New IVF Media affect Blastocyst Development and Gene Expression Levels in in vitro Produced Bovine Embryos

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Introduction
Most media used for in vitro production of bovine embryos have to be supplemented with various compounds prior to use in the IVF laboratory. This is time-consuming and increases the risk of inconsistent media batches.

We have tested a novel in vitro maturation (IVM), Bo-IVM and in vitro culture (IVC), Bo-IVC media (two new commercially available “Ready To Use” media from EmbryoTrans Biotech ApS (Denmark)) vs. standard IVM and IVC media TCM199 and SOF, respectively, from GMH Minilab (Germany).

The performance of the media were evaluated as:
- Embryo development as blastocyst rates, morphology and kinetics.
- Gene expression levels of 8 genes associated with critical processes and developmental competence of the embryo.

Materials and Methods

Maturation (IVM)
Cumulus oocyte complexes aspirated from slaughterhouse ovaries were randomized in two groups and matured for 22 hours in either Bo-IVM or TCM199 (+0.5% BSA, +1% MSG, +1IU MG) (T:38.8, 5.5% CO2, 21%O2).

Fertilization (IVF)
Oocytes maturation was evaluated as expansion of cumulus cells. For fertilization both groups were treated equally with media from EmbryoTrans Biotech. Sperm was washed in Bo-Semenhepg, and all oocytes fertilized in Bo-IVO medium for min. 19 hours (T:38.8, 5.5% CO2, 21%O2).

Culture (IVC)
The presumptive zygotes were randomized to culture in either Bo-IVC or SOF (+0.5%BSA) for 7 days (T:38.8, 5.5% CO2, 5%O2).

Results

Oocyte Maturation
Cumulus oocyte complexes matured in Bo-IVM in general displayed more abundant cumulus expansion and viscoelasticity than their counterparts matured in TCM199.

Blastocyst Development, Kinetics and Morphology

Blastocysts cultured in the Bo-IVC medium gave significantly higher blastocyst rates and yielded more embryos of the highest quality and most advanced development.

Gene Expression Levels

The Bo-IVC medium significantly altered gene expression levels of most genes tested. A two way ANOVA revealed a significant effect of culture media on 7 out of 8 genes.

Conclusion

The combination of Ready to Use Bo-IVM and Bo-IVC media increased blastocyst rates, kinetic and morphology scores compared to blastocysts produced in a combination of TCM199 and SOF.

Blastocyst cultured in Bo-IVC medium had an increased gene expression, compared to blastocysts cultured in SOF medium.

Acknowledgements: This study was supported by GIFT project consortium (www.gift.ku.dk) which is funded by the Danish Council for Strategic Research