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In Vivo Development of Vitrified Rat Embryos: Effects of Timing and Sites of Transfer to Recipient Females

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In cryopreserved rat embryos, survival rates obtained *in vitro* are not always consistent with the rates obtained *in vivo*. To determine the optimal conditions for *in vivo* development to term, rat embryos at the 4-cell, 8-cell and morula stages were vitrified in EFS40 by a 1-step method and transferred into oviducts or uterine horns of recipients at various times during pseudopregnancy. Vitrified and fresh 4-cell embryos only developed after transfer into oviducts of asynchronous recipients on Day -1 to -2 of synchrony, i.e., at a point in pseudopregnancy that was 1-2 days earlier than the embryos. However, although about half the vitrified embryos transferred into oviducts on Day -1 developed to term, only a minority of embryos transferred at later times did so, whether vitrified (10-34%) or fresh (24-33%), suggesting that this may not be the most suitable stage for cryopreservation. Very few 8-cell embryos, either vitrified or fresh, developed when transferred into oviducts on Day 0 to -0.5. However, when transferred into uterine horns, high proportions of vitrified 8-cell embryos (~63%) developed to term in reasonably synchronous recipients (Day 0 to -0.5) but not in more asynchronous ones (6%; Day -1). A majority of vitrified morulae also developed to term (52-68%) in a wider range of recipients (Day 0 to -1), the greatest success occurring with recipients on Day -0.5. Similar proportions of vitrified and fresh 4-cell embryos, 8-cell embryos and morulae developed to term when there was appropriate synchronization between embryo and recipient. Thus vitrification of preimplantation stage rat embryos does not appear to impair their developmental potential *in vivo*.

Key words) *Developmental stage, Embryo transfer,Rat, Vitrification*