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# Functional and morphological effects of NG2 proteoglycan deletion on hippocampal neurogenesis.

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**Abstract**
NG2-expressing cells are the largest proliferating cell population in the adult central nervous system. The function of NG2 proteoglycan or NG2-expressing cells in the adult brain, however, is unknown. So far, NG2-positive cells are thought to be mainly oligodendrocyte precursor cells. This view was recently challenged when NG2+/CNP-EGFP-positive cells were identified as multipotent progenitor cells in the postnatal and adult CNS (e.g., [Belachew, S., Chittajallu, R., Aguirre, A.A., Yuan, X., Kirby, M., Anderson, S., Gallo, V., 2003. Postnatal NG2 proteoglycan-expressing progenitor cells are intrinsically multipotent and generate functional neurons. J. Cell Biol. 161, 169-186]). In addition, purified NG2-expressing progenitor cells, were shown to differentiate into neurons and astrocytes in vitro [Sellers, D.L., Horner, P.J., 2005. Instructive niches: environmental instructions that confound NG2 proteoglycan expression and the fate-restriction of CNS progenitors J. Anat. 207, 727-734]. In this study, we focus on the influence of NG2 ablation on neurogenesis in the hippocampus, where putative multipotent NG2-positive cells reside, and on hippocampus-dependent behavior using NG2 knockout mice. Using the thymidine analogue bromodeoxyuridine (BrdU) to label dividing cells in vivo we show that the number of BrdU-positive cells was unchanged in the hippocampus of NG2 knockout mice 1 day after a series of BrdU injections. This finding suggests that the proliferation rate of hippocampal progenitor cells is not influenced by NG2. A few BrdU-positive cells were found in deeper layers of the granule zone 1 day after a series of BrdU injections, which is different from the wild type. The presence and the phenotype of newborn hippocampal cells were studied 4 weeks after a series of BrdU injections. The survival and differentiation of BrdU-positive cells in NG2 knockout hippocampus did not significantly differ from wild-type mice. Concurrently, the water maze task did not reveal obvious differences compared to wild-type animals. These results suggest that the null mutation for NG2 does not influence adult hippocampal neurogenesis or hippocampal-dependent behavioral tasks.

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