



257 DIFFERENCES BETWEEN *BOS TAURUS* AND *BOS INDICUS* EMBRYOS: TRANSCRIPTS AMOUNTS

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- ▶ Issue Contents
- ▶ Abstract
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Abstract

The Zebu breeds (*Bos indicus*) are different from European breeds (*Bos taurus*) in some aspects of their reproductive physiology, including follicle recruitment, number of follicular waves, and oocyte ultrastructure. On the other hand, embryos produced *in vivo* and *in vitro* show morphological and developmental differences, which can be related to culture environment. The aim of this study was to evaluate the effect of breed (Gyr v. Holstein) within embryo production system (*in vivo* and *in vitro*), as well as effect of production systems within breeds on relative abundance of transcripts related to formation, survival, and subsequent development of blastocysts, such as those involved in water and small solutes transport (Aquaporins 3 and 11), blastocoel formation (Na⁺/K⁺-ATPase $\alpha 1$ and $\beta 2$), and cellular stress response (Peroxiredoxin 1). For *in vivo* embryo production, donors were superstimulated with FSH and inseminated, and embryos were recovered 7 days after AI. For *in vitro* embryo production, oocytes recovered by ovum pickup were *in vitro* matured and fertilized and then cultured for 7 days in culture medium under 5% CO₂ at 38.5°C. For each group, blastocysts ($n = 15$) distributed in 3 pools were used for RNA extraction (RNeasy MicroKit, Qiagen, Valencia, CA, USA), followed by RNA amplification (Messageamp II amplification kit, Ambion-Applied Biosystems, Foster City, CA, USA) and reverse transcription (SuperScript III First-Strand Synthesis Supermix, Invitrogen, Carlsbad, CA, USA). The cDNA were submitted to real-time PCR, using the H2a gene as endogenous control, and analyzed by REST© software. To evaluate breed effect within the production systems, 2 comparisons were performed: (1) *in vivo*: Gyr v. Holstein and (2) *in vitro*: Gyr v. Holstein, considering Holstein data as 1.00. To evaluate production system effect within breeds, 2 comparisons were performed: (1) Gyr: *in vivo* v. *in vitro* and (2) Holstein: *in vivo* v. *in vitro*, considering *in vivo* produced embryo data as 1.00. The results are shown as mean \pm SEM. For *in vivo* comparison between breeds, Aquaporin 3 (1.66 ± 0.77), Na⁺/K⁺-ATPase $\alpha 1$ (1.61 ± 0.56), and Peroxiredoxin 1 (1.61 ± 0.66) were up-regulated ($P < 0.05$) in Gyr embryos when compared with Holstein embryos, whereas for *in vitro* comparison, no differences ($P > 0.05$) were found. For comparisons between production systems within breeds, only Peroxiredoxin 1 (0.31 ± 0.39) was down-regulated ($P < 0.01$) in *in vitro* produced Gyr embryos when compared with *in vivo* counterparts. No differences ($P > 0.05$) were found between production systems for the Holstein breed. In conclusion, these data suggest that there is a difference on gene expression between *Bos taurus* and *Bos indicus* blastocysts, but such difference between breeds can be attenuated by the *in vitro* production system, indicating an embryo adaptation to the *in vitro* culture conditions. The data also suggest that the *in vitro* production system can influence the amount of transcripts in Gyr embryos. Other genes should be evaluated for a better understanding of these differences.

Financial support was provided by CNPq and FAPEMIG.

Reproduction, Fertility and Development 22(1) 285–286 doi:10.1071/RDV22n1Ab257
Published: 08 December 2009

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4981
P.158



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Table of Contents



Reproduction, Fertility and Development Volume 22 Number 1 2010

Proceedings of the Annual Conference of the International Embryo Transfer Society, Córdoba, Argentina, 9–12 January 2010
Full Papers and Abstracts for Poster Presentation

IETS 2010 author index

pp. 383-393
[PDF \(112 KB\)](#)

IETS 2010 abstracts

pp. 159-381
[PDF \(3.5 MB\)](#)

Recipient of the 2010 IETS Pioneer Award: Reuben John Mapletoft, DVM, MSc, PhD

pp. xxxv-xxxviii
[PDF \(185 KB\)](#)

Coordinated regulation of follicle development by germ and somatic cells

Mario Binelli and Bruce D. Murphy
pp. 1-12
[Abstract](#) | [Full Text](#) | [PDF \(1.3 MB\)](#)

Mammalian oocyte development: checkpoints for competence

Trudee Fair
pp. 13-20
[Abstract](#) | [Full Text](#) | [PDF \(208 KB\)](#)

Is the zona pellucida an efficient barrier to viral infection?

A. Van Soom, A. E. Wrathall, A. Herrier and H. J. Nauwynck
pp. 21-31
[Abstract](#) | [Full Text](#) | [PDF \(525 KB\)](#)

Towards the use of microfluidics for individual embryo culture

R. L. Krisher and M. B. Wheeler
pp. 32-39
[Abstract](#) | [Full Text](#) | [PDF \(341 KB\)](#)

Challenge testing of gametes to enhance their viability

Henrik Callesen
pp. 40-46
[Abstract](#) | [Full Text](#) | [PDF \(169 KB\)](#)

Applications of RNA interference-based gene silencing in animal agriculture

Charles R. Long, Kimberly J. Tessanne and Michael C. Golding
pp. 47-58
[Abstract](#) | [Full Text](#) | [PDF \(244 KB\)](#)

Effects of gamete source and culture conditions on the competence of *in vitro*-produced embryos for post-transfer survival in cattle

Peter J. Hansen, Jeremy Block, Barbara Loureiro, Luciano Bonilla and Katherine E. M. Hendricks
pp. 59-66
[Abstract](#) | [Full Text](#) | [PDF \(270 KB\)](#)

Bovine embryo transfer recipient synchronisation and management in tropical environments

Pietro S. Baruselli, Roberta M. Ferreira, Manoel F. Sá Filho, Luiz F. T. Nasser, Carlos A. Rodrigues and Gabriel A. Bó
pp. 67-74
[Abstract](#) | [Full Text](#) | [PDF \(305 KB\)](#)

Pregnancy recognition and abnormal offspring syndrome in cattle

C. E. Farin, W. T. Farmer and P. W. Farin
pp. 75-87
[Abstract](#) | [Full Text](#) | [PDF \(286 KB\)](#)

Delivery of cloned offspring: experience in Zebu cattle (*Bos indicus*)

Flávio V. Meirelles, Eduardo H. Birgel, Felipe Perecin, Marcelo Bertolini, Anneliese S. Traidi, José Rodrigo V. Pimentel, Eliza R. Korninou, Juliano R. Sangalli, Paulo Fantinato Neto, Mariana Tikuma Nunes, Fábio Celidonio Pogliani, Flávia D. P. Meirelles, Flávia S. Kubrusly, Camila I. Vannucchi and Liege C. G. Silva

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