

DESCRIPTION FOR THE GENERAL PUBLIC

Perineuronal nets forming well-organized lattice-like structures, which were first described by Camillo Golgi in 1873. Perineuronal nets appear to play a beneficial role in synaptic stabilization and plasticity. There are plenty of data showing upregulation of perineuronal nets and their components after injury of central nervous system. Perineuronal nets create a barrier which limits neuronal plasticity and counteracts the regrowth of nerve fibers. These results encouraged us to verify if using (1) locomotor training, which stimulate whole spinal network and (2) selective electrical stimulation of peripheral nerve aiming stimulation of specific motoneurons, leads to perineuronal nets reorganization.

A great value of the project is use of comprehensive research on total spinal cord transection model. In the proposed project we can compare the effect of two experimental models of spinal cord circuit activation on changes in organization of perineuronal nets. Furthermore research includes perineuronal nets components- chondroitine sulfate proteoglycans, which are involved in the formation of glial scar after spinal cord injury, but also occur in large areas below the lesion site. Therefore I will investigate the localization and protein level of perineuronal nets components around motoneurons in lumbar segments.

In developed countries, also in Poland, progressive increase of the traffic leads to a increasing number of accidents, which often result in spinal cord injuries leading to permanent impairment of motor functions (paralysis of limbs, pareses, sensory disorders and lost of autonomic function control). They cause serious problems - not only personal, but also social and economic. Therefore very important task of neuroscience is to explore processes underlying motor dysfunction mechanisms and possible ways to limit it as it may serve implementation of new rehabilitative methods after spinal cord injury leading to improvement of the function of neuromuscular system. The use of proposed model of peripheral nerve stimulation may be of interest, as this type of stimulation can be applied in the clinic in non-invasive (percutaneous) way.