



Assignment: Physiological Psychology

Class: MSC 2nd Morning

Topic: Neurotransmitters

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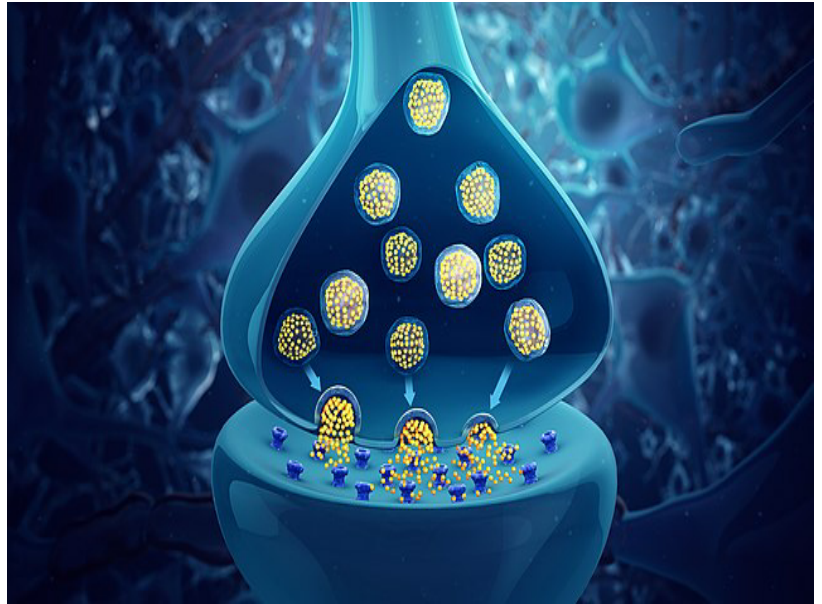
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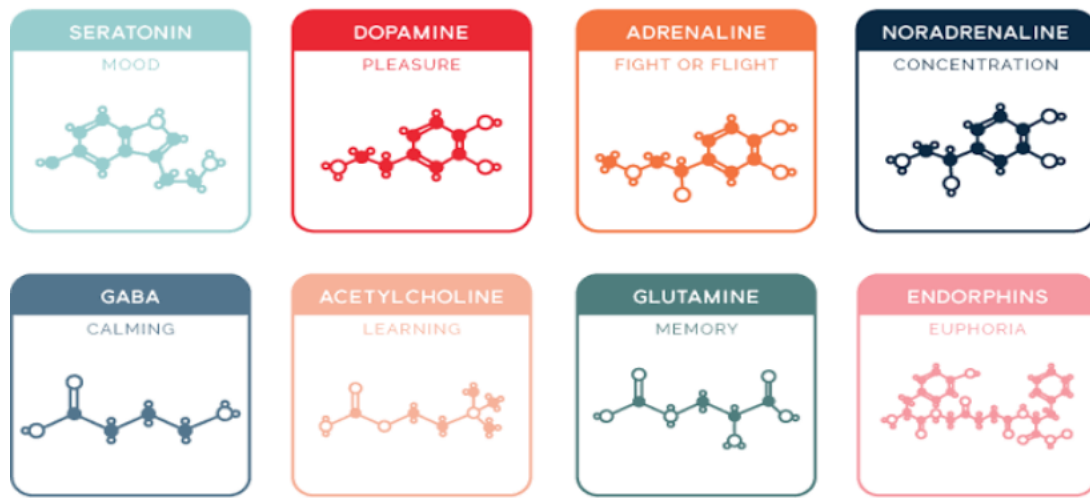
# NEUROTRANSMITTERS

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- Neurotransmitters are endogenous chemicals that enable neurotransmission. It is a type of chemical messenger which transmits signals across a chemical synapse, such as a neuromuscular junction, from one neuron (nerve cell) to another "target" neuron, muscle cell, or gland cell.
- Neurotransmitters are released from synaptic vesicles in synapses into the synaptic cleft, where they are received by neurotransmitter receptors on the target cells.
- Many neurotransmitters are synthesized from simple and plentiful precursors such as amino acids, which are readily available from the diet and only require a small number of biosynthetic steps for conversion.
- Neurotransmitters play a major role in shaping everyday life and functions. Their exact numbers are unknown, but more than 200 unique chemical messengers have been identified.



## ➤ Types of Neurotransmitters



### ➤ Acetylcholine

A neurotransmitter used by neurons in the PNS and CNS in the control of functions ranging from muscle contraction and heart rate to digestion and memory.

### ➤ Norepinephrine

A neurotransmitter involved in arousal, as well as in learning and mood regulation.

### ➤ Serotonin

A neurotransmitter used by cells in parts of the brain involved in the regulation of sleep, mood and eating.

### ➤ Dopamine

A neurotransmitter used in the parts of the brain involved in regulating movement and experiencing pleasure.

➤ GABA

inhibits the firing of neurons

➤ Glutamate

An excitatory neurotransmitter that helps strengthen synaptic connections between neurons.

