Synapse Encyclopedia Article

Synapse

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Synapse

A synapse is the junction between one neuron and another in the nervous system. It is via the synapses that neurons communicate. The synapse is a microscopic gap--as minuscule as 100nm--between the terminal endings of the first cell (the pre-synaptic neuron), and the dendrites of the adjoining cell (the post-synaptic neuron). This gap, called the synaptic cleft, contains extracellular fluids consisting of ions and degrading enzymes that are "taken up" as necessary by the pre- and post-synaptic neurons in order for them to transmit information effectively. The pre-synaptic terminals store different kinds of neurotransmitters in tiny capsules called synaptic vesicles; the post-synaptic dendrites are equipped with a multitude of receptors, each one designed to receive (or up-take) specific ions, proteins, or neurotransmitters. When an action potential in the pre-synaptic neuron travels down its axon and reaches the pre-synaptic terminals, a complicated electrochemical process causes the synaptic vesicles to burst open, releasing neurotransmitters into the synaptic cleft. Here they quickly accumulate and begin to bind to their appropriate receptor on the post-synaptic dendrites. These chemicals excite the post-synaptic neuron, stimulating an action potential in that cell, which causes it, in turn, to release neurotransmitters into the synaptic cleft between it and its adjacent neuron. Thus, the message is carried from neuron to neuron via the synapses to the target--for example, to muscles of the eye lid telling it to blink.