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The mouse born after adipose stem cell mitochondria supplementation show normal reproductive system

Masaya Yamanaka1, Shu Hashimoto2, Udayanga Sanath Kankanam Gamage1, Hideki Kitaji2, Yuki Takada2, Yuki Miyamoto1, Tatsuya Nakano3, Hiroshi Matsumoto4, Manabu Satoh3, Yoshiharu Morimoto1.

1. HORAC Grand Front Osaka Clinic
2. Reproductive Science Institute, Graduate School of Medicine, Osaka Metropolitan University
3. IVF Namba Clinic
4. IVF Osaka Clinic

Introduction

We successfully obtained offspring from fertilized eggs by injecting mitochondria derived from adipose stem cells (ASC) simultaneously with ICSI into vitrified-and-warmed murine oocytes (Udayanga et al., 2022), and the first generation (F1) and second generation (F2). However, the normality of the resulting mice has not been sufficiently validated. In this study, in order to assess the effect on ASC mitochondria supplementation on female reproductive performances, we compared the ovarian follicles numbers in F1 and F2 generations with those of naturally bred females.

Material and Method

ASC derived mitochondria were injected into vitrified-and-warmed murine (C57BL/6JJmsSlc) oocytes simultaneously with ICSI, and the zygotes were transferred into foster mothers. The born males were mated with wild type (WT) females after growth to obtain the first generation. A second generation was also obtained in the same manner. The primordial, primary, secondary, antral follicles were counted on four ovarian serial sections (H&E stained) of fifteen-week-old female mice (F1 n=3, F2 n=3). As a control, the number of ovarian follicles in commercially available same age WT females (WT n=3) born by natural mating were measured. The follicle numbers were standardized into available follicle number per um^3 in each generation and WT females and then they were compared by using two-way analysis of variance.

Results

The average numbers of primordial follicles in WT, F1 and F2 were 4.3±0.9, 4.2±1.0, 4.7±1.4 (e-06/um^3, mean±sd), with no significant difference. The average number of primary follicles were 8.5±2.8, 10.2±3.1, 11.9±4.6 (e-07/um^3), the secondary follicles were 6.3±1.0, 7.9±5.0, 7.2±3.5 (e-07/um^3), and the antral follicles were 5.7±1.6, 5.5±2.1, 6.6±2.1 (e-07/um^3), and no significant difference was observed.

Conclusion

Data of the present study suggested that ASC mitochondria supplementation into oocyte may not have adverse effects on mouse female reproductive performances in transgenerational manner.