



A048 Folliculogenesis, Oogenesis and Ovulation

### Effects of a high-fat and energy diet on ovarian gene expression in young and aged female mice

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Studies indicate that high-fat diets can have adverse effects on ovarian activity and that aging can reduce female fertility due to decreased quality and size of the oocyte ovarian reserve. The PI3K/AKT1 signaling pathway and the FOXO3a transcription factor are important regulators of cell proliferation and survival and are involved in the activation of primordial follicles. The aim of the current study was to determine the effects of a high-fat and energy diet on ovarian gene expression (AMH, IGF-1, AKT1, PI3K, MTOR, BMP15, CAT, SIRT1 e FOXO3) in young and aged female mice. Twenty female mice (C57BL/6) at four and thirteen months of age were used (young: n = 10 and old: n = 10). Animals were divided into four groups: young/control diet (YC); young/high fat diet (YH); old/control diet (OC) and old/high-fat diet (OH). Both diets contained 14.1% crude protein, but the control diet had 75.9% carbohydrate, 10.0% fat and 3,061 kcal/100g of energy, while the high-fat diet contained 54.6%; 32.7% and 4,402/100g kcal, respectively. Females were fed the diets during 55 days, intake was measured every two days and body weight measured weekly. After euthanasia, ovaries were collected, RNA was extracted using the Trizol method (Trizol, Invitrogen, USA), RNA was converted to cDNA (Biorad, Hercules, CA, EUA) and the expression of target genes measured by qRT-PCR (Applied Biosystems, Foster City, CA, USA) using the  $\beta 2$  - microglobulina as the endogenous control. For statistical analysis data were compared by two-way ANOVA (GraphPad Software Inc., La Jolla, CA, USA) for testing the effect of age, diet and its interaction. AMH was 67% less expressed in old than in young females ( $P < 0.05$ ). Furthermore, there was a 46% reduction in the expression of IGF-1 in females fed the high-fat diet ( $P < 0.05$ ), as well as lower food intake when compared to mice fed the control diet ( $P < 0.05$ ;  $2.9 \pm 0.1$  and  $3.9 \pm 0.1$ ). Previous studies suggest that IGF-1 may be involved in the premature depletion of the ovarian reserve (Schneider et al., 2015; J Ovarian Res. 7: 120). Females fed the high-fat diet had increased body weight gain compared to controls ( $P < 0.05$ ; 28% and 9% gain, respectively). In conclusion, there was a reduction in IGF-1 expression in the ovary of females fed the high fat diet, which may be a factor modulating ovarian aging.