

赵秀秀, 韩肖华, 张靖慧, 黄晓琳. 高频重复经颅磁刺激对大鼠脑梗死后学习记忆功能及pCREB、bcl-2、bax表达的影响[J]. 中国康复医学杂志, 2012, (12): 1087-1092

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基金项目: 教育部高等学校博士学科点专项科研基金(20090142110013); 国家自然科学基金(81071601); 国家自然科学基金(81171858)

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摘要:

**摘要** 目的: 研究高频重复经颅磁刺激(rTMS)对脑梗死大鼠学习记忆的影响, 并探讨其可能机制。方法: 采用大鼠中动脉栓塞再灌注方法建立脑梗死模型, 给予7d的20Hz重复经颅磁刺激治疗, 采用Morris水迷宫评定大鼠学习记忆功能变化, 并观察磁刺激组与模型组、给予阻滞剂H89与给予生理盐水(NS)组间蛋白激酶A-环磷酸腺苷反应元件结合蛋白(pCREB)、B细胞淋巴瘤/白血病基因2(bcl-2)、bcl基因相关蛋白(bax)的表达变化。结果: ①模型组大鼠与正常组相比逃避潜伏期明显延长(P=0.001), 磁刺激组逃避潜伏期较模型组大鼠明显缩短(P=0.017)。②磁刺激组的pCREB和bcl-2表达较模型组增加(P<0.01), bax则较模型组减少(P<0.01), bcl-2与bax的比值磁刺激组大于模型组(P<0.01)。rTMS+H89组的pCREB和bcl-2表达较rTMS+NS组降低(P<0.01), bax的表达则较rTMS+NS组增加(P<0.01), rTMS+H89组bcl-2与bax的比值较rTMS+NS组亦降低(P<0.05)。结论: 高频重复经颅磁刺激能够改善脑梗死后学习记忆功能并促进海马神经元的存活, 抑制凋亡; 磁刺激促进脑梗死后海马神经元存活的作用可能通过影响p-CREB通路的表达来实现。

**关键词:** [脑梗死](#) [重复经颅磁刺激](#) [学习记忆](#) [蛋白激酶A-环磷酸腺苷反应元件结合蛋白](#) [凋亡](#)

Effects of high-frequency repetitive transcranial magnetic stimulation on learning and memory of rats with cerebral infarction [Download Fulltext](#)

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Abstract:

**Abstract Objective:** To investigate the effects of high-frequency repetitive transcranial magnetic stimulation (rTMS) on learning and memory ability and its mechanism in rats with cerebral infarction. **Method:** Reperfusion model with middle cerebral artery occlusion (MCAO) was established. The rTMS of 20Hz was given to successful models for 7d. Learning and memory changes of rats were observed with Morris water maze. Expression changes of protein kinase A-cyclic adenosine monophosphate response element binding protein(pCREB), B cell lymphoma/Leukemia gene2(bcl-2) and bcl-2-associated protein X(bax) were investigated between model control group and rTMS group or blocker(H89) injection group and normal saline(NS) injection group. **Result:** ①The escape latency in model control group delayed more than that in blank control group(P=0.001). The escape latency in rTMS group decreased less than that in model control group (P=0.017). ②The pCREB and bcl-2 expressions in rTMS group increased more than that in model group (P<0.01). The bax expression in rTMS group decreased less than that in model group (P<0.01). The ratio of bcl-2 and bax (bcl-2/bax) in the rTMS group increased more than that in model group (P<0.01). The pCREB and bcl-2 expressions in blocker injection group decreased more than that in NS injection group(P<0.01). The bax expression increased in blocker H89 injection group more than that in NS injection group (P<0.01). The ratio of bcl-2 and bax (bcl-2/bax) in blocker H89 injection group reduced compared with that in NS injection group (P=0.02). **Conclusion:** The rTMS of 20Hz could promote hippocampus neuronal survival after cerebral ischemia and inhibit apoptosis. Its affect on the pathway of PKA-CREB might be one of the mechanisms.

**Keywords:** [cerebral infarction](#) [repetitive transcranial magnetic stimulation](#) [learning and memory](#) [PKA-CREB](#) [apoptosis](#)

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