

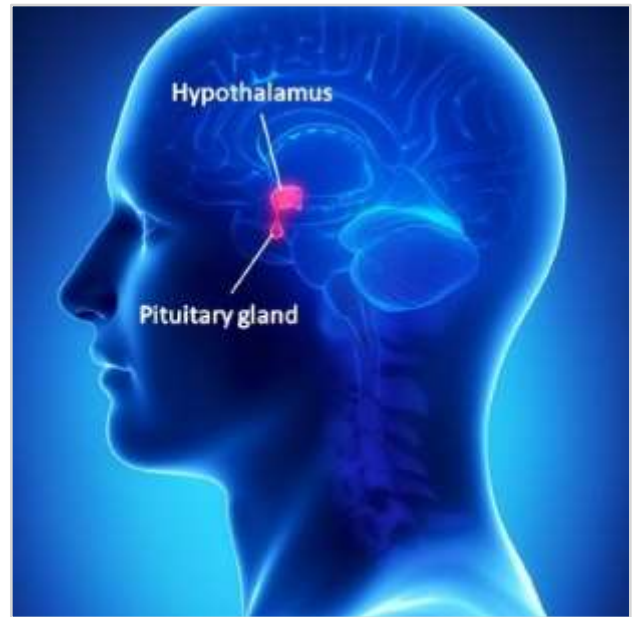
Pituitary Gland

Fact Sheet

Location

The pituitary gland is found at the base of the brain in line with the top of the nose. It is roughly the shape of a kidney bean.

The pituitary gland has two lobes – an anterior (front) lobe and a posterior (back) lobe. It is connected to the hypothalamus by a thin stalk made up of nerves and blood vessels.



Functions/Roles

The pituitary gland is often called the “master gland” as it helps control several other glands. These include the thyroid, adrenal, ovaries and testes.

The pituitary gland makes hormones that control:

- Blood pressure
- Blood sugar levels
- Stress response
- Menstrual cycle
- Sperm production
- Bone growth and muscle mass
- Uterine contractions
- Breastmilk production and milk flow
- Mother-infant bonding
- Other glands

Hormones produced by the pituitary gland

The front (anterior) lobe of the pituitary gland makes hormones in response to signals from the hypothalamus. These include:

Adrenocorticotrophic hormone (ACTH) signals the adrenal glands to make hormones that control stress, blood pressure and blood sugar levels.

Thyroid Stimulating Hormone (TSH) signals the thyroid to make thyroid hormones.

Follicle stimulating hormone (FSH) works with luteinising hormone (LH) to regulate the ovaries and testes. In women, FSH helps mature the ovarian follicles so that an egg can be released during the menstrual cycle. In men, FSH is important for sperm production.

Luteinising hormone (LH) works with follicle stimulating hormone (FSH) to regulate the ovaries and testes. In women, LH signals the release of an egg from the ovary (ovulation). In men, LH stimulates the production of testosterone.

Growth Hormone (GH) controls body composition, growth and development. In children, GH is important for bone growth and muscle mass. In adults, GH controls muscle mass and fat distribution.

Prolactin is important in women for preparing the breasts during pregnancy for breastfeeding and making breast milk after childbirth. It also has important roles in men and women for reproductive health, controlling the immune system and for regulating some behaviours.

The back (posterior) lobe of the pituitary gland releases hormones made in the hypothalamus. These include antidiuretic hormone (ADH) and oxytocin.

Keeping pituitary hormones in balance

Adrenocorticotrophic hormone (ACTH) is controlled through a negative feedback loop. CRH from the hypothalamus signals the pituitary gland to make adrenocorticotrophic hormone (ACTH). ACTH then signals the adrenal glands to release glucocorticoids, such as cortisol. When glucocorticoid levels reach a threshold, the hypothalamus and pituitary make less CRH and ACTH.

Thyroid Stimulating Hormone (TSH) is controlled through a negative feedback loop. Thyrotrophin releasing hormone (TRH) from the hypothalamus signals the pituitary gland to make thyroid stimulating hormone (TSH), which signals the thyroid to make thyroid hormones. These hormones travel through the blood and are recognised by the hypothalamus and pituitary gland. When a threshold is reached, the hypothalamus makes less TRH and the pituitary gland makes less TSH. This reduces thyroid hormone levels.

Follicle stimulating hormone (FSH) and Luteinising hormone (LH) are controlled through a negative feedback loop. The hypothalamus releases gonadotropin releasing hormone (GnRH), which signals the pituitary gland to make luteinising hormone (LH) and follicle stimulating hormone (FSH). In men, LH and FSH signal the testes to produce testosterone. In women, LH and FSH signal the ovaries to make estrogen and progesterone. When these hormones reach a threshold level, the hypothalamus makes less GnRH. The hypothalamus can also reduce GnRH production when prolactin levels are high. This in turn decreases pituitary production of FSH and LH.

Growth Hormone (GH) is controlled through a negative feedback loop. Growth hormone releasing hormone (GHRH) from the hypothalamus signals the pituitary gland to make growth hormone. Neurons (nerve cells) in the hypothalamus monitor growth hormone levels. When levels are high, the hypothalamus releases somatostatin, which stops the pituitary gland making growth hormone. These two hormones rise and fall in turn to keep growth hormone levels within a normal range.

Prolactin is mainly controlled by dopamine, a chemical produced by neurons (nerve cells) in the hypothalamus. Dopamine signals the pituitary to stop making prolactin. Rising and falling dopamine levels keep prolactin in a normal range.

Common problems and conditions of the pituitary gland

- Pituitary tumours / Adenomas
- Hyperprolactinaemia / Prolactinoma
- Hypogonadism
- Growth hormone deficiency
- Acromegaly
- Diabetes insipidus
- Cushing's Disease
- Hypopituitarism