

Developmental competence of immature and failed/abnormally fertilized human oocytes in nuclear transfer.

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Public Summary:

Scientific Abstract:

Somatic cell nuclear transfer holds great promise for basic studies of reprogramming human somatic cells and for the potential development of novel cell-based therapeutics. The aim of this study was to examine experimental aspects of human nuclear transfer via use of an abundant source of oocytes, those that are routinely discarded from assisted reproduction clinics. The results suggest and reinforce several findings based on the analysis of multiple parameters: first, it was observed that supplementation of commercial culture media with hormones promoted embryo development after parthenogenetic activation. Second, the use of the chemical activation reagent puromycin resulted in significant differences in cleavage rates in oocytes that were failed/abnormally fertilized after intracytoplasmic sperm injection relative to those from IVF ($P < 0.05$). Third, cycloheximide promoted cleavage rates $\geq 40\%$ in both groups of oocytes; moreover, two blastocysts were produced following cycloheximide treatment. Finally, the use of a subset of oocytes for nuclear transfer resulted in cleaved embryos that expressed green fluorescent protein from a transgene in donor nuclei from human embryonic stem cells. In light of these results, it is suggested that the discarded oocytes can be used to investigate new human nuclear transfer protocols for embryonic stem cell derivation.

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