

Office of Research on Women's Health



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What is the Pituitary Gland?

What Happens When the Pituitary Gland Malfunctions?

Why Are Pituitary Disorders a Problem?

What Causes Pituitary Malfunction?

How Can Pituitary Disorders Be Treated?

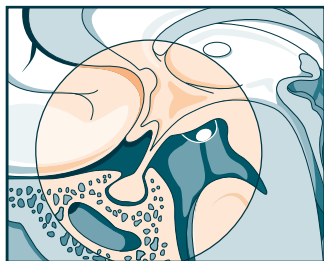
What Is NIH Doing About Pituitary Disorders?

Pituitary Disorders

Understanding These Disorders and Planning for Future Research
OCTOBER 2004 NIH Scientific Workshop Focuses the Discussion

What Is the Pituitary Gland?

The pituitary is a bean-shaped gland attached to the base of the brain by a thin stalk. Essential for growth, the pituitary functions as the “master gland.” It receives inputs from the brain and the rest of the body, integrates that information, and then responds by producing hormones that regulate other glands and bodily functions. The pituitary sends signals to the thyroid gland, adrenal glands, and ovaries or testes, directing them to produce thyroid hormone, cortisol, estrogen, testosterone, and many other hormones. These hormones have dramatic effects on metabolism, blood pressure, sexuality, reproduction, and other vital bodily functions. In addition, the pituitary gland produces growth hormone for normal development of height and prolactin for milk production.



As the master gland, the pituitary is essential for growth and overall hormonal regulation.

What Happens When the Pituitary Gland Malfunctions?

Tumors (primarily benign), inflammation, infections, and injury can cause the pituitary gland to malfunction. Rarely, spread of other tumors to the pituitary can also cause malfunction. In some cases, radiation therapy

to the brain can cause normal pituitary cells to malfunction. Pituitary malfunctions result in headaches, compression of the optic nerve with loss of peripheral vision, and a variety of hormonal effects on the heart, the gut, muscle, bone, and other parts of the body.

Pituitary disorders stunt growth in children and shorten the lives of all affected individuals by causing health complications, such as mood disorders, sexual dysfunction or infertility, diabetes, osteoporosis, arthritis, and accelerated heart disease. Certain pituitary tumors cause Cushing's disease, where too many hormones, called glucocorticoids, are released into the bloodstream. This causes fat to build up in the face, back, and chest, and the arms and legs to become thin. Other symptoms include too much sugar in the blood, weak muscles and bones, a flushed face, and high blood pressure. Other pituitary tumors cause a condition called acromegaly, in which the hands, feet, and face are larger than normal; in very young people, the whole body may grow much larger than normal. Another type of pituitary tumor causes the breasts to make milk, even though a woman may not be pregnant, and her menstrual periods may stop. Empty sella syndrome (ESS) involves the sella turcica, a bony structure at the base of the brain that surrounds and protects the pituitary gland. In children, ESS may be associated with early onset of puberty, growth hormone deficiency, pituitary tumors, or pituitary gland dysfunction. Pituitary malfunction causes other disorders as well.

Why Are Pituitary Disorders a Problem?

The most common cause of pituitary gland malfunction is tumors, generally benign. Such tumors occur in nearly 20 percent of adults worldwide. Unfortunately, many go undiagnosed or misdiagnosed for years. This is largely due to the nonspecific features of the disease, which often mimic symptoms of other conditions, and a lack of awareness in both the medical community and the public.

Every year thousands of new patients are diagnosed with pituitary tumors in the United States; most pituitary tumors are adenomas, and few pituitary tumors are fatal. However, the number of pituitary tumors diagnosed is much lower than their actual number. Most of these pituitary tumors are benign and, therefore, are not included in statistics collected by cancer registries. Almost all individuals with these tumors will not experience any symptoms or impairment of their health. If symptoms are present, a doctor may order laboratory tests to determine hormone levels in the blood. The doctor may also order an MRI (magnetic resonance imaging) scan, which uses magnetic waves to make a picture of the inside of the brain. Other special x-rays may also be done.

What Causes Pituitary Malfunction?

Scientists do not know exactly what causes most pituitary tumors. During the past few years, a great deal of progress has been made in understanding how certain changes in a person's DNA can cause cells in the pituitary to produce a tumor. About 3 percent of all pituitary tumors are caused by a condition that is inherited; these pituitary tumors usually occur in adults, and genetic testing of family members is available.

Moving Forward

Future research is needed to identify the cause of pituitary tumors so that improved and targeted therapies, with fewer complications, can be developed. While advances will continue to be made in perfecting treatments, the experts at the workshop identified the most significant research needs:

1. Develop methods for screening and earlier diagnosis of pituitary disorders.
2. Explore the psychosocial consequences of pituitary disorders in the patient and his or her family.
3. Determine the nature of pituitary dysfunctions associated with psychiatric disorders.

Additional Information about Pituitary Disorders

- The primary NIH Institute for research on pituitary disorders is the National Institute of Neurological Disorders and Stroke, <http://www.ninds.nih.gov>.
- Other NIH Institutes conducting research on pituitary and associated disorders include the National Institute of Child Health and Human Development, <http://www.nichd.nih.gov>, the National Institute of Diabetes and Digestive and Kidney Diseases, <http://www.niddk.nih.gov>, and the National Institute of Mental Health, www.nimh.nih.gov.
- The Pituitary Network Association can be accessed at <http://www.pituitary.org>.

How Can Pituitary Disorders Be Treated?

Treating pituitary disorders depends on the type of tumor, how far it has invaded into the brain, as well as the patient's age and overall health. Three kinds of treatment are used: Surgery to remove the tumor, radiation therapy using high-dose x-rays or proton beams to kill tumor cells, and drug therapy to shrink and sometimes eradicate the tumor. Medical management of the health and emotional problems that result from pituitary disorders is also very important. Most patients recognize the need for a life-long regimen of care to ensure they maintain a normal quality and length of life.

What Is NIH Doing About Pituitary Disorders?

The information presented here is a synopsis of a scientific National Institutes of Health (NIH) workshop, Family Hormonal Health, held in October 2004. The Office of Research on Women's Health, in collaboration with other NIH Institutes and Centers, and the Pituitary Network Association, convened an internationally recognized group of experts and a select group of patients to increase awareness and scientific understanding of the all-encompassing nature of pituitary disorders in order to improve earlier diagnosis and recognition, disseminate knowledge of state-of-the-art treatments, and arouse interest in novel scientific studies of the pathophysiology of these disorders and their many ramifications. A videocast of this meeting is available at <http://orwh.od.nih.gov/news/pastmeetings.html>.

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