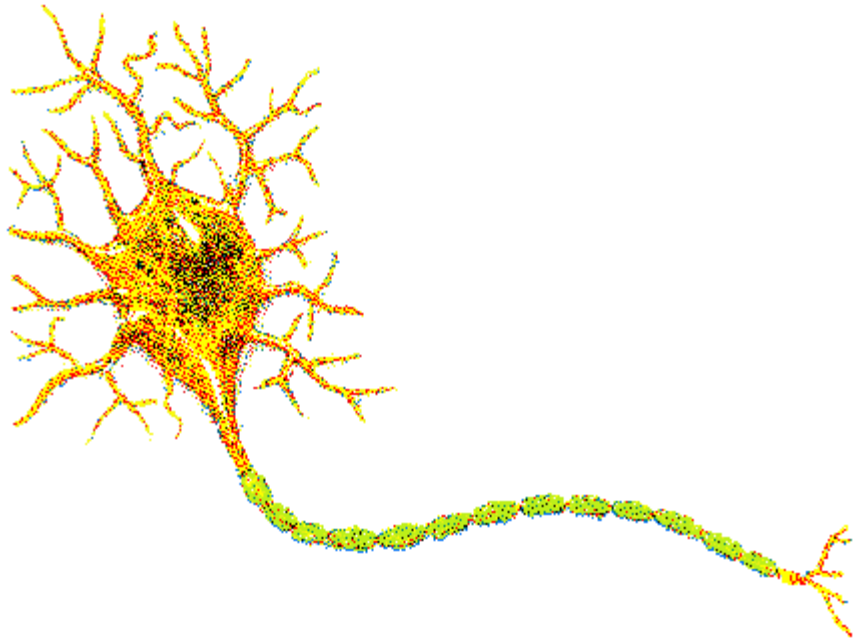
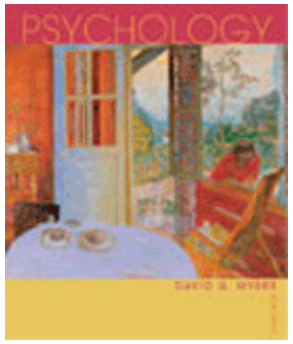
The Nervous System



It starts with an individual nerve cell called a NEURON.

Neural Communication



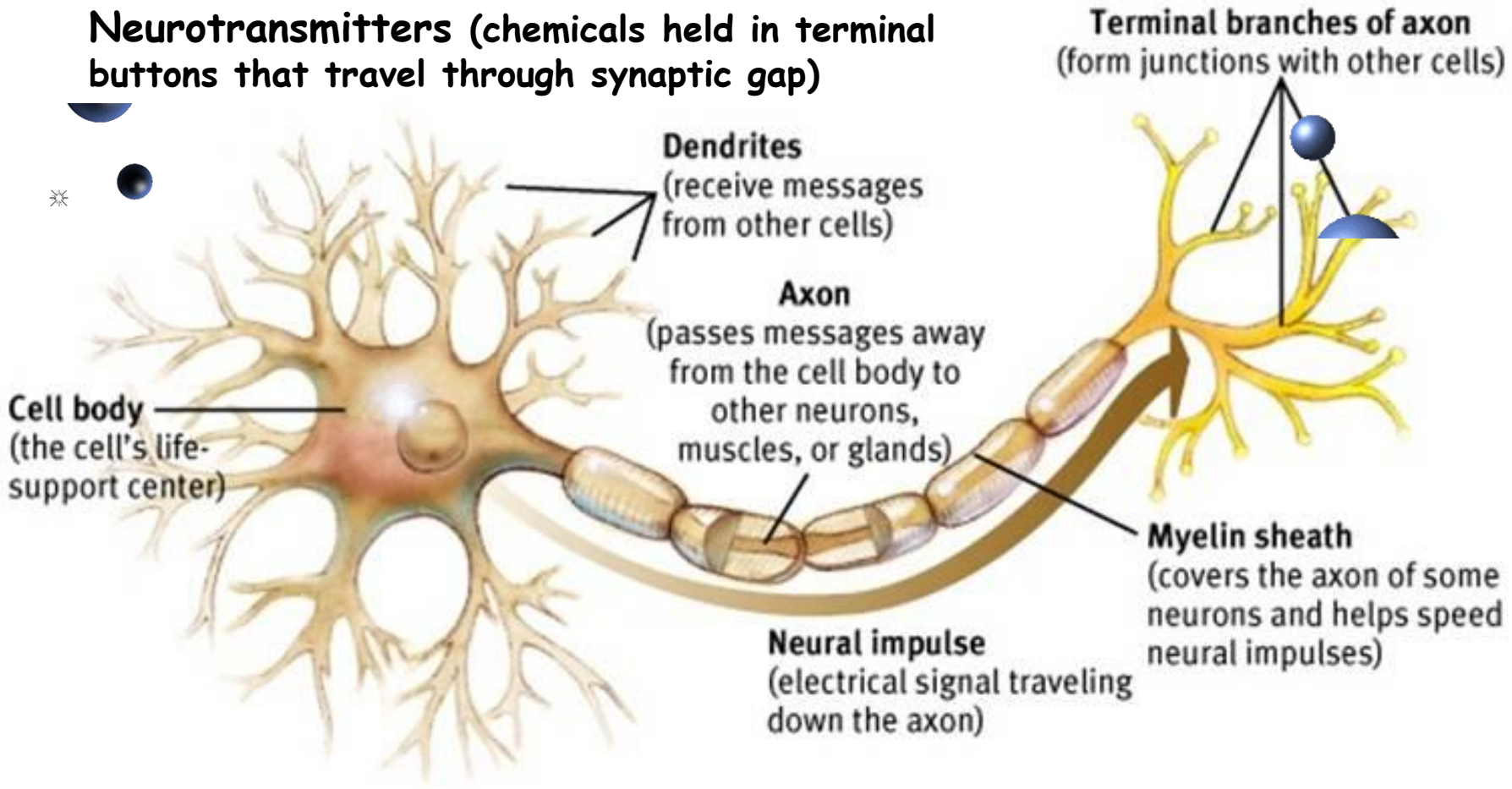
- Biological Psychology
  - branch of psychology concerned with the links between biology and behavior
  - some biological psychologists call themselves *behavioral neuroscientists, neuropsychologists, behavior geneticists, physiological psychologists,* or *biopsychologists*
- Neuron
  - a nerve cell
  - the basic building block of the nervous system
  - While Resting it is Negative

