STUDIES ON THE REGULATION OF PROLACTIN AND LUTEINIZING HORMONE SECRETION USING CULTURED RAT ANTERIOR PITUITARY CELLS

By

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10/28/82
Date

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ABSTRACT

STUDIES ON THE REGULATION OF PROLACTIN AND LUTEINIZING HORMONE SECRETION USING CULTURED RAT ANTERIOR PITUITARY CELLS

MICHAEL T HOEFER

Hormone release from the anterior pituitary is controlled by changes in hypothalamic secretion of releasing/inhibiting hormones and by changes in cellular responsiveness to these hormones. Both components are modified by feedback regulation by gonadal steroids. The objectives were to: 1. characterize a pituitary cell culture system for studying the control of PRL and LH release, 2. determine the brain sites involved with PRL secretion, 3. measure pituitary responsiveness to dopamine (DA) inhibition of PRL release and LH-releasing hormone (LRH) stimulation of LH release and 4. analyze the effect of estrogen treatment *in vivo* and *in vitro* on cell responsiveness to DA and LRH. Cells were dispersed with trypsin and optimal conditions were determined in terms of cell density, culture length, and short term incubation length. Inhibition of PRL release was observed with hypothalamic as well as posterior pitutary extracts and a dopaminergic mechanism of action is proposed at both sites. Basal PRL release from cells of male rats was less than that from cells of pregnant or lactating rats and they were also significantly less responsive to DA and LRH.

During the estrous cycle the most distinct changes in responsiveness were observed from cells obtained at 1300 and 1700h of proestrus. Sensitivity to DA increased and that for LRH decreased during this short period. In vivo estrogen treatment of ovariectomized (ovex) rats decreased the in vitro responsiveness of cells to DA but had no effect on the LRH response. Threatment of cells from ovex rats with estrogen in vitro significantly increased the response to LRH and decreased that of DA.

These studies suggest that changes in anterior pituitary responsiveness to hypothalamic hormones is an important component in the regulation of pituitary function. Estrogen appears to play a significant role in modifying pituitary responsiveness. This aspect of hormone regulation should be considered in the general scheme of hormone release from the anterior pituitary under different physiological conditions.

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