Мы полагаем, что полученные данные могут стать основой для разработки терапевтических препаратов на основе L-карнозина для применения его в качестве нетоксичного эндогенного криопротектора для нервной ткани.

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Cryoprotective Characteristics of L-Carnosine Dipeptide (β-Alanyl-L-Histidine)

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The dipeptide (β-alanyl-L-histidine) is found in significant amounts in the muscles and brain of mammals, especially in the olfactory structures. L-Carnosine exhibits many protective effects when exposed to various cytotoxic factors on cells. We used slices of the rat olfactory cortex to study the cryoprotective characteristics of L-carnosine during cryopreservation (CP). Changes in the activity of N-methyl-D-aspartate receptors (NMDAR) were analyzed during registration of NMDA potentials induced by electrical stimulation of the lateral olfactory tract. Brain slices were preincubated with L-carnosine (20 mM) in solution, frozen (−10°C), and after a long CP (30 days) they were warmed up to 37°C and changes in the amplitudes of NMDA potentials were determined. It was found that the dipeptide optimized the pH of the freezing solution after CP and retained the activity of NMDAR, determined by the amplitude of NMDA potentials. L-Carnosine after CP contributed to the dehydration of excess free water from the slices. The dipeptide inhibited the development of glutamate excitotoxicity in brain slices during CP and maintained normal NMDAR functioning. The data obtained prove that L-carnosine exhibits the properties of an endogenous cryoprotector in the nervous tissue.

Keywords: L-Carnosine, cortical slices, NMDA receptors, focal potentials, freezing/thawing, cryopreservation