Vitrification and warming of donor oocytes using a closed straw system

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Introduction:
Vitrification has emerged as a possible alternative to slow freezing for human oocytes. This technology uses high cooling rates and high concentrations of cryoprotectants to overcome the problems of ice formation, and sensitivity to temperature and ionic balance that have made oocytes so difficult to freeze reliably.

Objective:
Using oocytes of the highest quality, this study assessed the ability of vitrification in a closed system to preserve oocytes without any loss in quality or developmental potential.

Materials and Methods:
Five oocyte donors were recruited to participate in the study. All 5 had a history of oocyte donation where high numbers of oocytes were retrieved, good embryo quality was achieved and 1 or more pregnancies resulted. Following controlled ovarian hyperstimulation, oocytes were retrieved from each donor and all oocytes were vitrified within 2 hours from the time of retrieval. Cumulus cells were removed from the oocytes which were then vitrified using cryotips and cryopreservatives from Irvine Scientific (Santa Ana, CA). Each cryotip was loaded with a single oocyte and stored in liquid nitrogen until warming. Recipients typically received 6-8 oocytes from one donor, which were warmed and subjected to ICSI 4 hours later. Transfer of resulting embryos was performed on day 3 or 5 post warming depending on embryo number and quality.

Results:
Two of the donors had very high oocyte numbers (38 & 39) and these oocytes did not tolerate the vitrification procedure (see table, donors 2 &3). The other 3 donors yielded oocytes that performed well after warming and have to date established 5 pregnancies in 5 recipient cycles, with approximately enough oocytes remaining in storage for a further 3 recipient cycles. For the 3 donors with lower oocyte numbers (donors 1, 4,&5) the number of implantations per embryo transferred (7/10) is comparable to that seen in fresh cycles.

Donor #	Oocytes	Recipient #	Embryos transferred	Pregnancy outcome
1	19	1	3	Singleton delivered
		2	2	SAB
2	39	1	3	No pregnancy
3	38	1	0	No ET
4	21	1	1	Ongoing singleton
		2	2	Ongoing twin
5	23	1	2	Ongoing twin

Discussion:
In this small study, donors with proven fertility were used to test a vitrification system. Oocytes that came from large cohorts seemed overly sensitive to the procedure and outcomes were poor. However, with more moderate oocyte numbers, implantation and pregnancy rates were

acceptable for this patient population. The data suggest that an oocyte bank could be established using young donors with modest oocyte numbers.

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