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The effects of thyroid hormone (T3) on the differentiation of neural stem cells

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It is reported that thyroid hormone (T3) can regulate the development of oligodendrocytes and the formation of myelin sheath, but it is unclear about the mechanisms. The inhibitor of DNA binding 2 (Id2) plays an important role during the development of brain. We compared the expression of Id2 being affected by T3 with controls during the course of anterior subventricular zone (SVZa) neural stem cells (NSCs) differentiation *in vitro*. The results showed that there were an intense Id2 expression in control proliferative SVZa NSCs, and Id2 expression were decreased in the differentiated cells at 48 h differentiation, then it increased at 7 days again. T3 can promote the differentiation of SVZa NSCs, at the same time, the Id2 were expressed less intensively. T3 increased the number of CC-1 positive oligodendrocytes and decrease the number of GFAP positive astrocytes. Both Id2 and CC-1 positve cells in T3 inductive group were more than in the control. It inferred that T3 can promote the differentiation of SVZa NSCs into oligodendrocytes and maybe function through Id2 pathway. (This is supported by natural science foundation of China 30572364)

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Expression and estrogen effects of steroid receptor coactivator-1 in the postnatal mice brain

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Steroid receptor coactivator-1 (SRC-1) has been reported to be involved in the motor dysfunction and delayed development of cerebellar Purkinje cells, suggesting a crucial role of SRC-1 in the brain. To further address the role that SRC-1 plays in the brain, we studied its distribution in the female mice brain using immunohistochemical technique. Our results showed this coactivator is widely distributed in the brain; the highest expression was detected in the hippocampus especially the dentate gyrus, the cerebral cortex especially the piriform cortex, and cerebellar Purkinje cells. High level of expression was found in basal forebrain, and some specific nuclei of hypothalamus (medial preoptical, ventromedial hypothalamus, arcuate, supraoptic), central nuclear of inferior colliculus, comparatively low level of expression was found in the midbrain, some nuclei of the thalamus. While most of the positive materials were localized in the cell nucleus, we still found some extra-nucleus immunostaining in some area of the midbrain. We also noticed the expression of SRC-1 decreased with ageing, since the expression in the postnatal day 7 brains was higher than in the adult, and ovriectomy dramatically decreased the expression in the hippocampus. We concluded that SRC-1 may exert multiple functions in the brain, especially in the hippocampus. The high level of SRC-1 in the hippocamus indicates a pivotal role in mediating estrogen/ER-β regulation to the synaptic plasticity, learning and memory.