DEVELOPMENT OF A SINGLE BLASTOMERE FROM A DIPLOID 8–CELL MOUSE EMBRYO INJECTED INTO THE PERIVITELLINE SPACE OF A TETRAPLOID 4–CELL EMBRYO

Takahiro TAGAMI

Department of Theriogenology,
Faculty of Veterinary Medicine,
Hokkaido University, Sapporo 060, Japan

This study aimed to produce identical offspring from one diploid 8–cell stage mouse embryo, using the technique of injecting a blastomere from the 8–cell stage embryo into the perivitelline space of a tetraploid 4–cell stage embryo. Initially the capability of diploid-tetraploid aggregated embryos to produce offspring was investigated. Thereafter, the capability to produce offspring from one blastomere of a diploid 8–cell embryo injected into a tetraploid 4–cell embryo was examined. The presence of cells originating from the tetraploid embryo was also examined by glucosephosphate isomerase–1 (GPI–1) analysis.

The offspring obtained from aggregation had the features of diploid embryos. Five of 6 offspring which were analyzed by GPI did not show chimerism.

From 93 to 98 percent of tetraploid 4–cell embryos which received a blastomere from an 8–cell embryo developed to normal blastocysts, while 10 to 11 percent of embryos transferred to recipient mice developed into young (n=24), including 2 sets of triplets and 6 sets of twins. Only 1 of 7 mature offspring exhibited the coat color of a chimera, while the other 6 offspring presented the coat color derived from diploid embryos. However, GPI–1 analysis showed that all of 7 offspring examined were chimeras. Of these, 3 mature mice had normal reproductive ability.

This study demonstrates that it is possible to obtain identical offspring with a diploid phenotype by injecting a single blastomere from an 8–cell embryo into the perivitelline space of a tetraploid 4–cell embryo. However, it seems difficult to obtain offspring which are not chimeras.