

MODULE 9 BIOLOGICAL AND NEUROTRANSMISSION

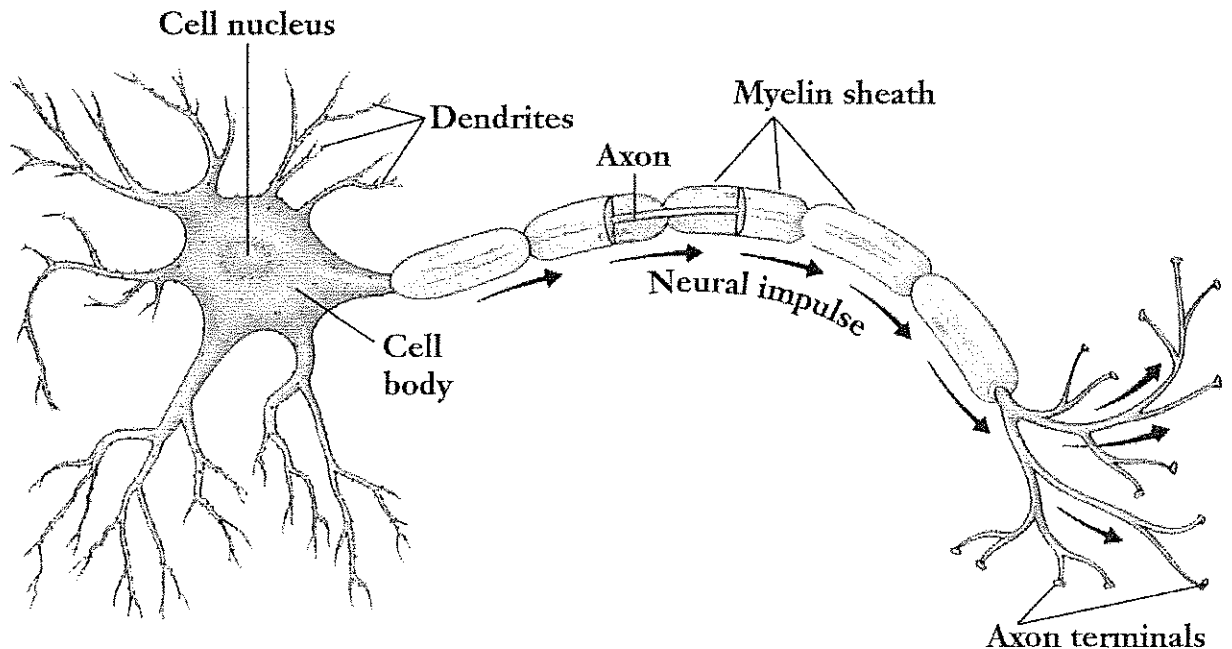
BIOLOGY, BEHAVIOR, AND MIND

- It's your brain, not your heart, that falls in love.
- In the early 1800's, Franz Gall proposed that **PHRENOLOGY**, studying bumps on the skull, could reveal a person's mental abilities and character traits.
- Today, **BIOLOGICAL PSYCHOLOGISTS** (BP) are announcing discoveries about the interplay of our biology and our behavior and mind at an exhilarating pace. BP's look for links between biological and psychological processes. Anything to do with genes, brain, or body's neuro networks is the Biological Approach.
- BIOPSYCHOSOCIAL SYSTEM is the study of how three (biological, psychological, and social) systems work together.

NEURAL COMMUNICATION

NEURONS

- The body's building blocks are called **NEURONS**, or the nerve cells that fathom our thoughts and actions, memories and moods.
- The neuron is made up of dendrites, an axon surrounded by myelin sheath, which uses action potential and refractory periods within the body.
- **DENDRITES** are the bushy branches that extend to receive a message from a neuron to conduct impulses toward the cell body sending the message into the neuron.
- **AXONS** are the cell's lengthy fibers that pass messages through its terminal branches to other neurons or to muscles or glands. Surrounding the axon is the **MYELIN SHEATH**, a layer of fatty tissue that insulates them and speeds their impulses. MS controls the speed of the **ACTION POTENTIAL**. The AP is a brief electrical charge that travels down its axon.



- Brain activity is measured in milliseconds. When a neuron has positive-outside/negative-inside state, this is known as **RESTING POTENTIAL**. The **DEPOLARIZATION** occurs when one axon channel is to open causing the other axon channels to open like a dominoes effect. During the **REFRACTORY PERIOD**, the positively charged sodium ions pump back outside causing the resting potential.
- Excitatory (push along throughout neuron and out) and Inhibitory (stops message from going to next).
- A **THRESHOLD** is the level of stimulation required to trigger a neural impulse. A neuron can never pull back, for it is an **ALL-OR-NONE RESPONSE**. The neuron either fires like a gun or doesn't.

HOW NEURONS COMMUNICATE

- The meeting point between neurons are known as the **SYNAPSE** (synaptic gap).
- When action potential reaches the knob-like terminals at an axon's end, it triggers the release of chemical messengers, called **NEUROTRANSMITTERS**. **REUPTAKE** allows the sending neuron to reabsorb the excess neurotransmitters.

HOW NEUROTRANSMITTERS INFLUENCE US

- Neurotransmitters influence us through hunger, thinking, depression, euphoria, addictions, and therapy.
- **ACETYLCHOLINE** (Ach) is a neurotransmitter that plays a role in muscle contractions, memory, and learning.

- **ENDORPHINS** are the morphine the body naturally makes. “Runners high”, indifference to pain in some severely injured.
- Drugs and neurotransmitters: when any type of drug is introduced to the body, most inflict neurotransmission. When the drug is withdrawn, the brain may then be deprived due to the stoppage of a naturally stimulated a certain neurotransmitter. **AGONIST** is molecules that are similar enough to a neurotransmitter to bind to its receptor and mimic its effects (temporary high by amplifying normal sensations of arousal or pleasure). **ANTAGONISTS** also bind to receptors but their effect is instead to block a neurotransmitter’s functioning. Instead of mimicking, antagonists actually block.

BE ABLE TO ANSWER: How do neurons communicate with one another?

PRACTICE FRQ'S: While hiking, Ken stumbled and fell down a 10-ft drop-off. Upon landing, he sprained his ankle badly. Ken was surprised that he felt very little pain for the first half hour. Explain how the following helped Ken feel little pain in the moments after the injury. Endorphins and the Synapse.