1. Neuroanatomy
   1. Neuroanatomy
      1. ​The study of the parts and functions of nerves
      2. Neurons
         1. ​individual nerve cells
   2. ​​Parts of the Neuron
      1. ​Dendrites
         1. ​root like parts of the cell
         2. stretch out from the cell body
         3. ​​grow to make synaptic connections with other neurons
      2. ​Cell body (soma)
         1. ​contains the nucleus and other parts of the cell necessary for its life
      3. ​Axon
         1. ​wire like structure ending in the terminal buttons
         2. extend from the cell body
      4. ​Myelin sheath
         1. ​a fatty covering around the axon of some neurons that speeds neural impulses
      5. ​Terminal buttons
         1. ​end buttons, terminal branches of axon, synaptic knobs
         2. branched end of the axon
         3. contains neurotransmitters
      6. ​Neurotransmitters
         1. ​chemicals contained in terminal buttons that enable neurons to communicate
      7. ​Synapse
         1. ​the space between the terminal buttons of one neuron and the dendrites of the next neuron
2. ​​​How a Neuron “Fires”
   1. ​Resting State
      1. ​Neuron has negative charge with positive ions surrounding the cell
   2. ​Steps
      1. ​Neuron is stimulated
         1. ​it releases neurotransmitters
      2. ​Neurotransmitters bind to receptor sites on the dendrites of the receiving neuron
      3. ​​If the threshold is reached, the cell membrane of the receiving neuron becomes permeable
         1. ​positive ions rush in
         2. action potential
      4. ​Axons release neurotransmitters to another neuron
   3. ​All-or-None Principle
      1. ​The neuron will fire completely or not at all
   4. ​Neurotransmitters
      1. ​Acetylcholine
         1. ​motor movement
         2. ​​lack → Alzheimer’s
      2. ​Dopamine
         1. ​motor movement and alertness
         2. lack → Parkinson’s disease
         3. too much → schizophrenia
      3. ​Endorphins
         1. ​pain control
         2. involved in addiction
      4. ​Serotonin
         1. ​mood control
         2. lack → clinical depression
3. ​​​Nervous System
   1. ​Afferent Neurons (Sensory Neurons)
      1. ​Take information from the senses to the brain
   2. ​Interneurons
      1. ​Send information to elsewhere in the brain or to efferent neurons
   3. ​Efferent (Motor) Neurons
      1. ​Take information from the brain to the rest of the body
   4. ​Central Nervous System (CNS)
      1. ​Consists of the brain and the spinal cord
         1. ​​​spinal cord- a bundle of nerves
   5. ​​Peripheral Nervous System (PNS)
      1. ​All nerves not encased in bone
      2. ​Somatic
         1. ​controls voluntary muscle movements
      3. ​Autonomic
         1. ​controls responses to stress
         2. sympathetic arouses
         3. parasympathetic calms
      4. ​Our pain reflexes help prevent us from harming ourselves
4. ​​Brain
   1. ​Ways to Study it
      1. ​Accidents
         1. ​studying the effects
      2. ​Lesions
         1. ​the removal or destruction of part of the brain
         2. studying the effects
      3. ​Electroencephalogram (EEG)
         1. ​detects brain waves
         2. examines brain waves in different stages of consciousness, especially                                          sleep
      4. ​Computerized Axial Tomography (CAT) Scan
         1. ​sophisticated x-ray
         2. shows brain structure
         3. uses x-ray cameras to get a 3-D picture
      5. ​Magnetic Resonance Imaging (MRI)
         1. ​shows brain structure
         2. ​​uses magnetic fields to measure the density and location of brain                                                 material
         3. no radiation
         4. more detailed than a CAT scan
      6. ​Positron Emission Tomography (PET) Scan
         1. ​shows how much of a certain chemical parts of the brain are using
         2. measures which parts of the brain are most active during certain tasks
      7. ​Functional MRI
         1. ​ties brain structure to brain activity during cognitive tasks
         2. combines elements of MRI and PET
   2. ​​Brain Structure and Function
      1. ​Hindbrain
         1. ​controls basic biological functions that keep us alive
         2. medulla
            1. controls blood pressure, heart rate, and breathing
         3. ​pons
            1. ​controls facial expressions
            2. connects the hindbrain with the rest of the brain
         4. ​cerebellum
            1. ​“little brain”
            2. coordinates muscle movement
            3. on the bottom of the brain
      2. ​​Midbrain
         1. ​coordinates simple movements with sensory information
         2. integrates sensory information and muscle movements
         3. reticular formation
            1. ​​​controls general body arousal and the ability to focus our attention
      3. ​​Forebrain
         1. ​controls thought and reason
         2. thalamus
            1. ​receives sensory signals coming up the spinal cord and sends them to other forebrain areas
         3. ​hypothalamus
            1. ​controls hunger, sexual arousal, thirst, and the endocrine system
         4. ​amygdala
            1. ​vital for emotion
         5. ​hippocampus
            1. ​vital for memory and retaining new information
   3. ​​​Cerebral Cortex
      1. ​Gray wrinkled surface of the brain
         1. ​the wrinkles are called fissures
            1. ​increase available surface area
      2. ​​Hemispheres
         1. ​contralateral control
            1. ​left hemisphere- right half of body
            2. right hemisphere- left half
         2. ​brain lateralization (hemispheric specialization)
            1. ​the specialization of function in each hemisphere
         3. ​split brain patients
            1. ​the corpus collosum has been cut to treat severe epilepsy
            2. can’t orally report information presented to only the right hemisphere of the brain
      3. ​​Association area
         1. ​any area of the cerebral cortex not associated with receiving sensory information or controlling muscle movements
      4. ​Frontal lobes
         1. ​prefrontal cortex
            1. ​at front of frontal lobe
            2. ​brain’s central executive
            3. foreseeing consequences, pursuing goals, and emotional control
         2. ​Broca’s area
            1. ​left hemisphere of frontal lobe
            2. controls the muscles involved in producing speech
         3. ​motor cortex
            1. ​at the back of the frontal lobe
            2. controls our voluntary movements
            3. top controls toes, bottom controls top of body
      5. ​​Parietal lobes
         1. ​sensory (somato-sensory) cortex
            1. ​right behind the motor cortex
            2. receives incoming touch sensations
            3. top receives information from the bottom of the body
      6. ​​Occipital lobes
         1. ​interprets messages from the eyes in the visual cortex
         2. messages in the left half of the retina go the to right visual cortex
      7. ​Temporal lobes
         1. ​process sound
         2. sound waves are processed by the ears and turned into neural impulses that temporal lobes interpret
   4. ​​Brain Plasticity
      1. ​Parts of the brain can adapt to perform other functions
      2. Because dendrites grow throughout our lives
      3. Younger brains are more plastic
5. ​​Endocrine System
   1. ​Adrenal Glands
      1. ​Produce adrenaline → “fight or flight” prep
   2. ​Ovaries and Testes
      1. ​Produce sex hormones
      2. May explain gender differences
   3. ​Controlled by the hypothalamus
6. ​Basic Genetic Concepts
   1. ​Twins
      1. ​Identical (monozygotic) twins
         1. ​effective psychological environment
            1. ​​​physical similarity in twins causes them to be treated the same way
   2. ​​​Chromosomal Abnormalities
      1. ​Turner’s Syndrome
         1. ​only single X chromosome
         2. ​​causes shortness, webbed necks, and different sexual development
      2. ​Klinefelter’s Syndrome
         1. ​XXY chromosome pattern
         2. causes minimal sexual development and extreme introversion
      3. ​Down’s Syndrome
         1. ​extra chromosome on 21st pair
         2. mental retardation