DRUGS FOR PITUITARY DISORDERS

The pituitary gland, which lies at the base of the brain, produces a number of hormones that regulate physical growth, metabolism, sexual development, and reproductive function. Many of these hormones act indirectly by stimulating other glands, such as the thyroid, adrenal glands, ovaries, and testes, to release their own hormones. A summary of the actions and effects of each pituitary hormone is given below.

An excess or a lack of one of the pituitary hormones may produce serious effects, the nature of which depends on the hormone involved. Abnormal levels of a particular hormone may be caused by a pituitary tumour, which may be treated surgically, with radiotherapy, or with drugs. In other cases, drugs may be used to correct the hormonal imbalance.

The more common pituitary disorders that can be treated with drugs are those involving growth hormone, antidiuretic hormone, prolactin, adrenal hormones, and the gonadotrophins. The first three are discussed below. For information on the use of drugs to treat infertility arising from inadequate levels of gonadotrophins, see p.124. Lack of corticotrophin, leading to inadequate production of adrenal hormones, is usually treated with corticosteroids (see p.99).

Drugs for growth hormone disorders

Growth hormone (somatotropin) is the principal hormone required for normal growth in childhood and adolescence. Lack of growth hormone impairs normal physical growth. Doctors administer hormone treatment only after tests have proven that a lack of this hormone is the cause of the disorder. If treatment is started at an early age, regular injections of somatropin, a synthetic form of natural growth hormone, administered until the end of adolescence usually allow normal growth and development to take place.

Growth hormone deficiency in adults is rare but may cause loss of strength and stamina, reduced bone mass, weight gain, and psychological symptoms such as poor memory and depression. In some cases it may be treated with somatotropin.

Less often, the pituitary produces an excess of growth hormone. In children this can result in pituitary gigantism; in adults, it can produce a disorder known as acromegaly. This disorder, which is usually the result of a pituitary tumour, is characterized by thickening of the skull, face, hands, and feet, and enlargement of some internal organs.

The pituitary tumour may either be surgically removed or destroyed by radiotherapy. In the frail or elderly, drugs such as bromocriptine and octreotide are used to reduce growth hormone levels. Octreotide is also used as an adjunctive treatment before surgery and in those with increased growth hormone levels occurring after surgery. People who have undergone surgery and/or radiotherapy may require long-term replacement with other hormones (such as sex hormones, thyroid hormone, or corticosteroids).

Drugs for diabetes insipidus

Antidiuretic hormone (also known as ADH or vasopressin) acts on the kidneys, controlling the amount of water retained in the body and returned to the blood. A lack of ADH is usually caused by damage to the pituitary, and this in turn causes diabetes insipidus. In this rare condition, the kidneys cannot retain water and large quantities pass into the urine. The chief symptoms of diabetes insipidus are constant thirst and the production of large volumes of urine.

Diabetes insipidus is treated with ADH or a related synthetic drug, desmopressin. These replace naturally produced ADH. Alternatively, a thiazide diuretic may be prescribed for mild cases (see Diuretics, p.57). The usual effect of such drugs is to increase urine production, but in diabetes insipidus they have the opposite effect, reducing water loss from the body.

Drugs used to reduce prolactin levels

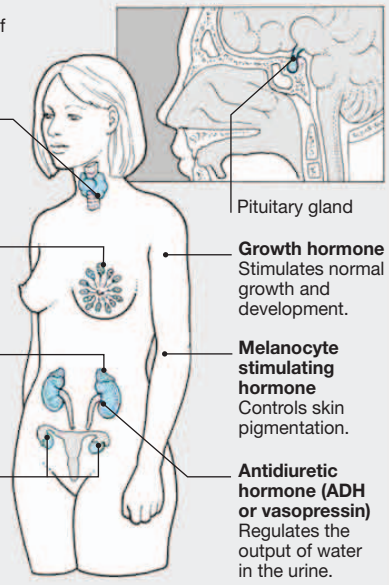
Prolactin, also called lactogenic hormone, is produced in both men and women. In women, prolactin controls the secretion of breast milk following childbirth. The function of this hormone in men is not understood, although it appears to be necessary for normal sperm production.

The disorders associated with prolactin are all concerned with overproduction. High levels of prolactin in women can cause lactation that is not associated with pregnancy and birth (galactorrhoea), lack of menstruation (amenorrhoea), and infertility. If excessive amounts are produced in men, the result may be galactorrhoea, erectile dysfunction, or infertility.

Some drugs, notably methyldopa, oestrogen, and the phenothiazine antipsychotics, can raise the prolactin level in the blood. More often, however, the increased prolactin results from a pituitary tumour and is usually treated with bromocriptine or cabergoline. These drugs inhibit prolactin production.

THE EFFECTS OF PITUITARY HORMONES

The pituitary gland produces a large number of hormones, many of which control the activities of other glands. The illustration shows the principal sites of action of the major pituitary hormones.



Thyroid-stimulating hormone Stimulates production and release of thyroid hormones.

Prolactin Stimulates glands in the breast to produce milk in women. Helps sperm production in men.

Corticotrophin (ACTH) Controls the production and release of adrenal corticosteroid hormones.

Gonadotrophins Two hormones, follicle-stimulating hormone (FSH) and luteinizing hormone (LH), act on the sex glands to stimulate egg production and release, and sperm production. They also control the output of the sex hormones oestrogen, progesterone, and testosterone.

Growth hormone Stimulates normal growth and development.

Melanocyte stimulating hormone Controls skin pigmentation.

Antidiuretic hormone (ADH or vasopressin) Regulates the output of water in the urine.

COMMON DRUGS

Drugs for growth hormone disorders
Bromocriptine ✻
Lanreotide
Octreotide
Somatropin

Drugs for diabetes insipidus
Carbamazepine ✻
Chlortalidone
Desmopressin ✻
Vasopressin (ADH)

Drugs to reduce prolactin levels
Bromocriptine ✻
Cabergoline
Quinagolide

✻ See Part 3