

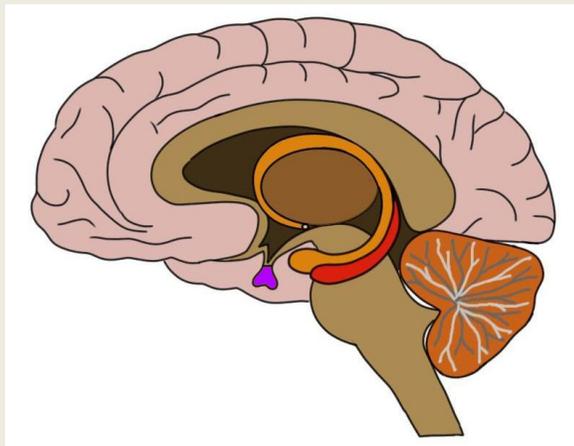
Medicine for Managers

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The Pituitary Gland

The **Pituitary Gland** is about the size of a pea and is an endocrine gland which is located in the base of the brain below the hypothalamus. The Greek physician Galen (129-216 AD) believed that it manufactured nasal mucus, a view reinforced by anatomist Versalius (1514-64), who originally coined the name 'pituitary' and whose theory was not discredited until 100 years later. Its alternative name is the hypophysis.

The true nature of the gland and its vital contribution to normal bodily functions was not fully understood until the latter part of the nineteenth century and the first half of the twentieth century.



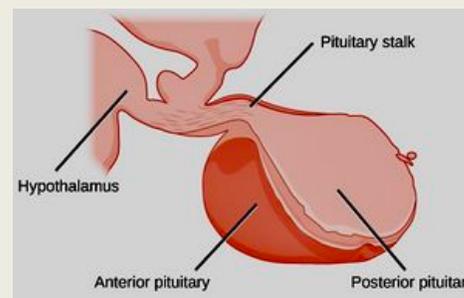
The gland is located at the base of the brain (shown in purple) below the hypothalamus to which it is attached. The **hypothalamus** is located deep inside the brain and is a centre for co-ordination of the functions collectively called **homeostasis**.

The word homeostasis comes from the Greek words for "same" and "steady" and is the

mechanism by which living things actively maintain the body in a state of stability.

The pituitary gland manufactures **hormones**, which are chemicals which co-ordinate functions within the body by acting as chemical messengers carried through the blood to various organs and other tissues. In simple terms the chemicals tell the body what to do and when to do it.

The gland itself is divided into an anterior and a posterior lobe connected



to the hypothalamus by a stalk containing nerves and blood vessels.

Both lobes make hormones.

The pituitary and the hypothalamus control vital bodily functions, through the hormonal releases.

These include:

- Growth
- Metabolism
- Salt and water balance
- Stress and response to injury
- Reproduction
- Childbirth
- Breast milk

The hypothalamus controls basic functions such as heart rate, breathing and blood pressure. It also produces **release factors** which act to cause release of the pituitary hormones.

Hormones manufactured by the pituitary gland

Their names are difficult to remember but their functions are all essential for normal function.

The **anterior lobe** of the gland produces a number of hormones:

- **Adrenocorticotrophic hormone** (ad-ree-no-core-tick-oh-trow-fick) **ACTH** is associated with stress, acting on the adrenal glands to make cortisol, which regulates metabolism, controls blood pressure and blood sugar and reduces inflammation
- **Follicle stimulating hormone (FSH)** which stimulates ovaries to produce eggs in women and sperm in men
- **Luteinising hormone (LH)** stimulates ovulation in women and testosterone production in men
- **Prolactin** stimulates milk production after birth.
- **Thyroid-stimulating hormone** controls the thyroid gland's output of thyroxine

which controls metabolism and energy levels.

- **Growth hormone** which stimulates growth and height in children and maintains muscle, bone and fat distribution in adults

The **posterior lobe** releases hormones manufactured by the hypothalamus:

- **Antidiuretic hormone (ADH)** which regulates sodium and water balance in the body
- **Oxytocin** helps uterine contractions during childbirth and stimulates milk release and maternal bonding.

Factors affecting function of the pituitary gland

The normal production of hormones, maintaining the body's stability, can be affected by several conditions, which may impact hormone release, and such disorders include:

- **Pituitary adenoma** is a benign (non-cancerous) growth in the gland. They normally grow slowly. They can apply pressure on nearby structures causing symptoms, such as visual disturbances or headaches. The tumour may (functioning) or may not (non-functioning) release hormones. Large tumours are normally removed surgically.
- **Hypopituitarism**. Lack or absence of one or more pituitary hormones. It is caused by pituitary gland damage and may follow brain surgery or radiation. Reduced hormone output can cause one or more of the following:
 - **Growth hormone deficiency** resulting in lack of growth and

- puberty in children or metabolic effects in adults
 - **Diabetes insipidus** due to lack of ADH resulting in excessive urination and water loss.
 - **Impaired sexual function and fertility**
 - **Hypothyroidism** causing low thyroid function and development of myxoedema
 - **Adrenal gland deficiency** reducing the body's steroid production
- **Hyperpituitarism.** Excess of one or more pituitary hormones. Specific conditions include:
 - **Acromegaly.** Too much growth hormone results in excessive growth of hands and feet, together with enlarged nose, enlarged lips and tongue, prominent jaw and chin and a prominent forehead
 - **Cushing's syndrome** where the pituitary releases too much ACTH. The result is weight gain, bruising, high blood pressure, weakness and development of type II diabetes.
 - **Hyperprolactinaemia.** Increased prolactin causes infertility, reduced sex drive and milky nipple discharge.

- **Raised blood pressure**
- **Erectile dysfunction** in men
- **Irregular periods** in women
- **Unexplained weight gain**
- **Weakness and lassitude**
- **Insomnia**
- **Memory Loss**
- **Mood swings, anxiety or depression**
- **Production of breast milk** when not nursing after pregnancy.

Experiencing such symptoms will necessitate a visit to the General Practitioner.

Suspicious raised by the nature of the symptoms will prompt the doctor to carry out blood tests and, if abnormal, will result in a referral to a physician or endocrinologist, where further investigations, including hormone assays, radiography and scans will help in the elucidation of a diagnosis.

Treatment is normally by hormone replacement and, where necessary, in the presence of a tumour, with surgical intervention.

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How is pituitary dysfunction recognised?

It is often difficult to spot a pituitary disorder in its early stages.

Although it may cause **headaches**, other symptoms are often either more general or associated with another body organ or activity. They may include: