

CARNOSINE AS A NEUROPROTECTOR UNDER HYPERHOMOCYSTEINEMIC CONDITIONS

K. Kulebyakin, A. Boldyrev

Moscow State Department of Biochemistry, M.V. Lomonosov Moscow State University, Moscow, Russia

konstantin-kuleb@mail.ru

Homocysteine, sulfur-containing amino acid is an intermediate in methionine metabolism. High level of plasma homocysteine (hyperhomocysteinemia), caused by genetic disorders, nutrition features or environmental factors is a known risk factor for neurodegenerative diseases. One of the mechanisms of homocysteine toxicity results from its interaction with NMDA receptors. We have showed that activation of NMDA receptors of cerebellar granule cells by homocysteine causes long term activation of ERK 1/2, which cell perceives as a pro-apoptotic signal. Natural brain antioxidant carnosine (b-alanyl-histidine) modulates the time profile of ERK 1/2 activation in cerebellar granule cells stimulated by homocysteine and transforms it from long term to transient shape, which can switch on the anti-apoptotic mechanism(s). Such effect of carnosine underlies its neuroprotective action under hyperhomocysteinemic conditions. Thus carnosine can be used as a potent natural agent being able to prevent the neurodegenerative diseases associated with hyperhomocysteinemia, like Parkinson's disease and Alzheimer's disease.