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Miconazole stimulates post-ischemic neurogenesis and promotes functional restoration in rats

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HIGHLIGHTS

- Miconazole could promote neurobehavioral recovery of rats after t-MCAO surgery.
- Miconazole could stimulate neuroregeneration in rat stroke model.
- Miconazole could increase the level of BDNF in the peri-infarct region after stroke.

ABSTRACT

Miconazole, a frequently used antifungal drug, has been identified with new functions to promote oligodendrocyte progenitor cells differentiation and to enhance remyelination. However, the neuroregenerative and therapeutic benefit of miconazole on ischemic stroke model have not been tested. In the present study, the effects of miconazole on a rat model of transient middle cerebral artery occlusion were evaluated. Rats received miconazole (10 mg/kg) or saline by intravenous administration for 7 days after stroke. A battery of neurobehavioral assessments, including rotarod test, open-field test, neurological severity score and novel object recognition task were evaluated. The results revealed a significant functional improvement in miconazole-treated rats compared with vehicle-treated control. Animals were sacrificed at 7 and 28 days after stroke. Double immunofluorescence staining for NeuN⁺/BrdU⁺, DCX⁺/BrdU⁺ and Nestin⁺/BrdU⁺ cells indicated miconazole significantly promoted neurogenesis. Western blotting analysis revealed miconazole upregulated the protein expression of brain derived neurotrophic factor, myocyte enhancer factor 2D, synaptophysin, and postsynaptic density protein 95, while downregulated the expression of cyclin-dependent kinase 5. Taken together, miconazole promoted functional recovery on ischemic stroke model via stimulating post-ischemic neurogenesis.

Keywords: Miconazole; Neuroregeneration; Ischemic stroke; Brain derived neurotrophic factor.

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