The Nervous System

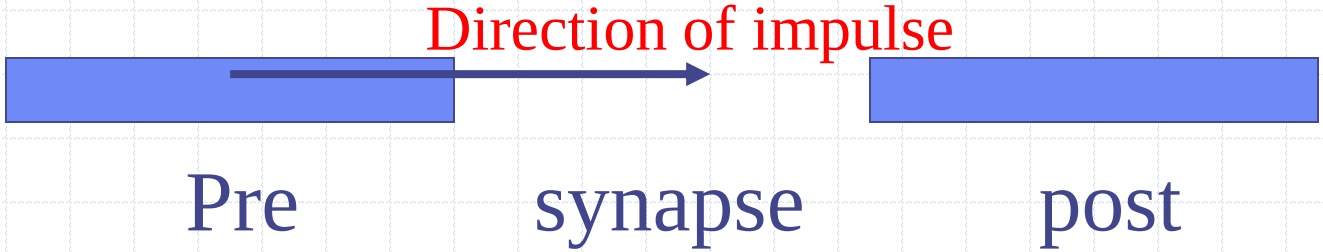
Synaptic Transmission; Part IV

Main Statement(s)

- How does a nerve impulse or action potential move from neuron to neuron?
- Or say, how does it move from your foot to your brain when you step on a tack?
- Action potentials in the presynaptic neuron stimulate the release of a chemical neurotransmitter, which activates the postsynaptic neuron.

Synapses

- Neuron to neuron junctions do not touch.
- The gap between them is called a synapse or synaptic cleft.
- The first neuron is called a presynaptic neuron while the 2nd neuron is called a postsynaptic neuron.

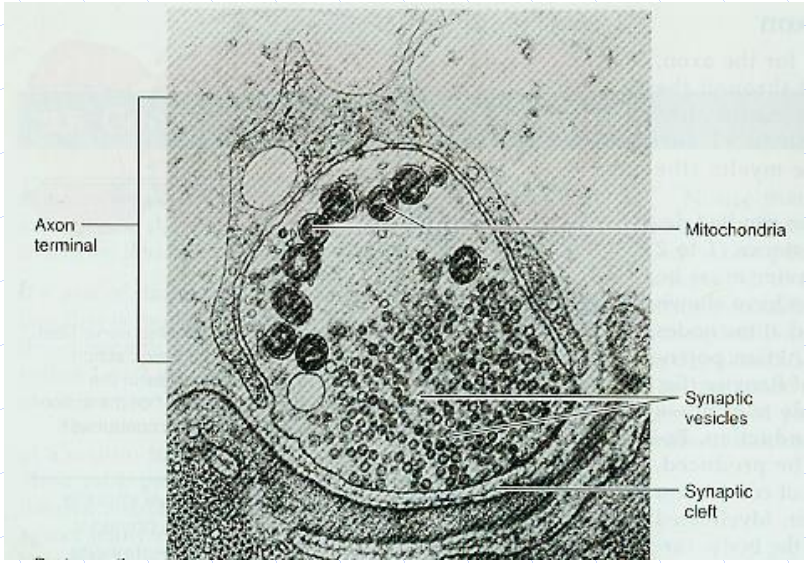


Synaptic Transmission

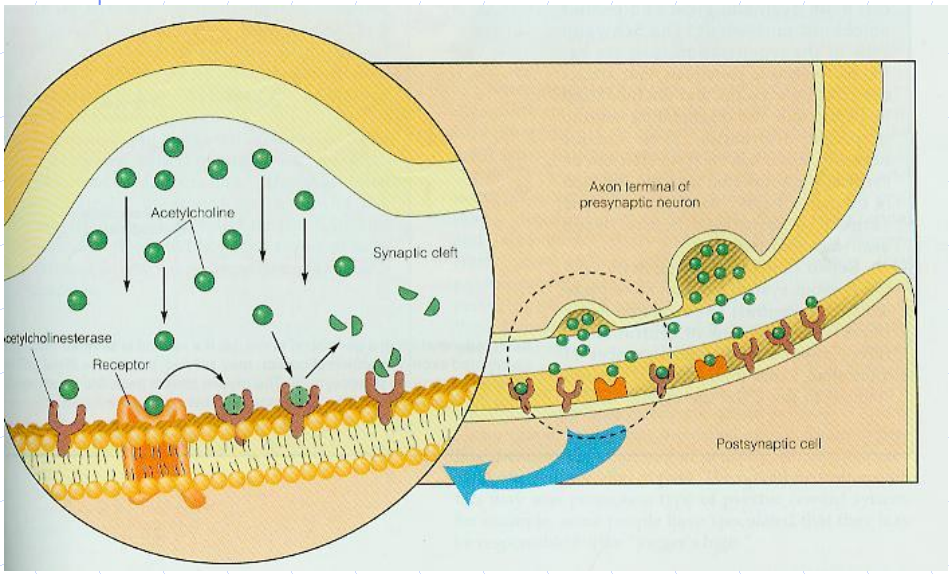
- When an impulse reaches the end of the presynaptic neuron a chemical is released – a neurotransmitter
- The first neurotransmitter to be discovered was acetylcholine
- The neurotransmitter floats across the synapse and attaches to the postsynaptic neuron

Acetylcholine

- The first neurotransmitter to be discovered was acetylcholine
- Each synaptic vesicle contains about 10,000 molecules of acetylcholine



Stimulation of Neurons



- When the acetylcholine floats across the synapse it bonds with receptors on the dendrites of the postsynaptic neuron
- This causes an action potential and the nerve impulse continues on its way

Stopping Acetylcholine

- Acetylcholine must be removed right after it starts an AP in the postsynaptic neuron
- This is caused by the enzyme acetylcholinesterase

Other Neurotransmitters

- **Dopamine:** Found in many regions of the brain; when neurons, that produce it, are diseased, you may develop Parkinson's disease
- **Norepinephrine:** another brain 'mitter
- **Glutamic acid:** a major brain 'mitter

Other Neurotransmitters (2)

- Glycine and GABA (gammaaminobutyric acid): are inhibitory neurotransmitters (they shut down impulses)
- GABA is the most used 'mitter in the brain – it's loss causes Huntington's chorea a disease that leads to uncontrolled movements and death

Other Neurotransmitters (3)

- Endorphins: An opioid neurotransmitter that may block pain – may be responsible for "runner's high"