GONADOTROPIN-RELEASING HORMONE

Gnrh, Follicle-Stimulating Hormone – Releasing Hormone (Fsh-Rh), Luteinizing Hormone – Releasing Hormone (Lhrh), Gonadoliberin, Luliberin

A releasing hormone responsible for the release of follicle-stimulating hormone (FSH) and luteinizing hormone (LH) from the anterior pituitary.

About Gonadotropin-releasing hormone

Function

A trophic peptide responsible for the release of follicle stimulating hormone and luteinizing hormone from the anterior pituitary, synthesized and released from the hypothalamus. Regulation of the reproductive system is a process that requires the action of hormones from the pituitary gland, the adrenal cortex, and the gonads. During puberty, in both males and females, the hypothalamus produces gonadotropin-releasing hormone (GnRH).

Gonadotropin Releasing Hormone (GnRH) (Pic. 1) is mainly made in the preoptic area of the hypothalamus from where it travels to the pituitary gland where it stimulates the synthesis and secretion of the gonadotropins, follicle-stimulating hormone, and luteinizing hormone.

Control of FSH (Follicle-stimulating hormone) and LH (Luteinizing hormone):

These hormones regulate the gonads (testes in males and ovaries in females); they are called gonadotropins. In both males and females, FSH stimulates gamete production and LH stimulates production of hormones by the gonads.

These processes are controlled by the size and frequency of GnRH pulses, as well as by feedback from androgens and estrogens. Low-frequency GnRH pulses are required for FSH release, whereas high-frequency GnRH pulses stimulate LH pulses in a one to one manner.

There are differences in GnRH secretion between females and males. In males, GnRH is secreted in pulses at a constant frequency; however, in females, the frequency of the pulses varies during the menstrual cycle, and there is a large surge of GnRH just before ovulation. Adult reference ranges are in males: 4.0 - 8.0 pg/mL and in females: 2.0 - 10.0 pg/mL. (Pic. 2).

GnRH activity

GnRH activity is very low during childhood, and is activated at puberty or adolescence. During the reproductive years, pulse activity is critical for successful reproductive function as controlled by feedback loops. However, once a pregnancy is established, GnRH activity is not required. Pulsatile activity can be disrupted by hypothalamic-pituitary disease, either dysfunction (i.e., hypothalamic suppression) or organic lesions (trauma, tumor). Elevated prolactin levels decrease GnRH activity. In contrast, hyperinsulinemia increases pulse activity leading to disorderly LH and FSH activity, as seen in polycystic ovary syndrome (PCOS). GnRH formation is congenitally absent in Kallmann syndrome.

Other organs
GnRH is found in organs outside of the hypothalamus and pituitary, and its role in other life processes is poorly understood. For instance, there is likely to be a role for GnRH in the placenta and in the gonads. GnRH and GnRH receptors are also found in cancers of the breast, ovary, prostate, and endometrium.

Find more about related issues

Diagnoses

Amenorrhoea
The absence of a menstrual period in women of reproductive age.
Learn more at: www.fertilitypedia.org/therapy/diag/amenorrhoea

Anovulation
Failure of the ovaries to release an oocyte over a period of time generally exceeding 3 months.
Learn more at: www.fertilitypedia.org/therapy/diag/anovulation

Azoospermia
Complete absence of sperm in the ejaculate of a man.
Learn more at: www.fertilitypedia.org/therapy/diag/azoospermia

Ejaculatory disorders
A class of sexual disorders defined as the subjective lack of normal ejaculation.
Learn more at: www.fertilitypedia.org/therapy/diag/ejaculatory-disorders

Hyperprolactinemia
The presence of abnormally high levels of prolactin in the blood.
Learn more at: www.fertilitypedia.org/therapy/diag/hyperprolactinemia

Hypogonadism
A medical term which describes a diminished functional activity of the gonads – the testes and ovaries.
Learn more at: www.fertilitypedia.org/therapy/diag/hypogonadism

Kallmann syndrome
A genetic condition where the primary symptom is a failure to start puberty or a failure to fully complete puberty.
Learn more at: www.fertilitypedia.org/therapy/diag/kallmann-syndrome

Klinefelter syndrome
The set of symptoms that result from two or more X chromosome in males.
Learn more at: www.fertilitypedia.org/therapy/diag/klinefelter-syndrome

Non-obstructive azoospermia
Complete absence of sperm in the ejaculate due to testicular failure.
Learn more at: www.fertilitypedia.org/therapy/diag/non-obstructive-azoospermia

Thyroid disorders
A medical condition impairing the function of the thyroid.
Learn more at: www.fertilitypedia.org/therapy/diag/thyroid-disorders

Undescended testes
In the case of cryptorchidism one or both testes are absent from the scrotum. It is is the most common etiologic factor of azoospermia in the adult.
Learn more at: www.fertilitypedia.org/therapy/diag/undescended-testes
Hypothalamus
A region of the forebrain that regulates body temperature, some metabolic processes and governs the autonomic nervous system.
Learn more at: www.fertilitypedia.org/edu/organs/hypothalamus

Sources
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