Efficiency of the CryoEyelet® Device in Simultaneously Vitrifying Large Numbers of Mouse Oocytes

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Current vitrification devices, designed for handling a limited number of oocytes, lead to significant time consumption and vary in effectiveness based on user experience. This necessitates an easy-to-use device that guarantees reproducibility and efficacy when attempting to store a large number of oocytes. Our study compared the CryoEyelet® device's efficiency to a commercial device, consisting of a transparent film strip attached to a plastic handle, in vitrifying up to 25 mouse oocytes by device, focusing on their fertilization and development post-thawing and Intracytoplasmic spermatozoa injection (ICSI) using piezo pulses targeting. MII oocytes were vitrified following Kitazato Co.'s instructions, then stored in liquid nitrogen. After thawing, oocytes were incubated in KSOMaa medium at 37°C in 5% CO_2 in humidified air. Embryo development was assessed at 1 (two-cell stage) and 3.5 days (blastocyst stage) post-ICSI. Statistical analysis showed no significant difference in two-cell stage outcomes between fresh oocytes, CryoEyelet®, and commercial devices (100% (165/165), 97.4% (149/153), 98.6% (70/71), respectively). Blastocyst development rates were 81.2%[a] (134/165) for fresh oocytes, 69.3%[b] (106/160) for CryoEyelet®, and 62.0%[b] (44/70) for commercial device ($p<0.05$). The CryoEyelet® device offers high storage capacity, saving time, and ensuring high viability of mouse oocytes. Funded by MCIN/AEI/10.13039/501100011033 and the EU "NextGenerationEU"/PRTR (PDC2021-120767-I00).