

# Abstract

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## **Oxidative stress impairs oocyte quality and melatonin protects oocytes from free radical damage and improves fertilization rate.**

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**OBJECTIVE:** We investigated the relationship between oxidative stress and poor oocyte quality and whether the antioxidant melatonin improves oocyte quality.

**METHODS:** Follicular fluid was sampled at oocyte retrieval during in vitro fertilization and embryo transfer (IVF-ET). Intrafollicular concentrations of 8-hydroxy-2'-deoxyguanosine (8-OHdG) in women with high rates of degenerate oocytes were significantly higher than those with low rates of degenerate oocytes. As there was a negative correlation between intrafollicular concentrations of 8-OHdG and melatonin, 18 patients undergoing IVF-ET were given melatonin (3mg/day), vitamin E (600Mg/day) or both melatonin and vitamin E

**RESULTS:** Intrafollicular concentrations of 8-OHdG and hexanoyl-lysine adduct were significantly reduced by these antioxidant treatments. One hundred and fifteen patients who failed to become pregnant with a low fertilization rate (< or =50%) in the previous IVF-ET cycle were divided into two groups during the next IVF-ET procedure; 56 patients with melatonin treatment (3 mg/day) and 59 patients without melatonin treatment. The fertilization rate was improved by melatonin treatment compared to the previous IVF-ET cycle. However, the fertilization rate was not significantly changed without melatonin treatment. Oocytes recovered from preovulatory follicles in mice were incubated with H<sub>2</sub>O<sub>2</sub> for 12 hr. The percentage of mature oocytes with a first polar body was significantly reduced by addition of H<sub>2</sub>O<sub>2</sub> (300 microm). The inhibitory effect of H<sub>2</sub>O<sub>2</sub> was significantly blocked by simultaneous addition of melatonin.

**CONCLUSION:** In conclusion, oxidative stress causes toxic effects on oocyte maturation and melatonin protects oocytes from oxidative stress. Melatonin is likely to improve oocyte quality and fertilization rates.

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