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Inhibitory Effect of Melatonin on Formation of the Chicken Primordial Follicles

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Abstract

Melatonin plays pivotal roles in controlling photoperiod-related circadian rhythm and regulating the functions of diverse target tissues as a hormone or an antioxidant agent. However, there is little evidence to demonstrate that melatonin is able to regulate the early ovarian development in the chicken. Here we investigated effects of melatonin on the developmental process from ovarian germ cells to primordial follicles in the chicken. Melatonin was administered from the Day 12 of the embryos till Day 6 of the chicks at 1-100 pg/day. Treatment with melatonin (100 pg/day) induced a decrease of germ cell cysts and follicles number, and the ovarian cortex thickness. In addition, melatonin suppressed the ovarian cells proliferation that was demonstrated by decreased proliferation cell nuclear antigen expression and germ cell marker *Dazl* protein. Furthermore, melatonin increased the expression of hypothalamic gonadotropin-inhibitory hormone (*GnIH*) mRNA, but decreased the expression of all mRNAs of hypothalamic gonadotropin-releasing hormone (*GnRH*) II, pituitary follicle stimulating hormone (*FSH*)- β and ovarian FSH receptor, luteinizing hormone (LH) receptor, estrogen receptors α and β , progesterone receptor, steroidogenesis enzymes *Cyp19a1* and *3 β HSDII*. These data indicated that melatonin might inhibit the ovarian germ cells number via suppression of the hypothalamus-pituitary-ovarian axis in the chicken, subsequently resulting in the inhibition of primordial follicles formation.

Key words: Chicken, Germ cell, Hypothalamus-pituitary-ovarian axis, Melatonin, Primordial follicle



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