Cheatography

1.4 Neurotransmitters + their effect on behaviour Cheat Sheet

by Sruby via cheatography.com/158326/cs/33428/

Antonova (2011)

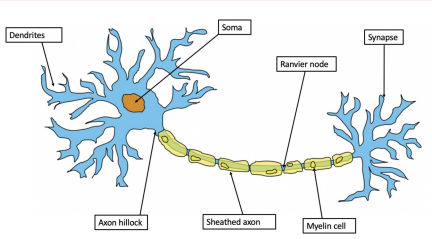
Aim:	wanted to see if scopolamine affected hippocampal activity in the creation of spatial memory.
Procedure	
-	20 healthy male adults (mean age 28). were injected with either Scopolamine or a placebo
-	Pts were put into an fMRI and scanned whilst playing the "Arena task." A virtual reality game where the goal was to navigate around an "arena" to reach a pole.
-	After learning where the pole was located, the pts were told to actively rehearse how to get to the pole in the arena.
-	**Repeated measures design** - pts returned 3/4 weeks later and redid the test - receiving the opposite treatment
Research method	Experiment
IVs	Scopolamine/Placebo
DV	fMRI - Brain activity
Antagonist	Scopolamine
Agonist	Acetylcholine
Findings	

1) When pts were injected with scopolamine, they demonstrated a **significant reduction in the activation of the hippocampus** compared to when they received a placebo.

2) They were also **more accurate in the placebo group**.

Counter-argument: Kulkofsky

Neuron



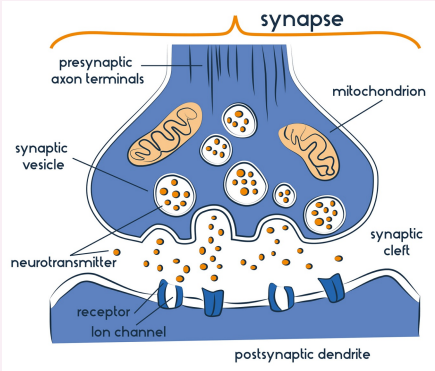
Neurons are cells within the nervous system that transmit information to other nerve cells, muscle, or gland cells. Most neurons have a cell body, an axon, and dendrites.

Explain synaptic transmission

Synaptic transmission is the **biological process by which a neuron communicates with a target cell across a synapse.** Chemical synaptic transmission **involves the release of a neurotransmitter from the pre-synaptic neuron, and neurotransmitter binding to specific post-synaptic receptors.**

Excitatory + Inhibitory

Neurotransmission



Describe Neurotransmission

Conclusions (Antonova (2011)

It appears that acetylcholine may play an important role in memory consolidation - **why do you think this?**

Becausethe hippocampus was activated - so what??

It was demonstrated that neurotransmitters themselves can be affected by other chemicals - **why?**

Because drugs interfere with the way neurons send, receive, and process signals via neurotransmitters.

= Some drugs, such as marijuana and heroin, can activate neurons because their chemical structure mimics that of a natural neurotransmitter in the body. This allows the drugs to attach onto and activate the neurons.

Antagonist

Is a substance that **fits** into a receptor site on the postsynaptic neuron, **preventing the neuron from firing** by blocking access to it.

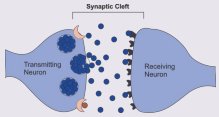
Agonist

Neurotransmitters have either an **excitatory** or **Inhibitory** effect of the neighboring neuron.

= Excitatory neurotransmitters are released into an excitatory synapse causing a neuron to fire, leading to an action potential, this produces stimulating effects on the brain.

E.g E.g. Acetylcholine when in excitation it makes the receiving neuron **positively** charged and more likely to fire and is thought to be involved in the process of memory consolidation.

Neurotransmitter



Neurotransmitters are electrochemical messages that result in a vast array of behaviours. The effects of Neurotransmitters can be amplified or reduced.

*Human behaviour is highly complex, thus trying to determine cause and effect is difficult to prove.

Neurotransmission is the process of nerve cell communication. The neurons that are interconnected communicate with each other by releasing chemicals called **neurotransmitters** into small gaps between the two nerve cells call the **synapse** gap (see above).

The process of **electrochemical** transmission starts in the **dendrites** that branch out from the cell body and these receive *incoming impulses* from neighboring **neurons**.

The impulse passes down the axon as **action potential**, down to the **terminal** buttons, containing synaptic **vesicles** (tiny sacs) filled with *neurotransmitters* which are released into the synapse.

A *released* neurotransmitter is available for the synapse gap for a short amount of time during which it may be **destroyed**, pulled back into the **presynaptic axon terminal** through **reuptake (reabsorption)**, or reach the **postsynaptic** membrane and bind to one of the receptors on its surface.

If the neurotransmitter bind onto the receptor on the postsynaptic neuron, this process changes the membrane potential and so contributes to activating an **electrical** pulse in the postsynaptic neuron. Here the chemical mechanism becomes electrical again.

Looks like the neurotransmitter and fits in the receptor site but it **amplifies the behaviour**. The reaction can be **excitatory or inhibitory**.

= Drugs are exogenous agonists.

= Neurotransmitters are endogenous agonists.

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