INVESTIGATION OF THE EFFECT OF MELATONIN HORMONE APPLIED DURING IN VITRO OOCYTE MATURATION ON HEAT STRESS IN SHEEP AT THE WHOLE GENOME EXPRESSION LEVEL

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THESIS ABSTRACT

The study aims to investigate the effect of melatonin hormone applied during in vitro maturation in sheep on heat stress at the embryonic development and whole genome expression level. The effect of melatonin hormone on embryonic development and morphology in sheep oocytes under heat stress, and the expression levels of maturation-related genes were evaluated. Melatonin hormone at a concentration of 10^{-7} M was added to the maturation medium at different temperatures. While melatonin showed an effect at the division and morula stages under heat stress, a significant decrease was observed at the blastocyst stage. When examining the effects of melatonin on various gene expressions in oocytes during the maturation stage, the levels of anti-apoptotic genes (BAX, Bcl2), cumulus and cytoplasmic maturation (PTX3, HAS2, EGFR, FSHR, LHR), and mitochondrial functions, it was observed that there were increases and decreases in apoptosis factors, maturation, and mitochondrial functions (SIRT1, AKT2, Polg2) across all experimental groups.

This study has highlighted the importance of adding melatonin to the in vitro maturation medium and concluded that the concentrations used play an effective role in embryonic development.

APPLICATION AREAS OF THE THESIS RESULTS

With the knowledge and experience gained from our study, it is believed that significant benefits can be achieved in advancing in vitro embryo production practices in sheep, accelerating genetic progress and breeding, and raising animals with high breeding value, as well as more successfully achieving IVM of sheep oocytes.

ACADEMIC ACTIVITIES

1. AKTAR, A., TOKER, M.B., KOCA, D., UZUN, U.C., ALÇAY, S. (2024). The effect of supplementation of vitamin D to the egg-yolk extender on cryopreservation of ram semen. Veterinary Medicine and Science.

KEY WORDS

- ✓ IVF
- ✓ MELATONIN
- ✓ HEAT STRESS
- ✓ GENE EXPRESSİON
- ✓ OXİDATİVE STRESS
- ✓ ANTİOXİDANT

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