Comment on "Molecular Correlates of Primate Nuclear Transfer Failures"

Robert Lanza, *et al.*

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TECHNICAL COMMENT

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We believe that Simerly *et al*. (*1*) have reported important new data but have overstated their conclusions. Their preliminary observations highlight the importance of egg quality—centrosome and spindle competence, specifically—in nuclear transfer (NT) procedures. However, the data are scant and their interpretation is compromised by the multiplicity of methods used. In our own experience, multiple factors including donor and recipient cell cycle stage and oocyte age can influence the integrity of the spindle complex. Simerly *et al*. buttressed their claim that primates are unique in the specific absence of NuMA (nuclear-mitotic apparatus protein) or HSET based only on immunofluorescence. However, one cannot conclude from these data that the oocyte was depleted of these proteins—only that they were not detected where expected using the techniques described. The occurrence of abnormal spindles has long plagued NT in most species, and few comparable immunocytochemical studies have been reported to support the conclusion that failed spindle complexes in other species would not lack those markers as well. More comprehensive investigations of NT-induced centrosome-spindle perturbations will reveal the true impact of these manipulations on the efficiency of NT on a species-by-species basis.

Simerly *et al*. transferred only 33 rhesus embryos into 16 surrogates and concluded that reproductive cloning in primates may be unachievable. In a related news article (*2*), the senior author of (*1*) stated that it is almost as if someone "drew a sharp line between old-world primates—including people—and other animals, saying, 'I'll let you clone cattle, mice, sheep, even rabbits and cats, but monkeys and humans require something more.' " In our own hands, it took dozens of embryos to generate Dolly (*3*), more than 150 embryos to generate the first cloned mouse pup (*4*),and 586 embryos to establish the first two pregnancies in pigs (*5*). Hundreds of other studies have ended with no pregnancies at all. We suggest that given the potential importance of nuclear transfer techniques in human cell therapies, conclusions regarding the efficiency of human NT extrapolated from animal data should be tempered with abundant caution.

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References
1. C. Simerly *et al*., *Science* **300**, 297 (2003).
2. G. Vogel, *Science* **300**, 225 (2003).
3. I. Wilmut, A. E. Schnleke, J. McWhir, A. J. Kind, K. H. S. Campbell, *Nature* **385**, 810 (1997).
4. Y. Chung, unpublished data.
5. I. A. Polejaeva *et al*., *Nature* **407**, 86 (2000).

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