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## Tests for Pituitary Tumors

Pituitary tumors are usually found when a person goes to the doctor because of [symptoms](#) they're having. But sometimes these tumors don't cause symptoms, and they're found when doing medical tests done for other health problems.

If there's a reason to suspect you might have a pituitary tumor, your doctor will use one or more tests to find out. Signs and symptoms might suggest that you could have a pituitary tumor, but tests are needed to be sure of the diagnosis and find out what [kind of pituitary tumor](#) it is.

### Medical history and physical exam

If your symptoms lead your doctor to believe that you might have a pituitary tumor, the first step is take a complete medical history to check for [risk factors](#) and to learn more about your symptoms. Your doctor may ask about your family history of tumors or other problems to see if you might have an [inherited genetic syndrome](#), such as multiple endocrine neoplasia, type 1 (MEN1).

Your doctor will also examine you to look for possible signs of a pituitary tumor or other health problems. This may include exams to look for vision or nervous system problems that could be caused by a tumor.

If a pituitary tumor is strongly suspected, your doctor may refer you to an eye doctor to check your vision, as pituitary tumors can damage nerves leading to the eyes. The most common test is to measure how well you can see. The doctor may also test your field of vision (or visual fields). At first, pituitary tumors only press on part of the optic nerves. This often leads to the loss of peripheral vision, meaning that you can't see things off to the side without actually looking right at them. Eye doctors have special instruments that can test for this.

You might also be referred to other doctors, such as an endocrinologist (a doctor who treats diseases in glands that secrete hormones) or a neurosurgeon (a doctor who uses surgery to treat brain and pituitary tumors), who might order other tests.

### Blood and urine tests of hormone levels

If your doctor suspects you might have a hormone-producing pituitary tumor, hormone levels in your blood and/or urine will be measured.

#### Somatotroph (growth hormone-secreting) adenoma

A physical exam may alert the doctor to look for this tumor because the [signs and symptoms](#) are often very distinctive.

The next step is to check the levels of growth hormone and insulin-like growth factor-1 (IGF-1) in your blood samples, which are taken in the morning after an overnight fast. When growth hormone levels are high, they cause the liver to make more IGF-1. Testing the IGF-1 level can be more helpful than checking the level of growth hormone. IGF-1 level doesn't change much during the day, while the level of growth hormone can go up and down.

If both levels are very high, the diagnosis is clearly a pituitary tumor. If the levels are slightly increased, another test called a *glucose suppression test* is often done to be sure. You'll be asked to drink a sugary liquid, then the levels of growth hormone and blood sugar will be measured at certain times. The normal response to suddenly taking in so much sugar is a drop in growth hormone levels. If the growth hormone levels stay high, a pituitary adenoma is likely the cause.

#### Corticotroph (corticotropin or ACTH-secreting) adenoma

Most of the [signs and symptoms](#) of ACTH-secreting tumors come from having too much cortisol (an adrenal steroid hormone). But quite a few diseases can cause the body makes too much cortisol, which is called Cushing's syndrome. If you have symptoms suggesting this syndrome, you'll need tests to see if it's caused by a pituitary tumor or something else.

One of the tests used measures the levels of cortisol in your saliva late at night to see if they stay elevated. (They normally drop at night.) Another may include measuring levels of cortisol and ACTH in blood samples taken at different times of the day. You also may be asked to collect all of your urine over a 24-hour period, which is then tested to measure your daily production of cortisol and other steroid hormones. One test involves taking a dose of a powerful, cortisone-like drug called dexamethasone, then checking blood or urine cortisol levels. Often more than 1 of these tests is needed to help distinguish ACTH-secreting pituitary tumors from other diseases, such as adrenal gland tumors, that can cause similar symptoms.

#### Lactotroph (prolactin-secreting) adenoma (also called a prolactinoma)

Blood prolactin levels can be measured to check for a prolactinoma.

#### Gonadotroph (gonadotropin-secreting) adenoma

Luteinizing hormone (LH) and follicle-stimulating hormone (FSH) blood levels can be checked to see if you have a gonadotropin-secreting tumor. Levels of related hormones, such as estrogen, progesterone, and testosterone, are often checked as well.

