Effect of cryopreservation in the imprinting pattern of gametes

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PROJECT PROPOSAL
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INTRODUCTION
Assisted Reproductive Technology (ARTs) is the technology that includes all fertility treatments in which both eggs and sperm are handled according to Centers for Disease Control and Prevention. This concept includes treatments as fertility medication, artificial insemination, in vitro fertilization and surrogacy. However, some studies report an increased incidence of imprinting disorders due to the use of ARTs.

In particular, cryopreservation and the consequent thawing of the gametes is a widely employed procedure in fertility techniques. It is known that cryopreservation causes structural and functional alteration in gametes, and is supposed to cause DNA alterations and epigenetic mutations. This is due to the effect of both toxic cryopreservatives and stress for the technique that could disturb the activity of DNA methyltransferases (DNMT1), which establish methylations marks such as imprinting.

OBJECTIVES
1. Perform a comparative analysis of the methylation pattern of Ndn, Moge2, Mkn3, Ube3A and Kcnin9 genes of mouse oocytes vitrified and non-cryopreserved.
2. Perform a comparative analysis of the methylation pattern of Ndn, Moge2, Mkn3, Ube3A and Kcnin9 genes between fresh sperm, and frozen and thawed sperm.

STATISTICAL ANALYSIS
Each experiment will be repeated 3 times. Statistical analyses between cryopreserved and non-cryopreserved gametes will be done using unpaired Student’s t-test; P < 0.05 will be considered statistically significant. Statistical significance for multiple tests will be corrected using the Bonferroni correction.

METHODS

STAGES AND DEVELOPMENT OF TASKS

EXPECTED RESULTS

TRANSLATIONAL RELEVANCE OF THE PROJECT
This project will offer us information that will allow us to perform other future projects as:
- The effect of cryopreservation in the imprinting pattern of mice embryos.
- The effect of cryopreservation in the imprinting pattern of human gametes and embryos.

Assuming that all this research will show us the implication of gamete and embryo cryopreservation on imprinting diseases, we will be able to develop a platform of preimplantational or prenatal diagnosis.

Also it could provide us information about Birk-Barel disease which has been recently described and it is caused by imprinting defects in Kcnin9 gene.

REFERENCES

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