

## SUMMARY OF PROPOSED RESEARCH

Please provide five Key Words that best describe your project:

- (1). Spermatozoa (2). antioxidants (3). L Carnitine  
(4). Centrifugation, (5). Cryopreservation

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

#### Project summary

Sperm quality plays a crucial role in reproduction. In recent years, a number of studies have documented the role of sperm chromatin integrity as one of the major cause of infertility. Factors that may be involved in the etiology of sperm DNA damage are oxidative stress and apoptosis. Semen centrifugation and semen cryopreservation-thawing are two techniques which are routinely used in andrology and assisted reproductive technology (ART) laboratories. Freezing of spermatozoa may affect sperm motility, morphology, DNA integrity, mitochondrial activity and viability. Reactive oxygen species (ROS) production is reported to increase during centrifugation and semen cryopreservation. This leads to oxidative stress and sperm DNA damage. Sperm DNA from infertile patients exhibit more DNA damage and its ability for DNA denaturation is significantly higher than fertile donors. Sperm DNA from infertile patients is more liable to DNA damage during intervention techniques like centrifugation or cryopreservation. LC is known to have a potent antioxidant effect and it can antagonize apoptosis that can result in sperm DNA damage. In a recent study done by our group, LC was able to antagonize a high concentration of hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) in in-vitro cultured mouse embryos. In addition we showed that LC was effective in antagonizing the apoptotic effect of actinomycin-D. Our study aim is to examine the extent of sperm DNA damage before centrifugation or cryopreservation and to see the beneficial effect of LC in reducing this damage. The potential significance of our study is that protecting the sperm DNA from the damaging effect of centrifugation or cryopreservation by LC may improve sperm quality, result in higher success rates per ART cycles, reduce number of ART cycles needed and be cost-effective.