

Hormones of the Hypothalamus

The hypothalamus is a region of the brain. It contains several types of neurons responsible for secreting different hormones.

- [Thyrotropin-releasing hormone \(TRH\)](#)
- [Gonadotropin-releasing hormone \(GnRH\)](#)
- [Growth hormone-releasing hormone \(GHRH\)](#)
- [Corticotropin-releasing hormone \(CRH\)](#)
- [Somatostatin](#)
- [Dopamine](#)

All of these are released into the blood in the capillaries and travel immediately – in [portal veins](#) – to a second capillary bed in the **anterior lobe of the [pituitary](#)**, where they exert their effects.

All of them are released in periodic spurts. In fact, replacement hormone therapy with these hormones does not work unless the replacements are also given in spurts.

Two other hypothalamic hormones:

- [Antidiuretic hormone \(ADH\)](#) and
- [Oxytocin](#)

travel in the [neurons](#) themselves to the **posterior lobe of the pituitary** where they are released into the circulation.

[Link to diagram of the endocrine glands \(92K\)](#)

Thyrotropin-releasing hormone (TRH)

TRH is a tripeptide (GluHisPro).

When it reaches the anterior lobe of the pituitary it stimulates the release there of

- [thyroid-stimulating hormone \(TSH\)](#)
- [prolactin \(PRL\)](#)

Gonadotropin-releasing hormone (GnRH)

GnRH is a peptide of 10 amino acids. Its secretion at the onset of puberty triggers sexual development and from then on it is essential for normal sexual physiology of both males and females. In both sexes, its secretion occurs in periodic pulses usually occurring every 1–2 hours.

Primary Effects	Secondary Effects
FSH and LH Up	estrogen and progesterone Up (in females)
	testosterone Up (in males)

The signal that stimulates GnRH secretion - [Link](#).

After puberty, a **hyposcretion** of GnRH **may** result from

- intense physical training
- anorexia nervosa

Synthetic [agonists](#) of GnRH are used to treat

- inherited or acquired deficiencies of GnRH secretion.
- prostate cancer. In this case, continuous high levels of the GnRH agonist
 - reduces the number of GnRH receptors in the pituitary, which
 - reduces its secretion of FSH and LH, which
 - reduces the secretion of testosterone, which
 - reduces the stimulation of the cells of the prostate.

Growth hormone-releasing hormone (GHRH)

GHRH is a mixture of two peptides, one containing 40 amino acids, the other 44.

As its name indicates, GHRH stimulates cells in the anterior lobe of the pituitary to secrete [growth hormone](#) (GH).

Corticotropin-releasing hormone (CRH)

CRH is a peptide of 41 amino acids.

As its name indicates, its acts on cells in the anterior lobe of the pituitary to release [adrenocorticotrophic hormone](#) (ACTH)

CRH is also synthesized by the placenta and seems to determine the duration of pregnancy.

[Description of the mechanism.](#)

It may also play a role in keeping the T cells of the mother from mounting an immune attack against the fetus. [Discussion](#)

Somatostatin

Somatostatin is a mixture of two peptides, one of 14 amino acids, the other of 28.

Somatostatin acts on the anterior lobe of the pituitary to

- **inhibit** the release of [growth hormone](#) (GH)
- **inhibit** the release of [thyroid-stimulating hormone](#) (TSH)

Somatostatin is also secreted by cells in the [pancreas](#) and in the [intestine](#) where it inhibits the secretion of a variety of other hormones.

Dopamine

Dopamine is a derivative of the amino acid [tyrosine](#). Its principal function in the hypothalamus is to **inhibit** the release of [prolactin](#) (PRL) from the anterior lobe of the pituitary.

Antidiuretic hormone (ADH) and Oxytocin

These peptides are released from the posterior lobe of the pituitary and are described in the page devoted to the pituitary.

[ADH](#)

[Oxytocin](#)

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