Neuroanatomy

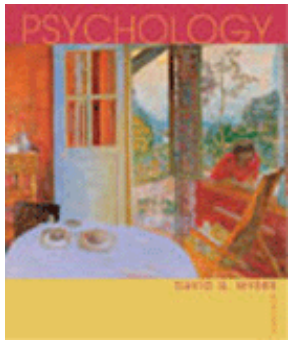
Synapse

Synapse

Neurotransmitters (chemicals held in terminal buttons that travel through synaptic gap)

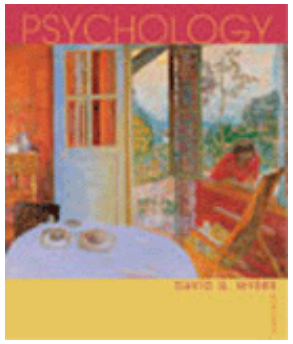


Neural Communication



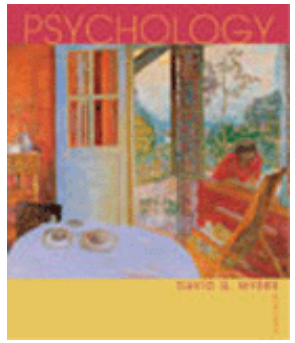
- Dendrite
  - the bushy, branching extensions of a neuron that receive messages and conduct impulses toward the cell body
- Axon
  - the extension of a neuron, ending in branching terminal fibers, through which messages are sent to other neurons or to muscles or glands
- Myelin [MY-uh-lin] Sheath
  - a layer of fatty cells segmentally encasing the fibers of many neurons
  - enables vastly greater transmission speed of neutral impulses (120 Meters per Second)

