Extracellular matrix (ECM) is a collection of extracellular molecules, which are secreted by cells of every tissue and create environment. ECM is not only passive filler but also play important role in regulation of cell function. Peculiar feature of the brain ECM is the presence of perineuronal nets (PNNs) - specialized matrix reticular structures that create a dense mesh on the surface of some neurons. PNNs consist of polysaccharide (i.e. hyaluronic acid) and proteins. The role of PNNs remains unclear and it is a subject of intense research. It has been suggested that PNNs, enveloping the cell, hinder synapse terminals from reaching neuronal membrane and thereby new synapse can be only formed in meshes of the net. Therefore PNNs limit brain neuroplasticity, which is an ability to reorganize neuronal connectivity and change neuronal function under the influence of environmental stimuli or brain injury. In previous study our research group shown the decrease in PNNs number and density in short time after stroke in the perilesional and remote cortex as well as in homotopic contralateral regions, which was followed by restoration of PNNs structure. We suggest that the observed changes can promote conditions favorable for synaptic remodeling and restore brain function after stroke. As ECM is mainly composed of polysaccharide components, we hypothesize that the observed changes in PNN density are induced by activity of enzymes associated with polysaccharide metabolism – its synthesis and degradation. Our preliminary data indicate that the increase in mRNA expression level lasts longer than it was previously expected. Therefore enzyme activity-induced changes may be prolonged. Therefore we want to analyze later time points. It enables us to recognize time window for neuroplasticity changes after stroke and to identify enzymes regulating the process. We want to investigate not only changes in the mRNA expression level, but also protein localization, in the perilesional and in the remote area, as well as in the corresponding regions in contralateral intact hemisphere.