**INTRODUCTION**

Reproduction is an indispensable function for the perpetuation of the species and, as such, is under the control of a sophisticated network of regulatory signals, which is sensitive to an ample variety of endogenous and environmental modulators. In this sense, it is well known that body energy balance and metabolic status can alter fertility. While female fertility is known to be sensitive to conditions of low body fuel reserves, the reproductive consequences of persistent energy excess remain ill defined. Yet, the pandemic proportions of obesity, and its plausible impact on the female gonadotropic axis, call for a better understanding of this phenomenon. Allege, the influence of ovarian hormones on the patho-physiology of obesity and its complications merits further investigation.

**EXPERIMENTAL DESIGNS & AIDS**

The aim of this work was to evaluate the metabolic and gonadotropic impact of sequential obeseogenic insults, namely, postnatal over-nutrition (by rearing in small fillers: SL) and high fat diet (HFD) after weaning, in gonad-intact and ovariolectomized (OVX) female rats. To cover this goal, Wistar female rats were bred in normal (NL) or small fillers (SL) during lactation in order to induce early postnatal normal-or over-nutrition, respectively, and fed a control diet (CD) or HFD after weaning. Thus, four experimental groups (NL/CD, NL/HFD, SL/CD & SL/HFD) were generated. At PND-90, subsets of animals from each group were subjected to OVX, as preclinical model of cessation of ovarian secretions to mimic human menopause. Analyses in intact rats were conducted at two age-points, 4-mo- and 10-mo-old, representative of young adult and middle-aged rats, whereas analyses in OVX rats were applied at 4-mo-old (PND-120), thirty days after OVX (see experimental design below). Such analyses included the study of phenotypic indices and serum biochemical/hormonal parameters, as well as expression studies in brain samples.

**RESULTS**

In young (4-mo)-cyclic females, SL or HFD caused similar increases in body weight: yet, only HFD evoked additional metabolic perturbations, some of which were worsened by precedent SL (Fig. 1A).

HFD caused a decrease in LH and estradiol levels (Fig. 1B), and suppressed Kiss1 expression in the arcuate nucleus (ARC) of the hypothalamus from young adult and middle-aged females, at estrus. Animals were ovx injected with saline (control) or Kiss1 expression, in the arcuate nucleus (ARC) of the hypothalamus from young adult and middle-aged females, at estrus.

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**CONCLUSIONS**

Our data document the deleterious consequences of overweight on the female gonadotropic axis, which involves the impairment of Kiss1 system, and substantiate the dramatic impact of OVX, as menopausal model, on the metabolic profile, especially when combined with preceding obeseogenic insults (SL and HFD).