

Biopsied and vitrified bovine embryos viability is improved by *trans10*, *cis12* conjugated linoleic acid supplementation during in vitro embryo culture

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Abstract

Bovine embryos cultured in serum-containing media abnormally accumulate lipids in the cytoplasm. This is well known to contribute to their higher susceptibility to cryopreservation and biopsied embryos are even further susceptible. We aimed to improve in vitro produced (IVP) embryos resistance to micromanipulation and cryopreservation by supplementing serum-containing media with *trans-10*, *cis-12* conjugated linoleic acid (*t10*, *c12* CLA). The effect of *t10*, *c12* CLA on lipid deposition and embryonic development was also tested. After in vitro maturation and fertilization (TVF day = D0), zygotes were cultured on granulosa cells + M199 + 10% serum + 100 μ M GSH supplemented with 100 μ M of *t10*, *c12* CLA (CLA group, $n = 1394$) or without supplementation (control group, $n = 1431$). Samples of D7/D8 embryos were observed under Nomarsky microscopy for lipid droplets evaluation while others were biopsied and vitrified (group B-Control, $n = 24$; group B-CLA, $n = 23$). Non-biopsied embryos were also frozen (group NB-Control, $n = 49$; group NB-CLA, $n = 45$). Biopsied cells were used for embryo sex determination. Postwarming embryo survival and viability were determined at 0 and 24 h of culture, respectively. Supplementation of *t10*, *c12* CLA did not influence cleavage, embryo sex ratio, D7/D8 embryo rate or morphological quality. CLA embryos had higher number of small lipid droplets ($P \leq 0.003$) and a smaller ($P < 0.001$) fat embryo index being leaner ($P = 0.008$) than control embryos. Embryo postwarming survival was higher in B-CLA than in B-control group ($95.0 \pm 7.0\%$ versus $62.5 \pm 7.9\%$; $P < 0.001$). After 24 h of culture, the viability (expansion rate) of biopsied embryos and nonbiopsied embryos, cultured with *t10*, *c12* CLA was higher than control

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