

Lecture Guide Chapter 2: The Science of Psychology Gen Psych (Sciartelli) S10
Based on the text: Psychology (Ciccarelli and White, 2009)

Introduction to this Chapter:

Overview of Nervous System (see slide) - CHART

Nervous System - **extensive network of specialized cells that carry info to and from all parts of body**

Neuroscience - examines the structure and function of neurons, nerves, and nervous tissue. Also interested in relationship of nervous system to behavior and learning.

- **deals with structure and function of Nervous System (neurons, nerves, and nervous tissue) (and its relationship to behavior and learning)**

Structure of the Neuron

Neurons - **basic cell in the nervous system.**

- **The receiver and sender of messages**

Parts of a Neuron (see slide) (in order message flows)

Dendrites - **receive**

Soma - **cell body ; responsible for maintaining life of cell**

Axon - **long tube-like structure ; carries message to other cells (sender)**

Other Types of Brain Cells

Glial cells - grey fatty cells that:

- 1) **Provide support for neurons to grow on/around**
- 2) **Deliver nutrients to neurons**
- 3) **Produce myelin to coat axons**

Myelin - fatty substances produced by certain glial cells

- coat axons to insulate, protect, and speed up the neural impulse.

- 4) **Clean up waste products and dead neurons.**

Neurons in the Body

Nerves - **bundles of axons in body that travel together**

How do neurons communicate?

Generating the Message: Neural Impulse

Sending the message within the cell: (electrical)

All-or-none? - **either fires completely or not at all**

Different Strength responses? **How are different strengths/responses indicated?**

The more neurons you have, the more stronger your response is

Sending the Message to Other Cells (CHEMICAL)

Neurotransmitters - (NT) - Chemical used to pass message to next cell

Synapse/synaptic gap - microscopic space between neurons

Receptor sites - holes in surface of dendrites (or muscle or gland cells) – shaped to fit only certain neurotransmitters.

Neuron Communication

Neurons must be turned ON and OFF.

Neurotransmitters

Excitatory neurotransmitter - causes receiving cell to fire

Inhibitory neurotransmitter - causes receiving cell to stop firing

Chemical substances can affect neuronal communication.

- Agonists - mimic or enhance effect of NT
 - o Example : black widow venom

- Antagonists - block or reduce response to NTs
 - o Example : curare, betablockers

Types of neurotransmitters-

*Acetylcholine (ACH)

*Serotonin

GABA

Glutamate

Norepinephrine

*Dopamine

Endorphins

Cleaning up the Synapse

- 1) Reuptake - NTs taken back into sending cell

- 2) Diffusion - drift away

- 3) Enzyme - a protein made by cells – breaks down n.t.

Central Nervous System (CNS) - brain and spinal cord

Spinal cord - a long bundle of neurons that:

- carries messages to and from the body and brain
- is responsible for very fast, lifesaving reflexes.

Three Types of Neurons

Sensory neuron -

Motor neuron -
Interneuron -

Peripheral Nervous System (PNS) - all nonCNS nerves and neurons running through body; divided into:

A. Somatic Nervous System - carries sensory info and controls skeletal muscles

1. Sensory pathway -

2. Motor pathway -

B. Autonomic Nervous System (ANS) - controls *involuntary* muscles, organs, and glands

1. Sympathetic division (fight-or-flight system)

- responsible for reacting to stressful events and bodily arousal.

2. Parasympathetic division

- restores body to normal functioning after arousal

- responsible for day-to-day functioning of organs and glands.

THE BRAIN:

How to study?

The Brain Stem

1. Medulla -

2. Pons -

3. Reticular formation (RF) -

4. Cerebellum -

Structures Under the Cortex

Limbic system - a group of brain structures located under cortex

- involved in learning, emotion, memory, and motivation.