

Review

Kisspeptin/GPR54 System: What Do We Know About Its Role in Human Reproduction?

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Key Words

Kisspeptin • Human Reproduction • Infertility • *KISS1* gene • *GPR54* gene • Dosage

Abstract

Kisspeptin is involved in the control of human reproduction bridging the gap between the sex steroid levels and feedback mechanisms that control the gonadotropin releasing hormone (GnRH) secretion; however, studies considering this peptide and infertility are limited. We conducted a review and critical assessment of available evidence considering kisspeptin structure, physiology, function in puberty and reproduction, its role in assisted reproduction treatments, kisspeptin dosage and the impact on *KISS1* and *GPR54* genes. Literature searches were conducted in PubMed using keywords related to: (i) kisspeptin or receptors, kisspeptin-1 (ii) reproduction or infertility or fertility (iii) gene and (iv) dosage or measurement or quantification or serum level, in human. Kisspeptin is a product of *KISS1* gene that binds to a G-protein-coupled receptor (*GPR54/KISS1R*) stimulating the release of GnRH by hypothalamic neurons, leading to secretion of pituitary gonadotropins (LH and FSH) and sexual steroids, which in turn will act in the gonads to produce the gametes. Kisspeptin is being recognized as a crucial regulator of the onset of puberty, the regulation of sex hormone mediated secretion of gonadotropins, and the control of fertility. Inactivating and activating mutations in both *KISS1* or *GPR54* genes were associated with hypogonadotropic hypogonadism and precocious puberty. Despite this, studies considering kisspeptin and infertility are scarce. The understanding of the role of kisspeptin may lead to its use as a biomarker in infertility treatments and use in controlled ovarian hyperstimulation.

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