Anatomy & Physiology SI
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Monday 4-5 & Wednesday 6-7
Session 18
!!LAST REAL SESSION!!

Homeostatic Imbalances
- MS or Multiple Sclerosis
  - Auto immune disease affects usually yang adults
  - What is the change that makes this harmful:
    myelin sheaths are destroyed
  - Describe scleroses:
    myelin -> hardened lesions
  - What happens to impulse conduction:
    slows & eventually ceases
  - What happens with the channels:
    ↑ Na+ channels

- The Synapse!
  - Nervous system works because: info flows from neuron to neuron
  - Neurons are connected? How? Synapses
    - What to what one neuron - another
    - OR What to what one neuron - one effector cell
- Pre synaptic neuron
  - Define: neuron conducting impulses toward synapse
- Post synaptic neuron
  - Define: receive info, away from synapse
  - In PNS: neuron, muscle or gland
- Summation by the postsynaptic neuron
  - A single EPSP cannot induce an summate but they can
  - IPSP can also summate
  - Motor neurons receive both:
    excitatory & inhibitory inputs
  - Two types of summation
Summation Types

- **Temporal summation**
  - Rapid-fire order
  - Impulse pathway:
    produces \( \text{EPSP} \Rightarrow \text{another EPSP} \Rightarrow \text{add on top} \)

- **Spatial summation**
  - Stimulated by: large #
  - Many receptors are activated, each producing EPSPS which can then add together!

- Neurotransmitters
  - What are they? language of nervous system
  - How many? 50+
  - Most neurons make: 2+ neurotransmitters
    - Does each neurotransmitter have one function? several functions
  - Usually released: @ different stimulation frequencies

Central Nervous System

- Write the term next to the definition
  - A surface marking that is comprised of ridges: Gyri
  - Short, nonmyelinated axons: Gray matter
  - A bundle of axons/dendrites outside the CNS: nerve
  - Part of the brain hemisphere that is deep within the white matter: bascule
  - The fluid filled chambers that are continuous to one another and to the central canal of the spinal order, filled with CSF, lined by neuroglial cells: Ventrictes
  - The division of labor between hemispheres: lateralization
  - Functions in language control, math and logic: Left hemisphere
  - A collection of perikaryons and dendrites inside the CNS: nucleus
  - A surface markings that are shallow grooves: Sulci
  - A bundle of axons/dendrites inside the CNS: tract
- A part of the basic region of the brain that is made of gray matter superficially:
- Functions in visual-spatial skills, intuition and music skills:
- A collection of prokaryotes & dendrites outside the CNS:
- A surface marking the is made of deep grooves:
- A part of the basic brain region that is internal:
- Myelinated and nonmyelinated axons:

- How much of the brain is made up of the cerebral hemisphere: 83%.
- What are the 4 regions of the brain:
  - Cerebral Hemispheres
  - Diencephalon
  - Brainstem
  - Cerebellum
- What is the CNS comprised of:
  - Brain
  - Spinal Cord

- The Cerebral Cortex
  - Also called: executive suite, blood vessels, N/A, neural cell bodies, dendrites, glial cells, axons
  - Comprised of:
    - Motor - voluntary movement
    - Sensory - sensation awareness
    - Association - integrate info
    - Contralateral - R→ comes from L
    - Lateralization - specialization
    - Conscious behavior = entire cortex

- The Diencephalon
Diencephalon

- Consist of 3 paired gray-matter structures:
  - **Thalamus**
    - 80% of Diencephalon
    - Main function: relay station
      - Ex. sort, edit
  - **Epithalamus**
    - Most dorsal portion
    - Contains *pineal gland/ body*
      - Secretes *melatonin* which regulates sleep-wake cycle
  - **Hypothalamus**
    - Located below thalamus
    - Function: **vital for homeostasis**
    - Controls: blood pressure, heart rate, pupil size
    - Initiates physical responses to emotions: ***part of limbic system***
    - Contains:
      - *mammillary bodies*
      - *infundibulum*

- The Brain Stem
  - Controls: **automatic behavior for survival**
  - 3 regions
    - **Midbrain**
      - Contains:
        - *cerebral pedunules*
        - Function: pillars - hold up cerebrum
        - *corpora quadrigemina*
        - Function: *dorsal protrusions* vision & hearing
        - *superior colliculi*
- Function: **Visual**
  - Inferior colliculus

- Function: **Auditory**
  - Pons

- Composed of conduction tracts:
  - Longitudinal fiber: Connect higher brain centers and spinal cord
  - Transverse/dorsal fibers: relay impulses between motor cortex and cerebellum
  - Contains reflex centers for many facial nerves.

- Reticular Formation
  - Function: Sensory filter

- Medulla Oblongata
  - First enlargement of spinal cord
  - Medulla is an autonomic reflect center
    - Functions overlap with: hypothalamus

1. Functional groups of medulla:
   - **Cardiovascular center**
     - Cardiac center: force & rate of heart contract
     - Vasomotor center: blood vessel & pressure
   - **Respiratory center**
     - Function: respiratory rhythm, rate & depth of breathing
   - **Various other centers**
     - Function: vomiting, swallowing, cough, hiccup, sneezing
The Cerebellum

- What % of brain mass: 11%
- Function: balance, skeletal muscle movement, thinking, language & emotion
- Major role in: balance

The Cerebrum

- Divided into two hemisphere, connected by transverse fibers called corpus callosum
- Where does the right side of the body’s sensory input get processed, left side!
- Neocortex: most superficial consciousness, higher order thinking