3-O-E3-2 Oral Sessions

The role of neurotrophin-3 in the hippocampal neurogenesis and maturation-related phenotypes

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We have previously shown that various types of antidepressant treatments cause profound changes in maturation-related phenotypes of neurons in the hippocampal dentate gyrus (DG) of adult mice. Comprehensive gene analysis in the DG of antidepressant-treated mice, the expression of neurotrophin-3 (NT-3) mRNA is the most prominently reduced. In order to investigate the contribution of NT-3 reduction in the hippocampal function, NT-3 was knocked down specifically in the hippocampal dentate gyrus using an adeno-associated virus with artificial microRNA. Compared with the control group, hippocampal NT-3 KD mice showed dendrite elongation and increased density of immature neurons in the DG. It was also found that the expression of calbindin, a mature neuronal marker, was decreased in the granule cell layer of DG. Furthermore, the protein level of brain-derived neurotrophic factor (BDNF), which is known to increase with antidepressant treatment, increased in the DG. These results suggest that changes in hippocampal function due to NT-3 reduction are partly consistent with changes in hippocampal function due to antidepressant treatment.