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### 经颅磁刺激对帕金森病小鼠黑质区多巴胺能神经元及脑源性神经营养因子表达的影响 [点此下载全文](#)

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#### 摘要:

目的: 观察重复经颅磁刺激(rTMS)对帕金森病(PD)小鼠黑质多巴胺能神经元及脑源性神经营养因子(BDNF)表达的影响, 探讨其可能的作用机制。方法: 32只雄性C57BL/6J小鼠随机分为生理盐水(NS)、PD模型(PD)、假刺激(s-rTMS)及磁刺激(rTMS)组, 每组8只。后3组采用1-甲基-4-苯基-1, 2, 3, 6-四氢吡啶(MPTP)皮下注射建立PD小鼠模型。rTMS组鼠每天接受1 Hz、1 T的rTMS治疗(共5个序列, 25脉冲/序列), 疗程为2周。经rTMS干预后, 免疫组织化学检测黑质(SN)区酪氨酸羟化酶(TH)和BDNF的表达变化, 并借助图像分析系统进行定量分析。结果: PD组酪氨酸羟化酶免疫组化阳性(TH-ir)和BDNF免疫组化阳性(BDNF-ir)细胞计数、校正光密度值(CD)较NS组减少( $P < 0.01$ ); rTMS组TH-ir和BDNF-ir、CD值较PD组和s-rTMS组增加( $P < 0.05$ ); s-rTMS组与PD组间以上指标无统计学差异。相关分析显示黑质区TH-ir与BDNF-ir细胞计数呈正相关( $r = 0.949, P < 0.01$ ), 相应的CD值比较亦呈正相关( $r = 0.880, P < 0.01$ )。结论: rTMS对PD小鼠模型黑质多巴胺能神经元具有保护作用, 而上调黑质区BDNF的表达可能是其作用机制之一。

关键词: [磁刺激](#) [帕金森病](#) [黑质](#) [酪氨酸羟化酶](#) [脑源性神经营养因子](#)

Effect of transcranial magnetic stimulation on dopaminergic neurons and expression of brain-derived neurotrophic factor in substantia nigra of mouse with Parkinson's disease [Download Fulltext](#)

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#### Abstract:

Objective: To investigate the effect of repetitive transcranial magnetic stimulation(rTMS) on dopaminergic neurons and brain-derived neurotrophic factor(BDNF) in the substantia nigra(SN) of mouse with Parkinson's disease(PD), and to disclose the possible mechanisms. Methods: Thirty-two male C57BL/6J mice were equally randomized into normal saline(NS), sham-rTMS(s-rTMS), PD model and rTMS groups. PD model was established with 1-methyl-4-phenyl-1, 2, 3, 6-tetrahydropyridine(MPTP) in mice. The animals in rTMS group received 5 trains of 1 pulse/s for 25 s, at an intensity of 1 Tesla(T) daily for 2 weeks. After the treatment of rTMS, the changes in expression of tyrosine hydroxylase(TH) and BDNF in the SN of animals were observed by immunohistochemical technique; the quantitative analysis was performed by image analysis system. Results: Compared with NS group, the numbers of TH and BDNF immunoreactive(TH-ir and BDNF-ir) cells and the corrected optical density(CD) values in PD and s-rTMS group were significantly lower than those in the NS group(all  $P < 0.01$ ); the numbers in rTMS group were significantly higher compared with those in the PD and s-rTMS groups(all  $P < 0.05$ ); and the numbers were not significantly different between the s-rTMS and PD groups( $P > 0.05$ ). Correlation analysis showed a positive correlation between the count of TH-ir and BDNF-ir cells( $r = 0.949, P < 0.01$ ); and positive correlation was also noted between the CD values of TH-ir and BDNF-ir cells( $r = 0.880, P < 0.01$ ). Conclusion: It is suggested that rTMS has protective effects on dopaminergic neurons in the SN of PD mice, and the mechanism might be related to the up-regulation of BDNF expression.

Keywords: [magnetic stimulation](#) [Parkinson disease](#) [substantia nigra](#) [tyrosine hydroxylase](#) [brain-derived neurotrophic factor](#)

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