

Undesired changes caused by long term estrogen treatment in the immunoreactivity of LH, FSH, PRL, ACTH and S-100 (present in folliculostellate cells) is modified by concomitant progesterone administration

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Sexual steroids regulate the secretion of pituitary trop hormones acting directly on the pituitary gland and through the central nervous system by feed-back mechanisms. Estrogen and progesterone receptors were identified on various pituitary hormone secreting cells and in several hypothalamic and extrahypothalamic structures. In the clinical practice long term estrogen treatment is frequently applied in both male and female patients. The aim of our experiment was to study the effect of concomitant progesterone (P) administration on changes caused by long term estrogen treatment in the secretion of LH, FSH, PRL, ACTH and on the changes of S-100 (present in folliculostellate cells) immunoreactivity tested by RIA and immunohistochemistry in Sprague-Dawley male and female rats. Estrogen (diethylstilbestrol, DES) P or both in a silastic capsule were implanted under the skin of 25 day-old rats. The survival of animals were two months. The animals were decapitated in the morning, trunk blood was used for RIA and the anterior pituitary for immunohistochemistry. We have also studied whether the changed hormone secretion caused by DES can return to normal level 1 or 2 months after the removal of DES containing capsule. The following results were obtained. In the vaginal smear of female rats upon DES treatment persistent estrus was observed. DES+P did not interrupt the cyclicity but it was irregular and metestrus predominated. P alone had no effect. LH: DES depressed the basal level of LH in both female and male rats, and P did not modify the effect of DES. It was more pronounced in female than in male rats. FSH: DES and DES+P very moderately influenced the basal level of FSH in female rats and both treatment depressed it in male rats. PRL: DES dramatically enhanced the PRL levels and the effect of DES+P was much lower than that of DES alone. P did not influence the effect of treatments, in both female and male rats it showed similar tendency. ACTH: Effect of various treatment on ACTH plasma levels was very similar to their effect on the PRL levels. DES enhanced the ACTH level in both sexes, P blunted this effect. P alone did not influence the ACTH level. Immunohistochemistry supported the abovementioned results. The number of LH and FSH immunoreactive cells decreased in the anterior pituitary, the changes in the ACTH immunoreactivity was not striking, the number and the size of PRL immunoreactive cells extremely increased, they formed prolactinomas. The distribution of S-100 immunoreactive folliculostellate cells is characteristic. In intact rats these cells were evenly distributed and they formed a barrier at the border of anterior and intermediate lobes. In DES treated rats this distribution is modified. Folliculostellate cells were hardly observed inside the prolactinomas; however, these cells demarcated the prolactinomas. The effect of removal of DES capsule on the plasma hormone levels: The removal of DES capsule 2 months after implantation gradually restored the changed LH, FSH and PRL levels by the end of the succeeding 2 month survival time. Two months after removal we had results similar to the intact aged matched controls. ACTH remained higher in female rats, and in male rats it was much higher 1 month after removal and returned to intact level 2 months later. On the basis of the abovementioned results it was concluded that 1. There is sexual dimorphism in the responsiveness of gonadotropes and corticotropes to steroid treatment. 2. P blunted the enhancing effect of DES on the PRL and ACTH levels. However, its effect on the case of LH and FSH was not significant. 3. After the removal of DES its effect is partially restored. LH, FSH and PRL returned to intact level; however, ACTH remained higher by the end of 2 month survival time.

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