

Maternal obesity and epigenetic and metabolic regulations during gametogenesis and early embryo development in mice: the specific role of leptin signalling /

Supervisor: dr hab. Antonio Galvao

The Lab of Dr Antonio Galvao is recruiting PhD student to undertake in vitro/in vivo work in ovarian function in mouse models for maternal obesity. The escalating epidemic of overweight and obesity is a major burden for our health systems. Obesity leads to long-term health problems, such as diabetes, cardiovascular disease or infertility. In the lab we use mouse models and/or in vitro systems of ovarian/follicular culture to study the impact of maternal obesity in ovarian function and oocyte biology. The project investigates particularly the impact of altered leptin signalling in the ovary, a major feature of obese mothers, on the establishment of oocyte epigenome and metabolic regulations in both gamete and surrounding granulosa cells throughout folliculogenesis. The appointed student will be responsible for leading small research projects and mainly working closely with other members of the team and supporting them on their projects. The job holder will use mouse and cell based experimental systems to carry out transcriptome, methylome and lipidome analysis. Studies may extend to engineered cell lines to validate new findings.

This work will lead to important advances in our understanding of the impact of altered leptin signalling in oocyte epigenome establishment, profiling also metabolic and gene expression changes in granulosa and other underlying mechanisms.

Person specification:

- MSc in protein biochemistry, cell signalling or related biological discipline
- Basic knowledge on cell signalling studies
- Previous experience in mammalian cell culture
- Previous experience in gene expression analysis (qPCR, WB, IF & IHC)
- Able to understand and communicate in the English to a level appropriate for the position
- Ability to work independently and as part of a team
- Excellent accuracy and attention to detail
- Excellent organisational skills, with good time management
- Excellent interpersonal skills with the ability to communicate with staff at all levels
- Proactive, motivated, showing initiative to move projects forward

Suggested literature:

- Wołodko K, Castillo-Fernandez J, Kelsey G, Galvão A. 2021. Revisiting the Impact of Local Leptin Signaling in Folliculogenesis and Oocyte Maturation in Obese Mothers. *International Journal of Molecular Sciences*. 22(8), 4270.
- Galvão A., Kelsey G. 2021, Profiling DNA-Methylation Genome Wide in Single Cells. *Methods in Molecular Biology*. 2214:221-240.
- Wołodko K, Adamowski M, Walewska E, Castillo-Fernandez J, Kelsey G, Galvão A. 2020, Leptin Resistance in the Ovary of Obese Mice Is Associated with Profound Changes in the Transcriptome of Cumulus Cells. *Cellular Physiology and Biochemistry*. 54: 417-437