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Comparison of Sexing Analysis between Karyotyping and Blasomere-PCR in Bovine embryos

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Accurate analysis of nuclear status is needed when biopsied-blastomeres are used for embryo sexing. In this study, the nuclear status of blastomeres derived from 8- to 16-cell stage IVF bovine embryos was analyzed to evaluate the representative of single blastomere for embryo sexing. When 55 embryos were analyzed by PCR following biopsy, the coincident rate of sex determination between biopsied-single blastomere and matched blastocyst by PCR was 80 %. Karyotyping of blastomeres in 8- 16-cell stage bovine embryos was conducted to assess chromosome status of IVF embryos. To establish karyotyping of blastomeres, concentrations of vinblastine sulfate and duration of exposure time for metaphase plate induction with 8- to 16-cell stage bovine embryos were tested. The most effective condition for induction of metaphase plate (>45%) was 1.0 $\mu g/m\ell$ vinblastine sulfate treatment for 15 h. In 22 embryos under the condition, only 8 embryos out of ten that had a normal diploid chromosome complement showed a sex-chromosomal composition of XX or XY (36.4%) and 2 diploid embryos showed mosaicism of the opposite sex of XX and XY in blastomeres of embryo (9.1%). One haploid embryo contained only one X-chromosome (4.5%). Four out of the other 11 embryos having a mixoploid chromosomal complement contained haploid blastomere with wrong sex chromosome (18.2%). These results suggeted that morphologically normal bovine embryos derived from IVF had considerable proportion of mixoploid and sex-chromosomal mosaicism which could be the cause of discrepancies of the sex between biopsied-single blastomere and matched blastocyst by PCR analysis.

Key words) ***Bovine embryo, Sex-chromosome, Mosaicism, Sexing, PCR***