

Abstract CRU lunch seminar November 7, 2018: “Use of hydrocolloids for cryopreservation of human semen”

Semen cryopreservation is a technique widely used combined with other reproductive biotechniques, such as artificial insemination (IA) and *in vitro* fertilization (IVF), for both animals and humans. However, this process usually decreases the survival and fertilizing ability of mammalian spermatozoa due to the formation of intra- and extracellular ice crystals as well as thermal shock due to abrupt changes in temperature. Within this context, several substances may be added to extenders and improve the results currently obtained. Gums are hydrocolloids/ polysaccharides acting as energy reserves in some plants, being extracted from roots, tubers, stems, seeds and tissues. They are low cost composts, odorless, tasteless and nontoxic, being widely used in the pharmaceutical, cosmetic and food industries, especially in the latter for their ability to reduce the formation of ice crystals in frozen food. Due to their physio-chemical characteristics, agar and guar gums bind to water molecules in the extracellular medium and may interfere with the dynamics of ice crystal formation, limiting the availability of water molecules and, therefore, the appearance of ice crystals. In addition, these substances can bind to plasma membrane lipids, preventing their efflux and then contributing to the maintenance of cellular integrity. Therefore, these hydrocolloids have characteristics that classify them as potential external cryoprotectants and their addition to the cryopreservation extender may lead to improvements in post-thaw sperm quality. This study aimed to verify the effects of the addition of gums guar and agar to human semen for cryopreservation. The samples were analyzed regarding motility, vitality, morphology, plasma and acrosome membrane integrity, mitochondrial activity. After cryopreservation, agar gum showed an improvement in sperm morphology when compared to a commercial cryoprotectant (TYB® - Freezing Medium Test Yolk buffer, Irvine Scientific, USA) and was similar to fresh samples (before cryopreservation). Guar gum showed better integrity of plasma and acrosome membranes than TYB®. These results demonstrated that agar and guar gums are potential cryoprotective agents and can be successfully used in cryopreservation of human semen. However, further testing are still needed to improve the process.

Visiting researcher Isabel B. Lima-Verde, Department of Clinical Sciences, SLU