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Effect of Sperm Heat Stress on Embryo Development in Cattle

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Heat stress to bovine oocytes and embryos has suggested a potential role of retardation of their development. Limited study has reported on the effect of heat shock on sperm before using it for IVF. Caudal epididymal sperm cultured in 42℃ incubator for 0.5, 1 and 2 h compared on sperm viability and oocyte development after its use for IVF to those of control. Oocytes were matured for 22 h and then inseminated with treated or control sperm for 16 h. Embryos were cultured in CR1aa medium, transferred to TCM199+10% FBS on day 4, and maintained on day 9. A higher proportion (84.1%, 0.5 h; 72%, 1 h; 65%, 2 h) in treated sperm was observed dead and abnormal pattern as 100% of consider as control. In control the rates of cleavage and development into blastocyst were 76% and 22%, respectively, and did not differ the rates between 1 h and 2 h of culture. Significant differences were appeared in the rates between treated for an hour and control (32% and 5% vs. 54% and 10%, respectively). Moreover increased time of culture is more retardation to be cleaved the oocytes. However, the rates of blastocyst from cleaved embryos in treated group similar to control (25% vs. 29%, respectively). The reason for this remains unclear, but male sperm, from preliminary experiment (data un-shown) for sexing of resulting embryos, would be more fragility on heat stress.

(Key words) heat stress, sperm, embryo, bovine

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