (sound waves) with **mechanoreceptors** and converts them into nerve impulses and interpreted in brain

c. **Smell** and **taste**- contain _____ that detect molecules that are dissolved in liquid.

d. **Touch, temperature, and pain**

1). _____ - uses two types of **mechanoreceptors** (light and heavy pressure)

2). **Temperature** and **pain** - sensed by _____ and **pain receptors**

IV. Central and Peripheral Nervous Systems (29.4)

A. The nervous system's _____ parts work together

1. **CNS** includes brain and spinal cord composed of _____

2. **PNS** is collection of _____ that connects the CNS to all of your organ systems

B. The CNS processes information

1. The **interneurons** of brain and spinal cord are arranged in a particular way

a. All **cell bodies** clustered together on outside (called _____ **matter**)

b. All **axons** clustered together on inside (_____ **matter**)

2. The **Brain**- contains over a 100 _____ neurons

a. Protected by three layers of connective tissue (called _____)

b. **Fluid** found between layers that help _____ brain

c. Brain has _____ main structures

1). _____ - part of brain that interprets signals from your body and forms responses

a). Has right and left _____

b). Outer layer called cerebral _____

c). different areas (_____) responsible for different functions

2). **Cerebellum**- coordinates _____

3). **Brain stem**- connects brain to spinal cord and controls most basic activities required for _____ (breathing and heartbeat)

3. The Spinal Cord

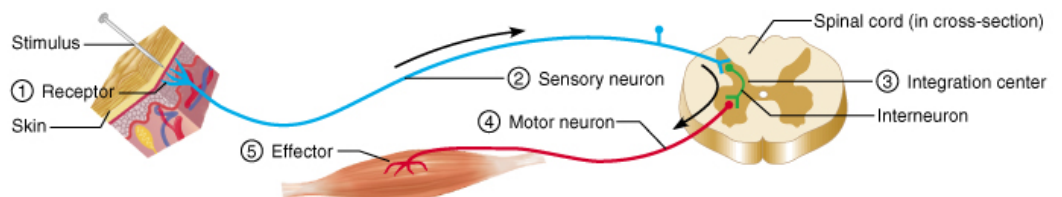
a. **Spinal column** consists of **vertebrae**, **fluid**, **meninges**, and the **spinal cord**

b. Connects brain to the nerves throughout your _____

c. **Reflex** _____ - involuntary movements allowing you to react quickly

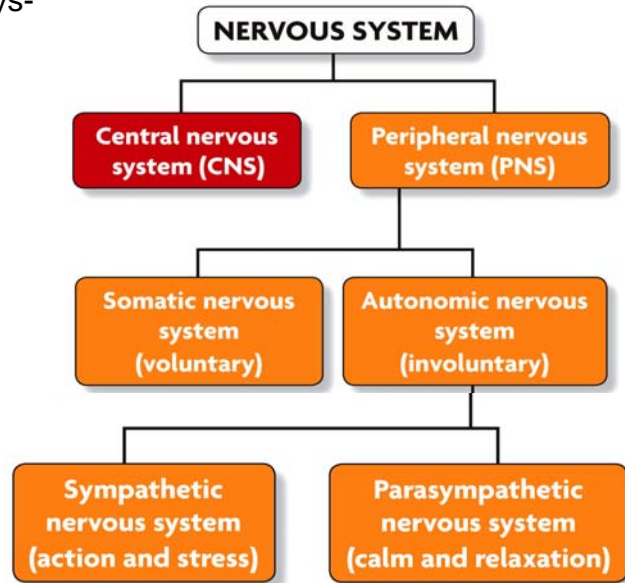
1). Important role in _____ your body from injury

2). Signal travels to spinal cord and back to create _____ response



C. The PNS links the _____ to muscles and other organs

1. PNS includes **12 pair** of nerves in your _____ and **31 pairs** of _____ nerves
2. PNS made up of _____ (senses) and _____ system (response)
3. Broken down into _____ (voluntary control) and _____ (involuntary response-automatic) systems
4. Autonomic broken down into **sympathetic (action and stress)** and **parasympathetic (calm and relaxation)** systems



V. Brain Function and Chemistry (29.5)

A. New techniques improve our understanding of the brain

1. New imaging technologies (CT, MRI, and PET scans)
2. Can study brain in living patients without _____

B. Change in brain chemistry can cause _____

1. Levels of **neurotransmitters** can _____ brain function
2. Abnormal levels of _____ can cause Parkinson's disease and schizophrenia
3. **Depression** linked to low levels of _____

