

Altered cell turnover and synaptic plasticity in rat dentate gyrus after adrenalectomy  
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Removal of the rat adrenal hormone corticosterone results within 3 days in acceleration of apoptosis and proliferation of newborn cells in the dentate gyrus. A critical question that remains to be addressed is whether such a shift in the maturity of dentate cells after adrenalectomy affects synaptic efficacy. To address this question, male rats were adrenalectomized and synaptic potentiation was recorded in hippocampal slices as well as *in vivo*, in response to high frequency stimulation of the perforant path three days after adrenalectomy. At this time-point cell loss was assessed and proliferation was examined. Based on two independent parameters, bromodeoxyuridine and Ki-67, we found that removal of the adrenal glands increases proliferation rate. Moreover, this increase in proliferation was in particular evident in those animals that displayed cell loss after adrenalectomy. This shift to less mature cells in the dentate gyrus after adrenalectomy was accompanied by reduced synaptic potentiation, both when recorded *in vitro* and *in vivo*. Corticosterone replacement in adrenalectomized animals prevented adrenalectomy-induced proliferation, apoptosis and restored synaptic potentiation to control levels. Taken together, our results indicate that a shift to less mature cells after adrenalectomy is accompanied by a reduction in synaptic efficacy.

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Neuroscience poster 2