

The Learning Process

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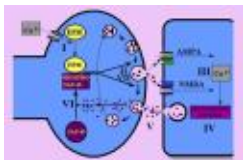
The learning process is very complicated and can be described as a special kind of memory.

The Process When an Aid Becomes a Movement

When a horse is asked to perform a movement electric impulses move from the location of the aid (touch of the skin) via receptors in the skin, to neurons connected to each other via synapses, through the spinal cord, to the horse's brain and then back again via neurons, axons and synapses to the muscles, which contract, allowing the horse to perform the movement we have asked for with the aid.

Skin receptor - neurons, axons and synapses - spinal cord - brain - spinal cord - neurons, axons and synapses – muscle

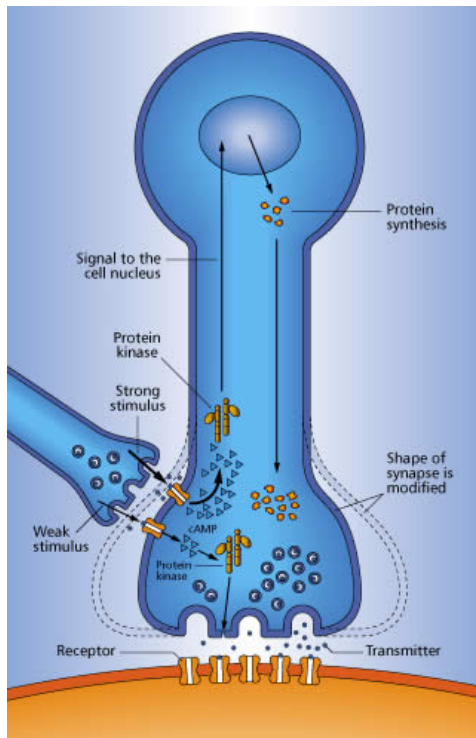
There are a lot of neurons involved in the whole process and they are connected via axons and synapses. Every time the electric signal passes via the axon, over the synapse to the next neuron it releases different substances which will pass the signal over the synapse to the next neuron.



A picture of a synapse and the substances necessary for transport of the electric signal over the synapse to the next neuron

Training

When the aids are repeated, the concentration of these substances in the synapse increases and the horse will answer the aid easier and quicker over time.



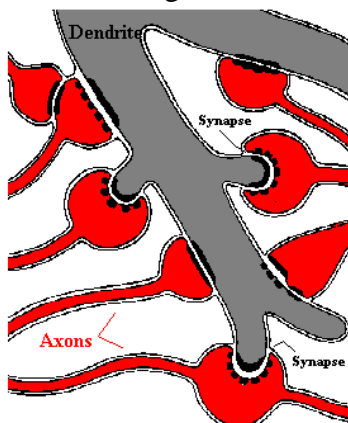
The picture shows how an electric signal starts the synthesis of new substances which are necessary for the transport of the signal over the synapse to the next neuron.

If you go too fast

If the education of the horse is too fast, the production of the substances in the synapse won't keep up with the use. The substances will then run out of stock which means that the horse can't learn anything more and you need to give the horse a break.

The break

The concentration of substances in the synapse will increase and the neurons and synapses which are used a lot will develop an extensive network of sprouts and synapses in the used area during the break. This adaptation will make the electric signal pass more effectively and quickly from the aid to the brain and back to the horse's muscle, and the horse has actually learned during the rest!



Learning; development of new sprouts and synapses with high concentration of substances in the synapse increase the speed of the transmission of the electric signal from the aid to the brain and back to the muscles. These sprouts are permanent.

Short-term memory is probably stored as electrical differences in the neurons and will go away if the signal does not come again. This is why we have to repeat and repeat and repeat again so the horse will build up a storage of substances and a network of neurons in the area involved in the aid and the movement.

Long-term memory is stored as new synapses with a higher concentration of substances necessary for transporting the electric signal over the synapses. When the horse does not use the neurons for a long time (years) the concentration of the substances will decrease but the new synapses will remain, so that's why a horse never forgets what he learned.