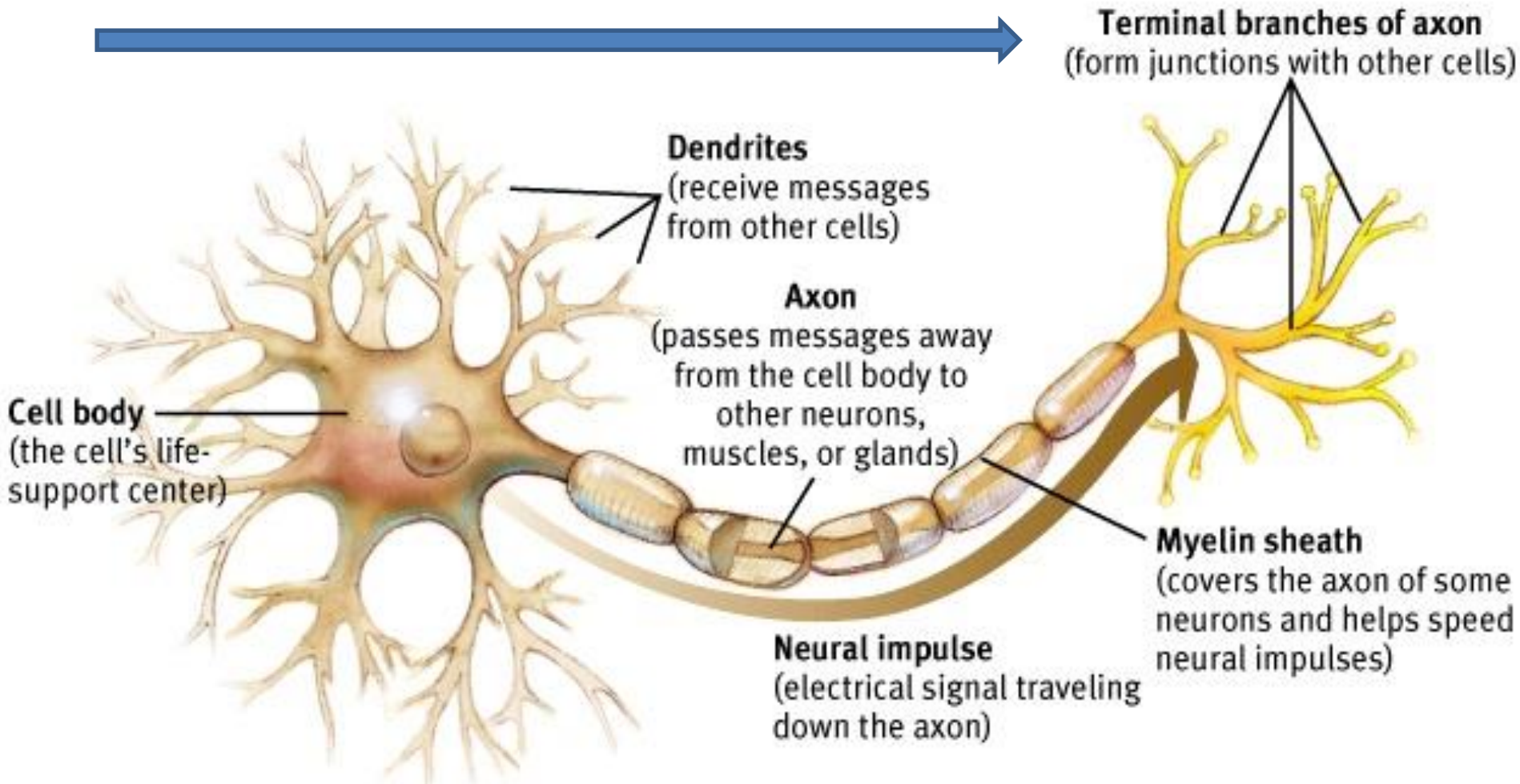
Neural Communication



- Synapse [SIN-aps]
  - junction between the axon tip of the sending neuron and the dendrite or cell body of the receiving neuron
  - tiny gap at this junction is called the *synaptic gap* or *cleft*
  - *Each synaptic gap at any time may contain many different inhibitory or excitatory neurotransmitters.*
- Neurotransmitters
  - chemical messengers that traverse the synaptic gaps between neurons (from terminal button to dendrite)
  - when released by the sending neuron, neuro-transmitters travel across the synapse and bind to receptor sites on the receiving neuron, thereby influencing whether it will generate a neural impulse
  - Within Neuron it is an electrical signal, between Neurons it is a chemical signal (So it is an Electrochemical Signal)

Neural Communication





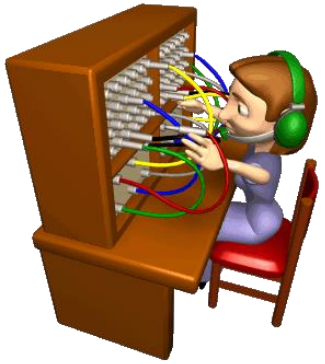
How does a Neuron fire?

- **Resting Potential**: slightly negative charge.
- Reach the **threshold** when enough neurotransmitters reach dendrites.
- **Threshold**: level of stimulation required to trigger a neural impulse; excitatory signals (excite other cells) minus inhibitory signals (prevent the next cell from firing) must equal a minimum intensity
- Go into **Action Potential**; a neural impulse (brief electrical charge) that travels down an axon.
- **All-or-None Principle** – neuron fires completely or it does not fire at all

Types of Neurons

- **Sensory Neurons** – sends receptors to CNS (Also called **Afferent Neurons**)

- **Interneurons** – internal communication neurons (Located in the Brain and Spinal Cord) takes in Sensory Signal and sends out Motor Signal

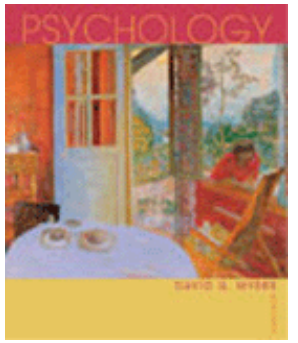


- **Motor Neurons** – CNS to muscle and glands (Also called **Efferent Neurons**)

Reflexes

- Normally, sensory neurons take info up through spine to the brain.
- With reflexes though, some reactions occur when sensory neurons reach just the spinal cord.
- Automatic response to sensory stimulus; **interneurons** react to **sensory** neurons w/o going to brain

The Nervous System



- Reflex
  - a simple, automatic, inborn response to a sensory stimulus