#### Thyrotroph (thyrotropin-secreting) adenoma

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Tests to measure blood levels of thyrotropin (TSH) and thyroid hormones can usually identify people with a thyrotropin-secreting adenoma.

### Null cell (non-functional) adenoma

A pituitary adenoma is considered non-functional if it doesn't make too much of any pituitary hormone. Pituitary hormone levels are not high in people with non-functional tumors. Sometimes, though, blood levels of pituitary hormones may actually be low because the adenoma crowds out the cells that normally make these hormones.

## Testing for diabetes insipidus

Diabetes insipidus can occur if the part of the pituitary that stores the hormone vasopressin (ADH) is damaged, which leads to too much water being lost in the urine. This condition can be caused by pituitary macroadenomas (or carcinomas in rare cases), or by tumors starting in parts of the brain or nerves next to the pituitary gland. It can also be a side effect of [surgery to treat pituitary tumors](#) or tumors near the pituitary gland.

In many cases, this diagnosis is made with tests that measure the amount of urine made over a 24-hour period, sodium and glucose levels in the blood, and *osmolality* (total salt concentration) of the blood and urine. If these test results are not clear, then a water deprivation study may be done. In this test, you are not allowed to drink fluids for several hours. The test is often done overnight. If your body is not making enough vasopressin, you'll continue to make urine even though you are not taking in any fluid. You may also be given an injection of vasopressin to see if this corrects the problem.

## Venous blood sampling

Corticotroph (ACTH-secreting) adenomas may be too small to be seen on imaging tests such as [MRI scans](#). When the ACTH level is high, but a person's MRI is normal, a special blood test may be useful to find the tumor.

For this test, catheters (long, soft, small tubes) are put into veins on each inner thigh through tiny cuts in the skin and are guided all the way up into the petrosal sinuses near the base of the brain. The sinuses hold 2 small veins that drain the blood from each side of the pituitary gland. Blood is taken from these 2 veins and your arm. Then an injection of corticotropin-releasing hormone (CRH, a hormone from the hypothalamus that normally causes the pituitary to make ACTH) is given. Blood samples are taken again to see if the ACTH level goes up a lot, or is higher on one side than the other. If it is, the source of the high ACTH level is a pituitary tumor.

## Imaging tests

[Imaging tests](#) use x-rays, magnetic fields, or other means to create pictures of the inside of your body. They may be done to look for pituitary tumors or to see if they have grown into nearby structures. In some cases, an imaging test of the head done for another reason may show a pituitary tumor.

### Magnetic resonance imaging (MRI) scan

[MRI scans](#) use radio waves and strong magnets to create detailed pictures of the inside of the body.

They are very helpful in looking at the brain and spinal cord and are considered to be the best way to find pituitary tumors of all types. MRI images are usually more detailed than those from CT scans (see below). They can show macroadenomas of the pituitary gland, as well as most microadenomas. But MRI might not detect microadenomas that are smaller than 3 mm (about 1/8 inch) across. Sometimes the MRI scan will show a small change in the pituitary that has nothing to do with the patient's symptoms. Between 5% and 25% of healthy people have some minor abnormality of the pituitary gland that shows up on an MRI scan.

### Computed tomography (CT) scan

A [CT scan](#) uses x-rays to create detailed cross-sectional images of part of your body. CT scans can find a pituitary adenoma if it's large enough, but MRI scans are used much more often to look at the brain and pituitary gland.

## Tests of pituitary tissue samples

In diagnosing tumors of most parts of the body, imaging tests and blood tests may strongly suggest a certain type of tumor, but a [biopsy](#) (removing a sample of the tumor to examine under a microscope) is usually the only way to be certain of the diagnosis. In many cases, doctors won't treat a tumor until a biopsy has been done.

But a biopsy isn't usually needed before treating a pituitary tumor. One reason is that the hormone tests for some types of adenomas are very accurate, so a biopsy isn't likely to provide much more information. Biopsies in this part of the body can also pose a very small risk of serious side effects. On top of this, some types of adenomas can be treated without surgery, using [medicines](#) or [radiation therapy](#).

When pituitary tumors are [removed by surgery](#), they're examined under a microscope to determine their exact type. Special stains may be used on the tumor to color the areas making hormones and [other tests](#) may be done, too. This helps classify the tumor.

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