MEASURING MEDIA OSMOLALITY DURING EMBRYO CULTURE: COMPARISON BETWEEN A G185 INCUBATOR AND GERI TL WITH AND WITHOUT HUMIDITY

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ABSTRACT

Introduction: Embryo culture media are designed based on physiological osmolality such as human oviduct fluid (Baltz, 2012). Human embryos can develop over a wide range of osmolality however a negative impact on embryo development has been demonstrated once 300mOsm/kg is reached. (Hadi, 2005). A study by Swain et al looked at the effects of humidifying an incubator on controlling the increase of osmolality in the culture media and found that without humidification culture media exceeds 300mOsm/kg by 168 hours.

The increasing interest in time lapse technology implies the non-disturbed culture of embryos and therefore an inability to change media exposing embryos to a potentially changing culture environment. However, recent developments in time lapse technologies have developed incubators with better environmental control.

Methods: A G185 bench-top incubator and a Genea GERI time lapse incubator were used in this study. The GERI TL has the option to add specifically designed water bottles to each chamber to add humidity. The GERI TL incubator had three humidified and three un-humidified chambers. Culture dishes were made using a new bottle of media and initial media osmolality was assessed and then measurements were made from culture dishes in the three incubators at 24, 48, 72, 96, 144 and 168 hours.

Results: Osmolality levels in the G185 incubator increased over time approaching 300mOsm/kg at 168 hours. Levels in the GERI time lapse incubator were more controlled and the addition of humidity in the GERI TL resulted in even more stable osmolality.

Conclusions: Osmolality levels increase less quickly in the GERI TL incubator than the G-185 unit even without humidification, which could be attributable to a newer design with tighter sealed chambers. However the addition of specifically designed water bottles to the GERI TL stabilizes the osmolality which did not exceed 275mOsm/kg.

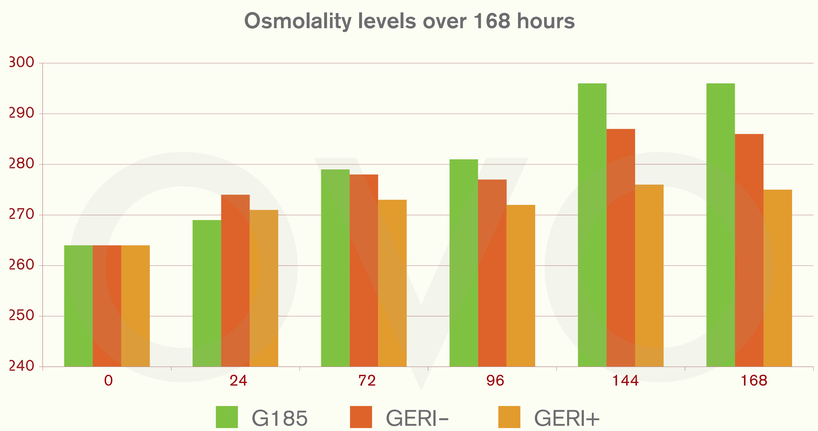
OBJECTIVE

The aim of the study was to analyse the effect of using undisturbed culture on the osmolality of the culture media and if the addition of humidity chambers to this undisturbed culture system improves stability.

METHODS

A standard non humidified bench-top incubator was compared to a non humidified time lapse incubator. In addition humidification chambers were added to the time lapse incubator to assess additional stability. Osmolality measurements were made at 24, 48, 72, 96, 144 and 168 hours post dish production to simulate days of embryo development in the laboratory.

RESULTS



CONCLUSIONS

Modern time lapse incubation systems are constructed to benefit long term uninterrupted culture with tightly sealed chambers rather than gravity sealed hinge doors as seen on many bench top incubators. This design aspect, potentially along with others, could explain improved environmental control as seen with better osmolality stability over the course of a time period equating to that of embryo development, as seen in an IVF cycle.

Furthermore the addition of specially designed humidity chambers appears to maintain osmolality levels with very little increase across this same time period.

The importance of the stability of environmental conditions of embryo culture are well established. Being able to ensure that environmental factors such as osmolality are maintained within optimal ranges is essential to maximize the potential of a patient's embryos.

REFERENCES

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