D127

Inhibition of gonadotropin-releasing hormone (GnRH) gene expression by buserelin, a GnRH agonist in hypothalamic GT1-1 neuronal cells

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Autocrine communication is involved in the regulation of the gonadotropin-releasing hormone (GnRH) neuronal activity. To elucidate whether an ultrashort loop feedback mechanism may operate at the level of GnRH gene expression, we examined the effect of buserelin, a potent GnRH analog, on GnRH mRNA levels in hypothalamic GnRH neuronal cells (GT1-1). GnRH mRNA level was significantly decreased by treatment with buserelin in a dose-dependent manner: a significant inhibition was observed at the concentration of buserelin higher than 5μM. Time course experiment showed that a significant decrease in GnRH mRNA level was observed at 12 hr and further decreased up to 48 hr. In a pulse-chase experiment of buserelin treatment, short-term exposure of buserelin (10μM) to the GT1-1 neuronal cells at least for 15 min was enough to exert its inhibitory effect. However, as did in chronic treatment, a 12 hr incubation time after buserelin removal was required for sufficient inhibition of GnRH mRNA level. These data indicate that buserelin rapidly induced inhibition of GnRH mRNA level, which was long-lasting. To examine the possible involvement of de novo synthesis and/or mRNA stability by buserelin, actinomycin D (5μg/ml), a potent RNA synthesis blocker, was co-treated with buserelin. Actinomycin-D alone failed to alter GnRH mRNA level, but partially blocked buserelin-induced decrease in GnRH mRNA level at 12 hr. Cycloheximide (50μg/ml) failed to affect buserelin-induced suppression of GnRH mRNA level. These data indicate that de novo synthesis maybe not heavily involved in buserelin-induced inhibition of GnRH mRNA, but mRNA degradation may be the case, mRNA stability may be regulated by unidentified gene (or gene products).

D128

Dopamine D_1 and D_2 receptor mRNAs are expressed in the villous core stem cells of rat placenta.

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The presence of dopamine(DA) in the human placenta had already been described in the late 1970's. However, the role of DA in placental development is not confirmed. The purpose of this study was to determine the distribution of dopamine receptor mRNAs and to search the role of dopamine in the fetal angiogenesis of the placenta. Expression of DA D_1 and D_2 receptor mRNAs was studied by *in situ* hybridization histochemistry, using radiolabeled cRNA probes. DA D_1 and D_2 receptor mRNAs were identified in the cell clusters within the Labyrinth zone of rat placentas. Cytological localization of dopamine receptor in the villi was identified to the angiogenic stem cells and they are detected in the fetal blood vessels according to the placental development. Chorioallantoic placenta was the source of a variety of different proteins functionally related to placental angiogenesis, which include the vascular endothelial growth factor(VEGF), endothelin 1 and 3, and heat shock protein 70. Our results suggest that DA might be one of the factors which regulate the development of fetal placental vessel through DA D_1 and D_2 receptor in the rat placenta.