



Comparison of hybrid and purebred in vitro-derived cattle embryos during in vitro culture

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Abstract

Frozen-thawed spermatozoa collected from a beef bull (Japanese Black) were used for in vitro fertilization (IVF) of matured oocytes obtained from dairy (Holstein) and beef (Japanese Black) females. Embryos were examined for fertilization, cleavage rate, interval between insemination and blastocyst production (experiment I), total cell number per embryo and sex ratio during blastocyst formation (experiment II), and blastocyst production rate of zygotes that developed to 2-, 4-, and 8-cell stages at 48 h post-fertilization (experiment III). Fertilized oocytes were cultured in vitro on a cumulus cell co-culture system. The fertilization and cleavage rate of oocytes groups were similar, however, the blastocyst production rate was greater ($P < 0.05$) in hybrid than from purebred embryos (27% versus 20%). Development of blastocysts produced from hybrid embryos developed at a faster rate than blastocysts produced from the straightbred embryos. In hybrid embryos, blastocyst production was significantly greater on day 7 (56%) and gradually decreased from 20% on day 8 to 17% on day 9. In contrast, blastocyst production rate from the purebred embryos was lower on day 7 (17%), increasing on day 8 to 59% and then decreased on day 9 to 24%. The total number of cells per embryo and sex ratio of in vitro-produced blastocysts were not different between hybrid and purebred embryos. The number of blastocysts obtained from embryos at the 8-cell stage of development by 48 h post-fertilization (94%) was greater ($P < 0.01$) than the number of zygotes producing blastocysts that had developed to the 4-cell stage (4%) and the 2-cell stage (2%) during the same interval. These results show that the blastocyst production rate and developmental rate to the blastocyst stage were different between hybrid and purebred embryos, and that almost all of

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