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Quantitative changes of Annexin and Syndecan in early Ischemic distant post conditioning of MCA occlusion in Rats

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Introduction: The Structural and functional integrity of the BBB (Brain-blood barrier) is determined by many mechanisms, including intercellular neurovascular interactions. Data on the participation of annexin and syndecan molecules in the mechanisms of brain recovery after stroke are few. The aim of the work is to reveal quantitative changes of annexin and syndecan molecules on the model of focal occlusive ischemia in postconditioning in the early post-stroke period.

Materials and methods: The Experiments were performed on sexually Mature male rats of Wistar stock weighing 220-250 g (nursery "Rappolovo" RAS, Leningrad region) (n=13). Experimental groups were formed: control (30 min. ischemia) (n=7) and a group with ischemia and multiple early ischemic postconditioning (n=6). Animals were anesthetized with chloral hydrate (450 mg/kg, intraperitoneal). Body temperature of the animals was maintained at 36.5-37.50 C with the help of heating table and monitored using a rectal sensor. Microsurgical introduction of the filament (Doccol, USA) introduced into the left middle cerebral artery (MCA) by Koizumi J. (1986) Method under an operating microscope (Carl Zeiss, Jena, Germany). During the operation, tissue blood flow was controlled by Lack-01 (LASMA, Russia). The duration of circulatory disorders in the basin of the left MCA (filamentous occlusion) in all cases was 30 minutes, then the filament was removed, and the time of subsequent reperfusion was 48 hours. The experiment used animals with a degree of blood flow reduction of more than 70 % of the original and the restoration of blood flow in the reperfusion period of more than 80 %. After the operation, the animals kept in a warm box to maintain body temperature until they came out of anesthesia.

Postconditioning was performed, starting from the first minutes of reperfusion, by briefly clamping the femoral artery on the symmetrical lower limb for 5 minutes 5 times every hour. Analysis of plasma protein content ANXA5 and SDC-1 analyzed by Enzyme-linked Immunoassay (ELISA) using a set of reagents (RayBiotech, USA) at a wavelength of 450nm on a flatbed spectrophotometer (Clariostar Plus, Germany).

Results: Analysis of plasma samples of animals with 30 min. ischemia showed the following results of the average concentration of annexin molecules (ng / ml): 41.3 ± 2.3 . For animal plasma samples with 30 min. ischemia and early distant ischemic postconditioning, this indicator was (ng / ml): 42.1 ± 4.9 . Analysis of animal plasma samples from 30 min. ischemia showed the following results of the average concentration of syndecan molecules (ng / ml): 41.4 ± 3 . For plasma samples of animals with 30 min. ischemia and early distant ischemic postconditioning, the indicated index was (ng / ml): $54.9 \pm 6^*$ ($p < 0.05$).

Conclusion: In a situation of ischemic/reperfusion brain damage, the syndecan molecule may be involved in restoring the permeability of the Blood-brain barrier, while annexin is a predictor of its damage. Both molecules are likely are involved in the formation of brain edema.

Biography

Maria Kolpakova is currently working as a Head of Pathophysiology Laboratory at Academic Institute for Biomedicine, Pavlov First Saint Petersburg State Medical University, St. Petersburg, Russia She has completed her Ph.D. at the Pavlov First Saint Petersburg State Medical University, St. Petersburg, Russia.

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