C. Drugs alter brain chemistry

1. Many _____ affect amount of neurotransmitters in synapses (increase or decrease amount)

2. Some drugs cause _____ (physiological need for a substance)

a. Increased levels of neurotransmitters cause brain cells to become **desensitized** and can lead to building up a _____ to drug (need larger doses to create same effect)

b. **Sensitization** can occur when low amounts of neurotransmitters are in _____

3. How drugs work (change in number of _____ potentials your neurons generate)

a. **Stimulants**- increase number of action potentials by increasing amounts of _____ in synapses

b. **Depressants**- reduce ability of neurons to generate _____

VI. The Endocrine System and Hormones (29.6)

A. Hormones influence a cell's activities by entering the cell or _____ to its membrane

1. **Endocrine system** makes **chemical signals** that help body grow, develop, and maintain _____

a. _____ - chemicals produced by endocrine glands

b. _____ - organs that release hormones into bloodstream

B. Endocrine glands secrete _____ that act throughout the body

1. **hormones** travel in the _____ to all areas of body to find _____ **cells**

2. Endocrine system consists of ____ major glands

a. **Hypothalamus**- makes hormones to stimulate _____ gland to release hormones

b. **Pituitary gland**- Can stimulate other endocrine glands. Produces _____ hormones

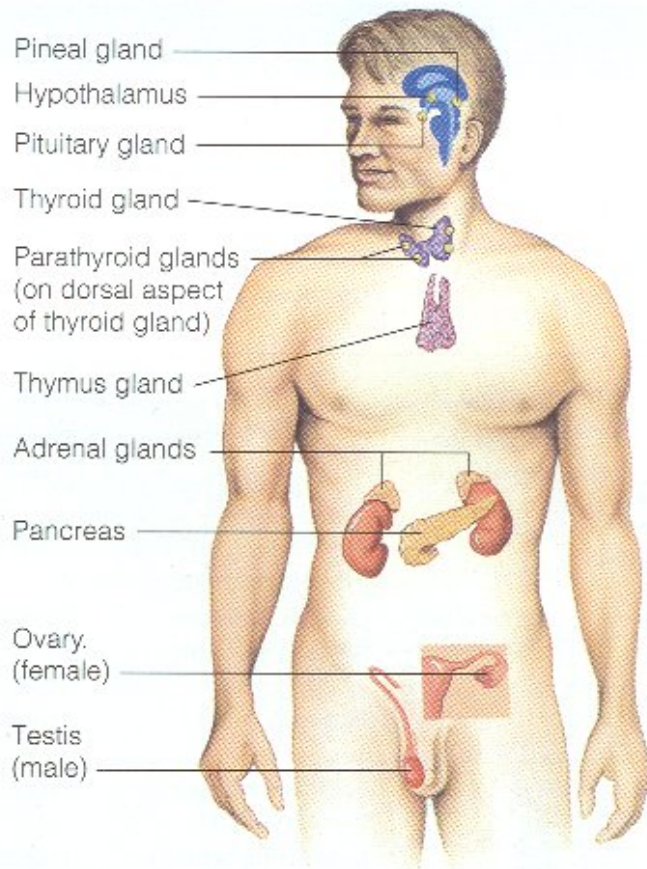
c. **Thyroid gland**- regulate _____, growth, and development

d. **Thymus**- causes _____ blood cells to mature and help fight infection

e. **Adrenal glands**- secrete hormone (adrenaline - epinephrine) that control “_____ or _____” response

f. **Pancreas**- makes digestive enzymes and produces _____ to help regulate sugar levels in bloodstream

g. _____ - **ovaries** in women and **testes** in men



C. The **hypothalamus** interacts with the _____ and _____ systems

1. Nervous and endocrine systems connect to each other at the _____ of the brain

2. The hypothalamus acts as part of both systems

a. As part of _____ it receives, sorts, and interprets information from sensory organs

b. As part of endocrine system, the hypothalamus produces _____ hormones that affect tissues and other endocrine glands to release hormones

D. Hormonal imbalances can cause severe _____

1. Too much or too little hormones can affect the entire body

2. _____ - pancreas not making proper amount of insulin and glucagons

3. Many hormonal imbalances can be treated with _____ or _____

