VALIDATION OF A RAPID VITRIFICATION AND WARMING PROTOCOL "FAST AND FURIOUS" FOR DONOR OOCYTES IN A CLINICAL IVF LABORATORY

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Background

- Donor egg banks implement stringent morphological assessment criteria when selecting oocytes for cryopreservation.
- Oocytes exhibiting structural abnormalities—such as irregular polar bodies, prominent vacuoles, central cytoplasmic granularity, or abnormalities of the zona pellucida or oolemma—are excluded from clinical use.
- Although not suitable for patient treatment, these non–bank-eligible oocytes represent a valuable resource for laboratory validation and optimization of novel cryopreservation protocols.

Objective

To assess the feasibility and performance of a rapid vitrification–warming protocol using previously vitrified–warmed donor oocytes with morphological abnormalities that were excluded from clinical egg banking.

Materials and Methods

450 morphologically abnormal donor oocytes *(previously excluded from banking)* that are:

- Used for internal QC only
- Two-year period

Standard vitrification/warming

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392 survived *(87.1%)*

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Re-vitrified *(Fast & Furious – 2 minutes)*

Performed on a 90 mm dish lid at room temperature

- Rinse in Washing Solution (m HTF)
- 1 min – Equilibration Solution (7.5% EG/DMSO)
- 1 min – Vitrification Solution (15% EG/DMSO + 0.5 M sucrose)
- Immediate Cryotop loading and LN_2 storage

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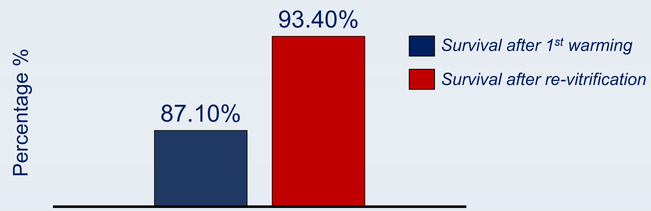
Rapid warming *(Fast & Furious – 2 minutes)*

- 1 min- Dilution solution (0.5 M sucrose) at 37°C
- 1 min-Washing solution (m HTF) at 37°C
- Recovery in global medium+ 20% protein

Results

- Despite prior freeze–thaw exposure, all oocytes tolerated two vitrification cycles. Compared with standard warming protocols, there was no significant increase in oocyte rupture or observable structural damage. Post re-vitrification survival showed a percentage of 93.4%; a total of 366 oocytes survived.



Conclusion

The protocol demonstrated high post-warming survival with reduced processing time and minimal handling. It shows promise for workflow optimization in clinical IVF laboratories. Rapid 2-minute vitrification protocol achieves 93.4% survival even after prior freeze-thaw exposure. However, further studies are required to evaluate its impact on fertilization rates, embryo development, and pregnancy outcomes.

Limitations

- The study was limited to morphologically abnormal oocytes, which may not fully represent the response of clinically eligible oocytes and translational applicability remains uncertain.
- Fertilization outcomes were not assessed, precluding evaluation of downstream developmental competence.

References

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