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SUMMARY OF PROPOSED RESEARCH
(Do not exceed the space provided)

Describe clearly and concisely, in language readily understandable to a biomedical scientist who may not be a specialist in the research project's field, the broad objectives, specific aims, general procedures, and the potential significance of the research.

Project Summary

Assisted reproductive techniques (ART) provide an invaluable means of conception for couples suffering from infertility. However, the pregnancy rates have remained disappointingly low. A large number of oocytes can be recovered from an individual, and as many as 60-65 % can undergo fertilization. However, while in culture, a majority of embryos undergo a development arrest. Potentially poor embryo quality and subsequent selection may attribute to poor pregnancy rates.

Arrest of embryonic development *in vitro* could be either due to a lack of specific culture conditions or the presence of undesirable culture conditions (1). In the oviduct and uterine environment, the early mammalian embryo is exposed to a much lower oxygen tension than *in vitro* (2). Despite these shortcomings, some embryos do proceed to the implantation stage. While there are multiple studies exploring the role of ROS in embryo culture (3, 4), the impact of follicular ROS on oocyte maturation and fertilization is unknown.

Excessive amounts of ROS, increased rate of lipid peroxidation, and reduced quantities of antioxidants play a role in the pathology of male infertility (5). The role of these parameters in the follicular fluid and their subsequent impact on early mammalian development is not known. We postulate that the follicular fluid environment of the oocytes may play a critical role in the subsequent development of the embryo. In this study, follicular fluid samples will be collected from women undergoing assisted reproduction with *in vitro* fertilization (IVF) or intracytoplasmic sperm injection (ICSI). ROS, lipid peroxidation, total antioxidant concentration (TAC), and DNA fragmentation of the oocytes, will be compared in women who achieve pregnancy versus those who do not.

This is a significant study as it examines the role of ROS and antioxidants for the first time in humans at the level of the oocyte environment. The follicular environment may provide prospective information on the quality of the subsequent embryos. It may help in the development of a simple but effective therapy such as antioxidant supplementation, thereby improving the pregnancy rates.

Please provide five Key Words that best describe your project:

- (1) Follicular Fluid (2) Oocyte (3) Reactive Oxygen Species
(4) Total Antioxidant Capacity (5) Pregnancy