

Chapter 3: Biological Psychology

- Brain Building blocks
 - o Cells in brain have special properties
- Nervous system Cells
 - o Neurons
 - Experience ourselves as a single entity
 - The experience arises from a nervous system comprised of enormous number of discrete cells
 - Special because they transfer information chemically and electrically
 - o Basic Anatomy of Neuron Cell
 - A cell body (soma) – cell
 - Dendrites – branching structures that receive transmissions from other neurons
 - Points of communication
 - Axon – a single, long thin fiber with branching tips
- Dendrites collect information through electrical signals → cell body integrates incoming signals and generates outgoing signal to axon if there is enough information → axon sends electrical signals to other dendrites/ effectors
- Electrical → chemical → Electrical
 - o Action Potential = energy signal
 - Inside of the cell – negative environment
 - High concentrate of Cl low concentrate of K and Na
 - Process of the charge moving down the axon
 - Axon covered in myelin, which speeds up transmission
 - Less fat = less myelin
 - MS attacks myelin; slows communication
 - o At the end of each Axon
 - Each axon bulge into terminal booth
 - When action potential reaches it the neurotransmitters are release
 - A neurotransmitter is a chemical stored in neurons
 - There is a small space between dendrites and axon bundles, dendrites and dendrites and axon bundles and axon bundles
 - Synaptic Space
 - Sending signal: Presynaptic Cell
 - Receiving signal: Post-synaptic Cell
- Neurotransmitters
 - o Many; neurons use them alone or in combination
 - o Some signals excite (go, go, go)
 - o Some inhibit (stop, stop, stop)
 - o Ex. Glutamate – GO GO GO
 - o Ex. GABA – STOP STOP STOP
 - Ex. Alcohol (stop signals that think about judgement)
 - o Ex. Nitrous Oxide, Serotonine, Epinephrine, norepinephrine, dopamine, acetylchloride
- Each NT must find its certain receptor/dock

- o Some signals have a close enough shape to others that it can connect with other receptors
- o Something may block a receptors
- LOOK AT GIST SLIDE
 - o Communication between cells is mediated by neurotransmitters
 - o Communication within cells is mediated by electrochemical charges (diff in ion gradient creates charge against them)
 - o The result of AP is the release of NT to continue communication
 - o Electro-chemical gradients in the dendrites and cell body sums together to trigger a wave of membrane potentials down the axon called action potential
- Neuron Communication
 - o Neurons receive and transport into electrical
 - Sensory carry information from sense organ to CNS
 - Neurons in the CNS process and intermembrane and send out commands to muscles and organs
- Cell Growth
 - o Dendrites spines differ in size and shape
 - Mature – more surface area; thicker
 - o When you learn your neurons make more spines
 - o Neurons do not have fixed anatomy
 - Constantly grow and shed dendrites
 - Synaptic connection points on dendrites called spines
 - Usually this occurs in response to experience and learning
 - Less learning = shrinking brain
- Experience and The Brain
 - o Learning changes the brain
 - We know this because we can see branch points
 - Can count spines
 - See how develops over time
 - Anti-depressants help with dendrites
- Nervous System Cells
 - o The human nervous system is estimated to have about 100 Billion neurons
 - o Neurons aren't only type of cell
- Glia
 - o Support neuron in many ways
 - They provide insulation and remove waste
 - 1/10 size of neurons, 10x more abundant
 - Super important