Enriched environment and spatial learning enhance hippocampal neurogenesis and salvages ischemic penumbra after focal cerebral ischemia.

許重義
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Abstract

Enriched environment (EE) has been shown to increase neurogenesis in the adult brain. The aim of this study is to determine the effect of EE and spatial learning on neurogenesis following ischemic stroke. Male adult SD rats were subjected to sham surgery or distal middle cerebral artery occlusion (MCAO). MCAO induced a transient increase followed by a sustained depression of progenitor cell proliferation and neuroblast production below baseline level in both ipsilateral and contralateral DG compared to sham. Increased neuronal differentiation and neurogenesis in the DG were observed in both sham and MCAO rats following 8 weeks in the EE combined with spatial learning, compared to rats housed in the standard environment. EE/Learning also restored the total number of neuroblasts in the DG after MCAO compared to sham. Furthermore, EE/learning enhanced the density of NeuN positive cells in the ischemic penumbra, though no new neurons were detected in this region.