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Melatonin Reduces Androgen Production and Upregulates Heme Oxygenase-1 Expression in Granulosa Cells from PCOS Patients with Hypoestrogenia and Hyperandrogenia

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Abstract

Background/aims: Polycystic ovary syndrome (PCOS) is an endocrine disorder characterized by abnormal hormone levels in peripheral blood and poor-quality oocytes. PCOS is a pathophysiological syndrome caused by chronic inflammation and oxidative stress. The aim of this study was to investigate the mechanism of melatonin regulation on androgen production and antioxidative damage in granulosa cells from PCOS patients with hypoestrogenia and hyperandrogenia.

Methods: Cumulus-oocyte complexes were collected from PCOS patients who had low levels of estrogen in follicular fluids.

Results: Melatonin triggered upregulation of cytochrome P450 family 19 subfamily A member 1 (CYP19A1) expression via the extracellular signal-regulated kinase pathway in luteinized granulosa cells. As a result, conversion of androgen to 17β-estradiol was accelerated. We also found that melatonin significantly reduced the levels of inducible nitric oxide (NO) synthetase and NO in luteinized granulosa cells. Levels of transcripts encoding NF-E2-related factor-2 and its downstream target heme oxygenase-1 were also increased, leading to anti-inflammatory and antioxidant effects. We also found that melatonin could improve oocyte development potential.

Conclusion: Our preliminary results showed that melatonin had a positive impact on oocyte quality in PCOS patients with hypoestrogenia and hyperandrogenia.

Figures

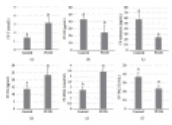

Figure 1 Low levels of melatonin were...

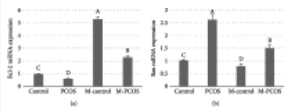

Figure 2 Effect of melatonin on expression...

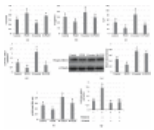

Figure 3 Effect of melatonin on CYP19A1...

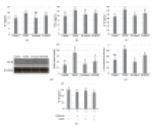

Figure 4 Effect of melatonin on inflammatory...

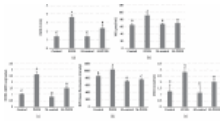

Figure 5 Effect of melatonin on oxidative...

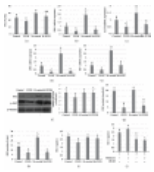

Figure 6 Effect of melatonin on HO-1...

All figures (8)

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