Human Organ Systems

- nervous system: recognizes and coordinates the body's response to changes in its internal and external environments
- integumentary system: serves as a barrier against infection and injury; helps to regulate body temperature; provides protection against UV from the sun
- respiratory system: provides oxygen needed for cellular respiration and removes excess carbon dioxide from the body
- digestive system: converts foods into simpler molecules that can be used by the cells of the body; absorbs food; eliminates wastes
- excertory system: eliminates waste products from the body in ways that mantain homeostasis
- skeletal system: supports the body; protects internal organs; allows movement; stores mineral reserves; provides a site for blood cell formation
- muscular system: works with skeletal system to produce voluntary movement; helps to circulate blood and move food through the digestive system
- circulatory system: brings oxygen, nutrients, and hormones to cells; fights infection; removes cell wastes; helps to regulate body temperature
- endocrine system: controls growth, development, and metabolism; mantains homeostasis
- reproductive system: produces reproductive cells; in females, nurtures and protects developing embryo
- lymphatic/immune systems: helps protect the body from disease; collects fuid lost from blood vessels and returns the fluid to the circulatory system

Organization of the Body

- levels of organization in a multicellular organism: cells, tissues, organs, and organ systems
- cells: basic unit of function in living things
- specalized cells: uniquely suited to perform a specific function
- tissues: group of cells that perform a single function; ex: connecting a muscle to a bone
- four types of tissue:
1) epithelial tissue: glands and tissues that cover interior and exterior body surfaces
2) connective tissue: provides support for the body and connects its parts
3) nervous tissue: transmits nerve impulses throughout body
4) muscle tissue: enables body to move
- organs: group of different types of tissues that perform a complex function; ex: sight
- organ systems: group of organs that perform closely related functions

Maintaining Homeostasis

- homeostasis: organisms keep internal conditions relatively constant despite changes in external environments
- maintained by feedback loops
- heating system controlled y feedback inhibition
- feedback inhibition: negative feedback; stimulus produces a response that opposes the original stimulus
- mantaining of homeostasis -> integration of all organ systems
- ex: body temp. (below 37°C -> hypothalmus speeds up activities, abole 37°C -> hypothalmus slows down activities)

Nuerons

- nervous system: controls and coordinates functions throughout the body and responds to internal and external stimuli
Neurons – cells that transmit impulses – bundles of neurons
make up nerves
1. sensory – from environment to brain
2. motor – from brain to muscles & glands
3. interneurons – connect sensory & motor
Parts of a Neuron
1. Cell Body – nucleus here; most metabolic activity
2. Dendrites – small “branches” (carries impulses toward cell body)
3. Axon – a long fiber “tail” (carries impulses away from cell body)
4. Myelin sheath – insulating membrane; creates gaps called nodes

Nerve Impulse

- resting nueron: negative charge inside, positive charge outside (sodium ions out; potassium ions in)
- resting potential: electrical charge throughout cell membrane of a nueron in its resting state
- moving nerve impulse: begins when a neuron is stimulated by another neuron or by its environment
- action potential: positive inside, negative outside
- threshold: all or nothing; minimum level of stimulus needed to produce an impulse

Central Nervous System

- central nervous system: relays messages, processes information, and analyzes information
- meninges: three layers of connective tissue that the brain and spinal cord are wrapped in

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Central Nervous System (cont)

- cerebrospinal fluid: space btwn meninges and central nervous system that acts as as a shock absorber -> protects central nervous system; allows for exchange of nutrients and waste products btwn blood & tissue

The Synapse

- synapse: location where nueron cantra-nsfer impulse to another cell
- ex: moton nuerons pass impulse -> muscle cells
- synaptic cleft: seperates axon terminal fom dendrites
- use neurotransmitters to send impulse

The Brain

- brain: place where impulses originate and flow
- approx 100 billion nuerons & is about 1.4 kilograms

1. The Cerebrum – voluntary activities of the brain
- right and eft hems. connected by corpus callousm
- hems deal with opposite sides of body
- outer layer (cerebral cortex) -> grey matter
- desnly packed nerve cell bodies
- inner layer -> white matter - bundles of axons & myelin sheaths

2. The Cerebellum – coordinates muscles
- located at back of skull

3. The Brain Stem – controls unconscious activity
- connects brain and spinal cord

a. Pons – upper part – sensory control

b. Medulla Oblongata – lower part – unconscious control

4. The Thalamus and Hypothalamus

a. thalmus: recieves messages from sensory recpts. & relays to cerebelum

The Brain (cont)

b. hypothalmus: control center for recog. & analysis for hunger, thirst, fatigue, anger, body temp.

The Spinal Cord

- reflex: quick, automatic response to a stimulus

The Peripheral Nervous System

somatic nervous system:	autonomic nervous system:
- regulates activities under conscious control	- controls functions not in concious control
- reflex arc	- sympathetic and parasympathetic nervous system

- transmits impulses from sense organs to central nervous system

The Senses

- sensory recepts: millions of nuerons that react directly to stimuli fro environment
- five categories: pain receptors, thermorec-eptors, mechanoreceptors, chemorece-ptors, and photoreceptors

Vision

- pupil: small opening in middle of iris
- lens: behind iris
- retina: lens focuses light on retina
- two types of photoreceptors:

a. rods - sensitive to light; do not distinguish colors

b. cones - less sensitive to light; color vision

Hearing

- vibrations of oval window create pressure waves in cochlea
- semicircular canals mantain equilibrium

Smell & Taste

- taste buds: sense organs that detect taste

Touch

- skin contains sensory receptors
- greatest density of touch: fingers, toes, and face

Drugs That Affect the Synapse

- stimulants increase heart rate, blood pressure, and breathing rate; increase the release of neurotransmitters at some synapses in the brain
- depressants slow down heart rate and breathing rate, lower blood pressure, relax muscles, and relieve tension
- cocaine causes the sudden release of a neurotransmitter in the brain called dopamine
- opiates mimic natural chemicals in the brain known as endorphins, which normally help to overcome sensations of pain
- marijuana comes from THC and is bad for lungs & memory loss
- alcohol is a depressant, and even small amounts of alcohol slow down the rate at which the nervous system functions -> FAS, liver failure, death
- FAS -> heart defects, malformed faces, delayed growth

Drug Abuse

- drug abuse: intentional misuse of any drug for nonmedical purposes
- addiction: uncontrollable dependence on a drug

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