

The negative influence of endogenous opioid receptor activity on the differentiation of the rat pheochromocytoma PC12 cells induced by nerve growth factor.

Yeh GC, Hsieh TH, and Chang SF

Abstract

We determined the effect of naloxone and morphine on the differentiation of pheochromocytoma cell, the PC12 cells, induced by nerve growth factor (NGF). PC12 cells were grown in medium containing NGF with or without the addition of naloxone or morphine for up to 10-day treatments. NGF-induced morphological differentiation of PC12 cells was manifested by an increase in the percentage of differentiated cells and the average length of neurite per cell. Co-addition of morphine with NGF did not affect both parameters as compared to that of NGF alone. On the contrary, co-addition of naloxone with NGF significantly increased the percentage of differentiated cells, but did not affect the outgrowth of neurites. This effect of naloxone was reversed by the addition of morphine, suggesting that naloxone produced its effect by inhibiting the endogenous activity of opioid receptor. This study indicates a significant functional role of opioid receptor in NGF-induced differentiation of PC12 cells.