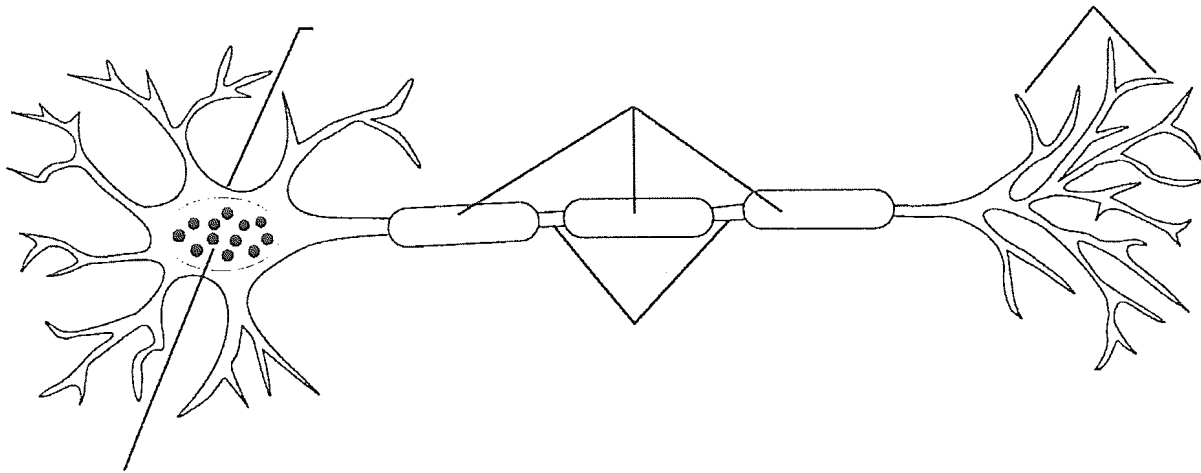


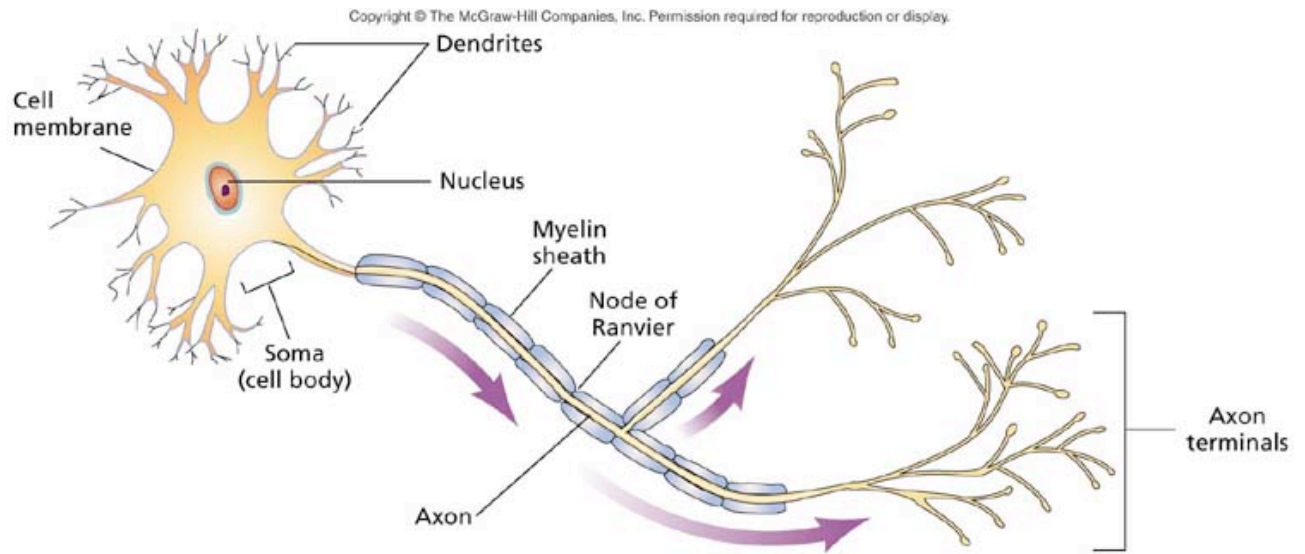
The Neuron: The Basic Unit of Communication

Neuron: Basic building blocks of the nervous system. It is a highly specialized nerve cell that communicate information in electrical and chemical form.



Neurons are found throughout the body. The structure of a neuron (see Figure 3.9 on page 74)

- Dendrites
- Soma (cell body)
- Nucleus
- Cell membrane
- Axon
- Myelin sheath
- Node of Ranvier
- Terminal Buttons or axon terminals



How do these neurons communicate with each other (see Figure 3.11 on page 77)?

When communication has occurred, the neurotransmitters are either:

- (1) broken down by enzymes and removed from the brain.
- (2) go through a reuptake process to be reused in the presynapse.

How small is the synaptic gap?

The synaptic gap (the space between synapses) is about 5/1,000,000 of an inch. To get a feel for how small this is, make the following analogy:

1 ream of paper	=	500 pages	=	2 inches
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2,000 reams	=	1,000,000 pages	=	4,000 inches or 111 yards
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One football fields (without the end zones) is 100 yards.

If 1 football field is approximately (plus one end zone) is one inch, five sheets is the gap in a neuron.

Neurotransmitters

The main neurotransmitters

- Acetylcholine (ACh)
- Norepinephrine (aka noradrenaline)
- Serotonin
- Dopamine
- GABA (gamma aminobutyric acid)
- Endorphins (covered in Chapter 12)

What are the major roles of each neurotransmitters (see handout)?

How do these drugs affect neural communication and behavior (page 178, 179)?

Many drugs, especially those that affect moods or behavior, work by interfering with normal functioning of neurotransmitters in the synapse. How this occurs depends on the drug, such as the following:

1. Drugs can mimic specific neurotransmitters. Nicotine is chemically similar to acetylcholine and can occupy acetylcholine receptor sites, stimulating skeletal muscles and causing the heart to beat more rapidly.
2. Drugs can mimic or block the effects of a neurotransmitter by fitting into receptor sites and preventing the neurotransmitter from acting. For example, the drug curare produces almost instant paralysis by blocking acetylcholine receptor sites on motor neurons.
3. Drugs can affect the length of time the neurotransmitter remains in the synaptic gap, either increasing or decreasing the amount available to the postsynaptic receptor.
4. Drugs can increase or decrease the amount of neurotransmitters released by neurons.

Deficits and Surpluses of Neurotransmitters (see handout)

Who has

- Alzheimer disease (deficit of Acetylcholine (ACh) in the hippocampus), and
- Parkinson's disease (deficits of dopamine in the substantia nigra)

Alzheimer's disease:

- Estimated 20 million worldwide suffer from Alzheimer, 4 million in the United States.
- It is hypothesized that high fat diets elevate the risk of Alzheimer's.

Learn more about these if you have a loved one suffering from Alzheimer. Ignorance can help foster fear of Alzheimer. Learning more can help you deal with the stress of the disease.

Alzheimer's: Time, July 17, 2000

Parkinson's: Newsweek, May 22, 2000