

## Quick Neurotransmitter Refresher

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What are they and how do they work? Of course everyone reading this already knows :) But it helps to have a quick reminder to refresh our memory every once in a while.

Having a basic understanding about these special chemicals in our brain and how they work helps us to understand memory, learning, behavior, addiction, how drugs work, and emotions.

First we'll quickly go over some of the most important neurotransmitters.

**Acetylcholine:** The first neurotransmitter to be identified. It allows nerve cells to communicate with each other.

**Noradrenalin (Norepinephrine):** Acts as a stress hormone and affects the parts of our brain where attention and responding actions are controlled. It is what is behind the fight-or-flight response.

**Dopamine:** Plays an important role in motivation and reward, sleep, mood, attention, motor activity, cognition and learning.

Endorphin: Helps modulate pain ("natural opiates"), cardiac, gastric and vascular function.

Serotonin: Believed to help regulate anger, aggression, mood, sleep, appetite, sexuality and body temperature.

GABA:  
One of the most abundant neurotransmitters. It is an inhibitory neurotransmitter - inhibiting all sorts of activating systems.

Glutamate: Heightens sensitivity to other neurotransmitters.  
An excitatory neurotransmitter involved in cognitive functions like learning and memory.

So... Neurons pass messages along themselves using electrical impulses, but they use neurotransmitters to pass messages to other neurons. Neurotransmitters are released from synaptic vesicles, flow across gaps between neurons called synapses and then bind with a receptor on the target neuron.

How about a slideshow?

Nerve impulses reach the end of a neuron and release neurotransmitters into the synapse

The neurotransmitter fits into a receptor site on another neuron like a key

The vesicle stores and releases neurotransmitters

The action potential is the electrical impulse that travels through the neuron (along the axon) triggering the release of neurotransmitters

When connections between neurons are not being used, they are cut back by synaptic pruning.

When connections are increased between neurons that are being used it is called synaptic sprouting.

When these changes happen it is called synaptic plasticity.