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Orchiectomy in young rats results in differential regulation of follicle-stimulating hormone and luteinizing hormone content

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While it is generally accepted that GnRH stimulates release of pituitary gonadotropins, it is not clear what regulates synthesis. The orchiectomized immature rat, with sustained high plasma levels of LH and FSH, provides an opportunity to study how gonadotropin biosynthesis responds to loss of the gonad. We have measured plasma and pituitary LH and FSH in castrate and sham operated rats after orchiectomy at 15, 30, 45, and 60 days of age. Plasma FSH and LH concentrations by RIA were markedly elevated in castrates within one to three days after castration, and they remained elevated in all groups. By contrast, pituitary content measurements revealed differences between the two gonadotropins: while LH content in castrates consistently exceeded that in controls, FSH content in castrates was lower. Pituitary LH excess was evident by seven to ten days after castration. The pituitary FSH deficit in younger animals was similarly apparent by seven to ten days. In the older groups, however, FSH content decreased as early as three days, but returned toward normal by 21 days. In orchiectomized young rats, pituitary LH is elevated, but FSH content is depressed. This discrepancy is delayed, but more marked, in younger rats. In view of sustained high plasma levels after castration, our findings imply differential regulation of synthesis, processing, or storage of the two gonadotropins.

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