The role of kisspeptins in reproduction

Introduction:
Kisspeptin is a polypeptide hormone, a product of the kisspeptin gene and its receptor, which plays a crucial role in the regulation of reproduction. Despite the fact that gonadotrophin releasing hormone (GnRH) has been considered to play a pivotal role in controlling reproductive functions, a hypothalamic neuropeptide kisspeptin, has recently emerged as a key regulator of the hypothalamo-pituitary-gonadal (HPG) axis, which plays a major role in the regulation of GnRH neurons.

Materials and methods:
This manuscript is a review article which presents new insights in the role of kisspeptin in hypothalamic-pituitary-gonadal (HPG) axis. Only articles published in the last 10 years were taken into consideration for this research.

Results:
Kisspeptin primarily operates centrally to regulate the HPG axis, however, peripheral administration of different isoforms (kisspeptin-10 and kisspeptin-54) has been shown to stimulate GnRH and gonadotrophin release. Since recently potential therapeutic applications of kisspeptins justified its use in clinical practice for treatment of infertility such as novel oocyte maturation triggers in in vitro fertilisation (IVF), in prevention of ovarian hyperstimulation syndrome and prediction of ovulation. Exogenous kisspeptin-54 has been successfully administered as a promising method of triggering oocyte maturation, following ovarian stimulation with gonadotrophins and GnRH antagonists in women undergoing IVF, due to its efficacy considering achieved pregnancy rates compared to human chorionic gonadotrophin (hCG) and GnRH agonists. Also, its safety in patients at high risk of developing ovarian hyperstimulation syndrome is noteworthy. Since kisspeptin levels are positively correlated to estradiol levels, increase kisspeptin surge in serum and urine may be used as a marker for dominant follicle development and pre-ovulation.

Conclusions:
Although a great improvement has been recorded regarding the role of kisspeptin in puberty and reproduction, as well as the beneficial results of triggering oocyte maturation during IVF, prevention of OHSS and prediction of ovulation, further studies would be desirable to establish the optimal trigger of egg maturation and to improve the reproductive outcome for women undergoing IVF treatment.