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## Noninvasive embryo assessment technique based on buoyancy and its association with embryo survival after cryopreservation

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**Statement of the Problem:** The use of assisted reproductive technologies (ARTs) is becoming mainstream procedure with human fertility clinics and commercial animal production programs. Previous research from this laboratory has demonstrated a Specific Gravity Device (SGD) can be used to assess embryo quality and predict embryo future growth potential. To maximize the efficiency of these programs, cryopreservation of embryos and oocytes is necessary. However, a limitation to ARTs is the demand for improved methods to estimate embryo and oocyte quality, viability and survival of cryopreservation. The purpose of this study was to determine if a non-invasive SGD could predict these properties.

**Methodology & Theoretical Orientation:** One-hundred-sixty-nine mouse blastocysts were dropped through SGD and frozen using Global Blastocyst Fast Freeze<sup>\*</sup> Kit. All embryos were stored in liquid nitrogen for a minimum of two weeks and then thawed according to protocol. Embryos were dropped through SGD post-thaw and hatching from zone pellucida was used to determine viability. To study SGD efficacy in determining oocyte viability, 266 mouse oocytes were assessed with SGD and randomly assigned to one of four treatments: exposure to 60 C, acidified media, ethylene glycol-glycerol cryoprotectant for 1 h, or standard culture to serve as control. Oocytes were evaluated again through SGD 1 h after treatment.

**Findings:** There was a significant difference in blastocyst post-thaw descent times in viable blastocysts from those that were non-viable (P<0.05). Oocytes assigned to lethal treatments had significantly different post-treatment descent times from controls (P<0.05).

**Conclusion & Significance:** SGD can be used to predict embryo and oocyte viability and survival of cryopreservation. Reduced freezing of non-viable oocytes and embryos will save time and money during cryopreservation techniques. Also, the ability to detect which embryos survive cryopreservation will improve pregnancy rates from ARTs.

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