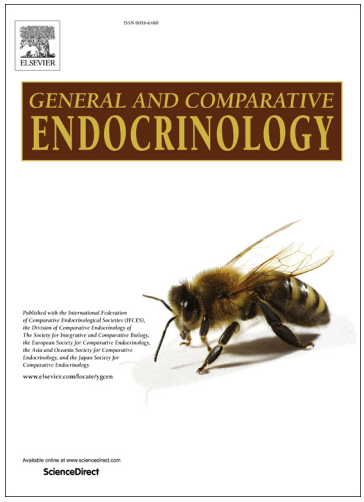

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Higher growth rate and gene expression in male zebra finch embryos are independent of manipulation of maternal steroids in the eggs

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Abstract

Sexual dimorphism in prenatal development is widespread among vertebrates, including birds. Its mechanism remains unclear, although it has been attributed to the effect of maternal steroid hormones. The aim of this study was to investigate how increased levels of steroid hormones in the eggs influence early embryonic development of male and female offspring. We also asked whether maternal hormones take part in the control of sex-specific expression of the genes involved in prenatal development. We experimentally manipulated hormones' concentrations in the egg yolk by injecting zebra finch females prior to ovulation with testosterone or corticosterone. We assessed growth rate and expression levels of CDK7, FBP1 and GHR genes in 37 h-old embryos. We found faster growth and higher expression of two studied genes in male compared to female embryos. Hormonal treatment, despite clearly differentiating egg steroid levels, had no effect on the sex-specific pattern of the embryonic gene expression, even though we confirmed expression of receptors of androgens and glucocorticoids at such an early stage of development. Thus, our study shows high stability of the early sex differences in the embryonic development before the onset of sexual differentiation and indicates their independence of maternal hormones in the egg.

Keywords

Maternal effects, Testosterone, Corticosterone, Gene expression, Sexual dimorphism, Avian embryos