Introduction

According to the World Bank reproductive health indicators, in the last 13 years the world rate of fertility has declined, especially in the upper middle and high-income countries (rate of 1.0% and 1.7% births per 1000 women respectively). One possible cause of this is that in the present decade couples have decided to delay motherhood when women are close to the subfertility window (near 35 years). This has also increased consultation in fertilization programs. Furthermore, recent evidence indicates that an early menarche in women is associated with premature depletion of ovarian follicular reserve (Weghofer A, 2013). Because of this, understanding the mechanism of follicular development during the subfertility period is now critical. In this regard, it has been described that during the subfertility period occurs an increased loss of follicular reserve (Faddy et al, 1992) and an increase in the ovarian inflammation (Heider et al, 2001). Particularly to this, our group is interested in identifying key factors of follicular development, and its alteration during the subfertility period concerning to the change in nervous system functioning. To assess this we use Sprague-Dawley rats, which during their reproductive senescence (8 to 12 months) has an increase in ovarian sympathetic tone. This increased sympathetic tone, has been associated with a decrease in corpora lutea, antral follicles and an increase in follicular cysts (Acusa et al, 2000). Also we described that young ovaries have the ability to increase kisspeptin production under a β-adrenergic stimulation using isoproterenol (Ficu et al, 2012). Since kisspeptin is a peptide that is present in the ovary, and yet has not been associated to a particular ovarian function, we want to investigate if kisspeptin changes during ageing. Our results show that kisspeptin is increased during ageing in the ovary, and when we blocked the sympathetic tone the kisspeptin levels decreased. This open the possibility to consider kisspeptin as a new pharmacological target to consider in females within the subfertility period.

Purpose

The aim of this study is to assess if kisspeptin levels are regulated by the adrenergic nervous system in the ovary using in two experiments.

Methods

1. Pharmacological Blockade (Daily Intraperitoneal injection of Propranolol a β-adrenergic antagonist)

2. Surgical Derenervation (Resection of superior ovarian nerve)

Results

1. Ovarian kisspeptin is increased during ageing.

2. Kisspeptin is correlated with adrenergic activity in the ovary.

3. Ovarian kisspeptin diminish under a β-adrenergic blockade with propranolol.

4. Ovarian kisspeptin diminish under a surgical denervation of ovarian superior nerve (SONX).

Conclusions

- Kisspeptin is elevated during ageing in our experimental model.
- Kisspeptin has a high correlation with the NA content and nerve activity in the ovary.
- Kisspeptin levels respond to sympathetic nervous system tone.
- Kisspeptin could be an important pharmacological target to be consider in future fertility treatments.

References


Kisspeptin increases during reproductive aging and is regulated by sympathetic nerve system.

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