

# Chronic lithium treatment decreases NG2 cell proliferation in rat dentate hilus, amygdala and corpus callosum.

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## Abstract

An increasing number of investigations suggest volumetric changes and glial pathology in several brain regions of patients with bipolar disorder. Lithium, used in the treatment of this disorder, has been reported to be neuroprotective and increase brain volume. Here we investigate the effect of lithium on the proliferation and survival of glial cells positive for the chondroitin sulphate proteoglycan NG2 (NG2 cells); a continuously dividing cell type implicated in remyelination and suggested to be involved in regulation of neuronal signaling and axonal outgrowth. Adult male rats were treated with lithium for four weeks and injected with the proliferation marker bromodeoxyuridine (BrdU) before or at the end of the treatment period. Immunohistochemical analysis of brain sections was performed to estimate the number of newly born (BrdU-labeled) NG2 cells and oligodendrocytes in hippocampus, basolateral nuclei of amygdala and corpus callosum. Lithium significantly decreased the proliferation of NG2 cells in dentate hilus of hippocampus, amygdala and corpus callosum, but not in the molecular layer or the cornu ammonis (CA) regions of hippocampus. The effect was more pronounced in the corpus callosum. No effect of lithium on the survival of newborn cells or the number of newly generated oligodendrocytes could be detected. Our results demonstrate that in both white and gray matter brain regions implicated in the pathophysiology of bipolar disorder, chronic lithium treatment significantly decreases the proliferation rate of NG2 cells; the major proliferating cell type of the adult brain.

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