

Institute of Zoology and Biomedical Research

Topic: Role of new regulators - adipokines in female physiology and pathology of reproduction

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Background information

Obesity and overweight are increasing worldwide and have detrimental influences on several human body functions including the reproductive health. In particular, obese women undergo perturbations of the 'hypothalamic pituitary ovarian axis', and frequently suffer of menstrual dysfunction leading to anovulation and infertility. Besides the hormone disorders and subfertility that are common in the polycystic ovary syndrome (PCOS). The adipose tissue indeed, releases a number of bioactive molecules, namely adipokines, that variably interact with multiple molecular pathways of insulin resistance, inflammation, hypertension and cardiovascular risk. Obesity is conditions that alter the profiles of specific hormones such as insulin and adipokines and, thus, definitely impair the women fertility. Many reports indicate that adipokines regulate the ovarian follicles' development, the onset of puberty, ovulation, and also play a crucial role in embryo implantation, trophoblast invasion, placenta and uterus physiology. In the present project we will focus on description of visfatin and chemerin – as new regulators in female reproduction - on ovarian and placenta physiology. Moreover, we intend to clarify the potential influence of this adipokines on reproduction pathology like PCOS development. Levels of both chemerin and visfatin are significantly higher in obese women; however expression and role of this adipokines is still unknown.

The main question to be addressed in the project:

mRNA and protein expression as well us immunolocalisation of visfatin/chemerin in the ovary and placenta and its impact on the transcriptome and proteome of the reproductive tissues cells; - the role of visfatin/chemerin in the regulation of ovary and placenta physiology: hormone secretion, proliferation, apoptosis, angiogenesis, signalling pathways ; - mRNA and protein expression as well us immunolocalisation of visfatin/chemerin in serum, adipose tissue and the ovaries collected from PCOS women.

Information on the methods/description of work:

real time PCR, Western blot, ELISA, immunohistochemistry, *in vitro* culture of ovarian and placenta cells (primary culture, cell lines), genes silencing, proliferation and apoptosis assays,

Additional information (e.g

Special requirements from the student) : ability to use planned methods, using basic statistical analysis programs, knowledge of English in speech and writing, readiness to work

in a team and openness to new challenges.

Place/name of potential foreign collaborator:

INRA, UMR85, Unité Physiologie de la Reproduction et des Comportements, Nouzilly, France
/ Professor Joëlle Dupont.

References:

Rak A, et al., Adiponectin and resistin: potential metabolic signals affecting hypothalamo-pituitary gonadal axis in females and males of different species. *Reproduction*. 2017;153(6):R215-R226.

Reverchon M, et al., Adipokines and the female reproductive tract. *Int J Endocrinol*. 2014;2014:232454.

Dupont J, et al., Involvement of adipokines, AMPK, PI3K and the PPAR signaling pathways in ovarian follicle development and cancer. *Int J Dev Biol*. 2012;56:959-67.

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