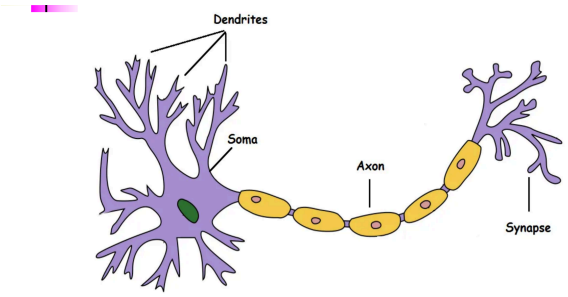
How does a natural neuron work?

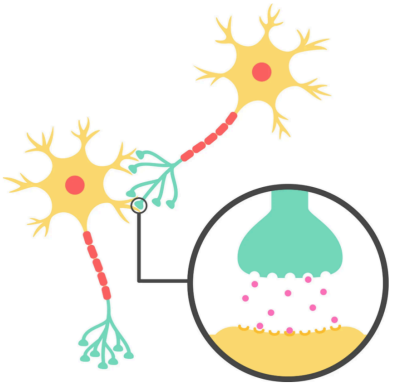
A natural neuron works by receiving signals via its dendrites, processing them in the cell body, and then, if the stimulation can reach a respective threshold, generating an electrical impulse that travels down the axon and dendrites. At the end of the axon terminals, the signal is prepared to be passed on to the next cell.



How do natural neurons transmit signals to other neurons?

If the connection is between two neurons, it is a neuron-to-neuron transmission, passing signals along the nervous system. If the connection is between a neuron and a muscle cell, it is called a neuromuscular junction, which controls muscle contraction.If the connection is between a neuron and a gland, it can regulate secretion, such as the release of hormones.

Left section: the yellow neuron connects via its axon terminal to another neuron (labelled as the green section in the picture).



Right section: The green terminal represents the end of the presynaptic neuron.
The yellow side represents the receptor area of the postsynaptic cell.
The presynaptic neuron releases neurotransmitters (shown as pink dots).
These neurotransmitters cross the synaptic cleft and bind to receptors on the postsynaptic neuron, transmitting the signal.

Describe the McCulloch and Pitts model of artificial neurons?

The **model** is the first computational model of a neuron, was proposed by Warren McCulloch (neuroscientist) and Walter Pitts (logician) in 1943.

The McCulloch and Pitts neuron aggregates the input signal and fires with the fixed signal, if the finally-accumulated signal reaches some threshold, and transmits the excitation over its output.

1）Inputs are binary (0 or 1).
2）Each input is aggregated (summed).
3）If the total input exceeds a **threshold**, the neuron “fires” and outputs **1**; otherwise, it outputs **0**.
Mathematical formula: $y=f(g)=1$ when $g \geq \theta$; otherwise, $y=f(g)=0$ with $g<\theta$