CONDUCTION OF IMPULSES THROUGH THE NERVOUS FIBERS

The conduction of impulses through the nervous fibers is performed according to the following laws:

- **The law of integrity of nervous fibers** - if a nervous fiber is cut, damaged, compressed or refrigerated (cooled); it can not conduct the nervous impulses (action potentials).
- **The law of isolated conduction** - the nervous fibers conduct exclusively and independently the nervous impulses; the excitation does not diffuse in the next adjacent fibers.
- **The law of indifferent conduction** - a nervous fiber which is excited at its middle, conducts the impulses in both direction, both orthodromic and antidromic. In nervous system, the synapses are those which direct the transmission of impulses in only one direction, from the presynaptic zone to the postsynaptic zone.
- **The law of in decremented conduction** - the amplitude of action potential does not decrease along the length of nervous fibers.

**Materials:** frog, frog board, pins, dissection kit, thread (black and white), a source of electric current, electric exciter, gloves.

**Procedure:** the frog is immobilized as in previous experiment. After that is fixed on the frog board with pins. A median section is made along the spine and another two perpendicular sections on it. The skin of the back is removed, together with the paravertebral muscles. With a scissor, the vertebral arches from the inferior part of spine are cut, without destroying the spinal cord. Anterior and posterior roots of spinal nerves are identified (the anterior root is thinner, the posterior one is thicker). On both roots are applied two ligatures, the proximal ligature (next to the spinal cord) with white thread and the other ligature (distally) with black thread. Ligatures should be made carefully, to not damage the roots. Each root is sectioned between the two ligatures, resulting four ends. Each end is excited with the electric current (using the electric exciter) and the response (muscular contraction) is noted. Only at excitation of the peripheral (distal) end of anterior root and central (proximal) end of posterior root, a motor response occurs.

**Interpretation:** in the constitution of a spinal reflex, the posterior root has the role of afferent pathway and the anterior root, the role of efferent pathway. The medullary reflex center (having one or several synapses) does not allow the passing / transmission of impulses only in a single way.