

The influence of different sub-type delta opioid receptors in nerve growth factor-induced neuronal differentiation in rat pheochromocytoma PC12 cell

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Abstract

The impairment of neuronal differentiation for long-term opioid drug-exposed infants is a serious problem and there are several speculated mechanisms. We have previously reported that altering the endogenous delta opioid receptor by long-term interaction with its antagonist augmented the nerve growth factor (NGF)-induced neuronal differentiation of rat pheochromocytoma PC12 cells. In this study using subtype-specific antagonist, we present data showing further that type 2 delta opioid receptor (delta(2)-DOR) is the receptor on the PC12 cells participating in the progression of neuronal differentiation upon NGF-stimulation. Unlike the delta(2)-DOR, alteration of type 1 DOR (delta(1)-DOR) activity by delta(1)-DOR-specific antagonist appeared to be toxic for the PC12 cells. The different influence of the subtypes of delta opioid receptors in the neuronal differentiation of the PC12 cells suggests that each subtype of opioid receptor may trigger different biological activities in vivo.