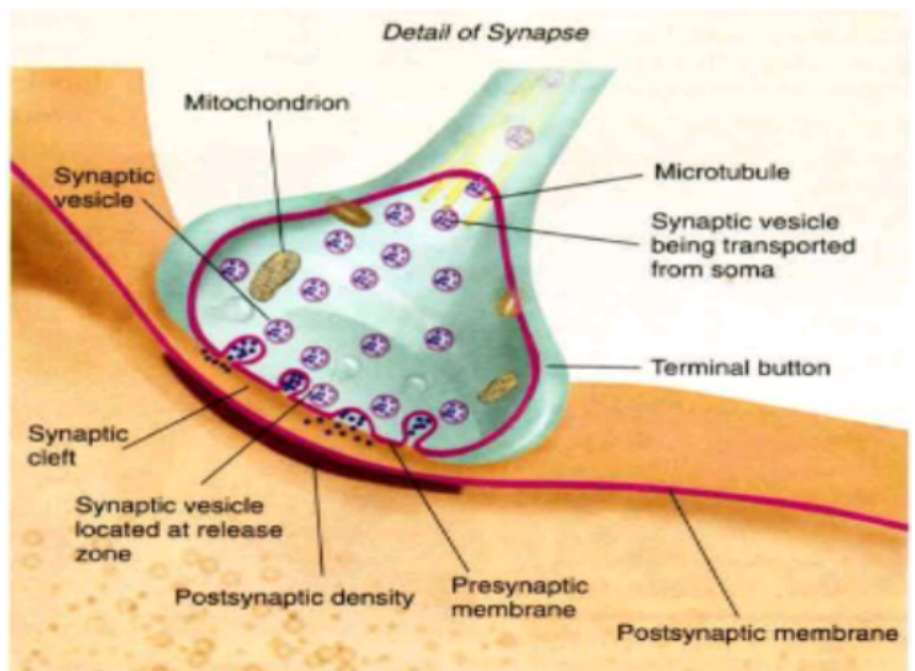
➤ Endorphin

bind to opiate receptors and moderate pain

## Mechanism Of Neurotransmitters

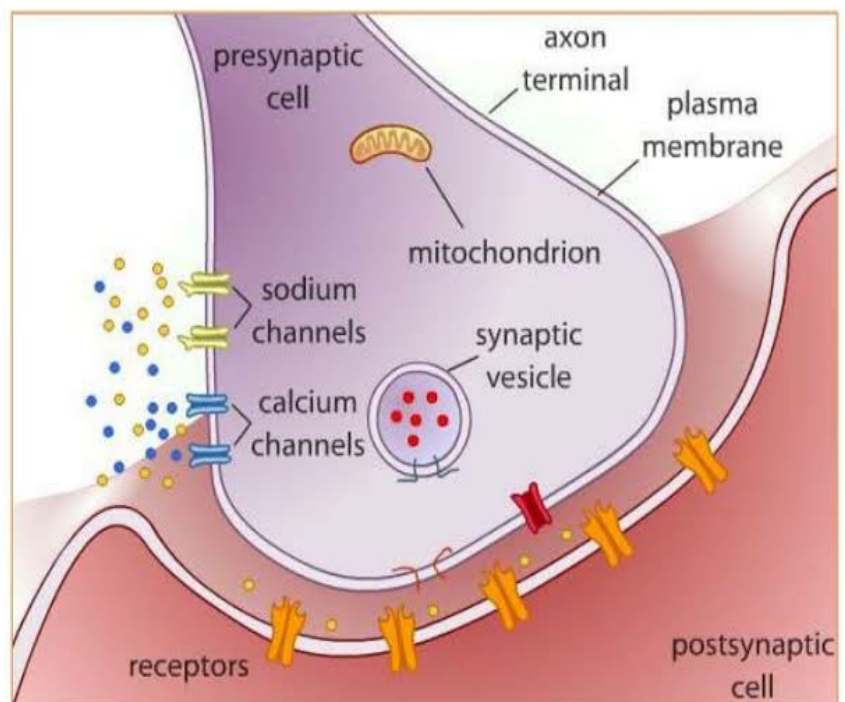
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- Neurotransmitters are stored in synaptic vesicles, clustered close to the cell membrane at the axon terminal of the presynaptic neuron. Neurotransmitters are released into and diffuse across the synaptic cleft, where they bind to specific receptors on the membrane of the postsynaptic neuron. Most neurotransmitters are about the size of a single amino acid; however, some



neurotransmitters may be the size of larger proteins or peptides.

- A released neurotransmitter is typically available in the synaptic cleft for a short time before it is metabolized by enzymes, pulled back into the presynaptic neuron through reuptake, or bound to a postsynaptic receptor. Nevertheless, short-term exposure of the receptor to a neurotransmitter is typically sufficient for causing a postsynaptic response by way of synaptic transmission.
- In response to a threshold action potential or graded electrical potential, a neurotransmitter is released at the presynaptic terminal. Low level "baseline" release also occurs without electrical stimulation. The released neurotransmitter may then move across the synapse to be detected by and bind with receptors in the postsynaptic neuron.



- Binding of neurotransmitters may influence the postsynaptic neuron in either an inhibitory or excitatory way. This neuron may be connected to many more neurons, and if the total of excitatory influences are greater than those of inhibitory influences, the neuron will also "fire". Ultimately it will create a new action potential at its axon hillock to release neurotransmitters and pass on the information to yet another neighbouring neuron.

## Reference:

- ★ *Foundation Of Physiological Psychology/ Neil Carlson- 6th Addition*
- ★ <https://en.m.wikipedia.org/wiki/Neurotransmitter>