

## Niacin improves glutathione synthesis of porcine in vitro grown oocyte

Takayuki Yamochi<sup>1</sup>, Shu Hashimoto<sup>1</sup>, Yoshiharu Morimoto<sup>2</sup>.

1. Reproductive Science, Graduate School of Medicine, Osaka Metropolitan University.

2. HORAC Grand Front Osaka Clinic

**Background:** We previously reported that 10 mM niacin increased male pronuclear formation of porcine in vitro grown (IVG) oocyte after ICSI (ISIVF2023). Reduced glutathione (GSH) is known to be important for male pronuclear formation. Thus, we hypothesized that niacin treatment increased GSH content in IVG oocytes. In the present study, we investigated the effect of niacin on GSH and glutamate-cysteine ligase catalytic subunit (GCLC, rate limiting enzyme of GSH synthesis) levels in porcine IVG oocytes.

**Methods:** Porcine growing oocytes were cultured in a medium with or without 10 mM niacin for 12 days. After the culture, some oocytes were matured in vitro. To observe GSH level, oocytes at metaphase II (MII) and prophase I (GV) were stained by ThiolTracker™ violet. To observe GCLC value, fully-grown oocytes were immunostained by anti GCLC antibody. Fluorescence intensity was calculated using image J.

**Results:** In MII oocytes, the GSH levels of both control and 10 mM niacin treated oocytes were significantly lower than that in in vivo grown oocytes ( $P < 0.01$ ). However, the GSH content in IVG oocyte significantly increased by 10 mM niacin treatment ( $P < 0.01$ ). In GV stage, the GSH level of control oocytes were significantly lower than those in in vivo grown oocytes and 10 mM niacin treated oocyte ( $P < 0.05$ ). There was no difference in GSH levels of oocytes between in vivo and 10 mM niacin treated IVG oocytes. There was no difference in GCLC value in oocyte between in vivo and control oocytes. However, the GCLC value in IVG oocyte significantly increased by 10 mM niacin treatment ( $P < 0.01$ ).

**Conclusions:** The data from this study demonstrate that the presence of 10 mM niacin during in vitro growth of growing oocytes accelerates GSH synthesis and supports the male pronuclear formation of porcine IVG oocytes.