

Adult Patient



**Knowledge**  
to live by

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Why aren't you feeling better?  
The answer may be related to  
your hormone system.

## Adult patient

### The long journey to feeling better

Sometimes, people suffer from a hormone imbalance that happens after a major health crisis. The original problem might involve a brain injury from an accident, surgery, or cancer and related treatments. Instead of feeling better over time, these people may continue to feel constantly tired, depressed, or “not themselves.” They may also see gradual changes in their bodies that they can’t explain.

If this sounds like you, you may be frustrated and confused. **Why aren’t you feeling better?** The answer may be related to your hormone system.

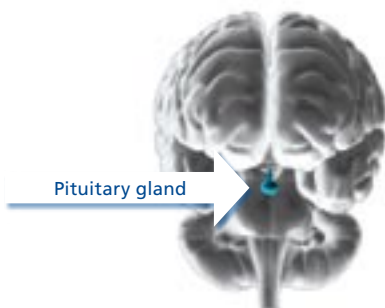
Hormones are chemical messengers that have dramatic effects on all kinds of body functions, from blood pressure, to metabolism, to bone strength.

This brochure can help you understand what happens if your body stops producing enough of one particular hormone—**human growth hormone**.

## Hormones and the master gland: your pituitary gland

Many hormones that help keep you healthy are produced by the **pituitary** (pi-TOO-i-tair-ee) **gland**. This is a pea-size organ found just under the brain, behind the bridge of your nose. The pituitary plays such an important role, it is sometimes called “the master gland.” This tiny gland makes eight different pituitary hormones.

The pituitary gland is connected to a part of the brain called the hypothalamus. This part of the brain acts like a “switching station,” bringing messages from across the brain to the pituitary, helping it do its job.



The front section of the pituitary gland makes many different hormones. One of these, **growth hormone** or **GH**, stimulates growth in childhood and is important for maintaining a healthy body in adults. It is also important in adults for maintaining muscle mass and bone mass and can affect fat distribution in the body.

Damage to the hypothalamus or the pituitary gland can create hormone imbalances and health challenges.

## Why do adults need GH?

Throughout your life, GH plays a critical role in your health. It helps regulate how your body makes and uses energy, and helps keep your bones and heart healthy.

When an adult's body has too little GH to maintain health, this condition is called adult-onset or adult-acquired growth hormone deficiency, or GHD.

If the lack of GH started during a person's childhood and continues into adult years, this is considered childhood-onset GHD.



## What causes GHD in adults?

**Adult-onset GHD is most often caused by one of the following:**

- A trauma (such as a fall or car accident) that affects the brain and the pituitary gland
- Surgery or radiation treatment in the area of the hypothalamus or the pituitary gland, either for cancer or a noncancerous tumor

Sometimes, there may be no known cause, but this usually occurs with other pituitary hormone deficits or as a continuation of childhood-onset GHD.

The most common cause of adult GHD is a benign (not cancerous) tumor of the pituitary gland, called a pituitary adenoma. The tumor itself—or treatment to shrink or remove the tumor—can lead to GHD. Other types of tumors of the pituitary gland or the hypothalamus can also cause GHD.

GHD may also occur in a condition called Multiple Pituitary Hormone Deficiency (MPHD). The pituitary stops producing healthy amounts of several hormones, including GH.



## Signs and symptoms of GHD

**Adults with GHD often feel tired and easily fatigued.**

Over time, body changes may occur, including:

- Increased fat, especially around the waist and in the face
- Decreased muscle mass

Other gradual changes that are not visible can include:

- Thinning bones
- Higher cholesterol, especially LDL (the “bad” cholesterol)

## How is GHD diagnosed?

Diagnosing GHD may be a complicated process. Many factors in the body can play a role, and some of the symptoms of GHD can also be caused by other conditions.

An endocrinologist will want to learn about your complete medical history. Physical signs and symptoms (such as those described above) offer important clues. An MRI of the brain can show possible damage in the area of the pituitary gland or hypothalamus. A special kind of X-ray called a DEXA scan looks at bone strength and health.

Blood tests that may help with diagnosis include:

- Cholesterol levels
- Complete blood count (CBC) with differentials
- Tests of various hormone levels, including thyroid hormones and testosterone or estrogen
- Measurement of IGF-1 (insulin-like growth factor 1), which is made by the liver in response to GH in the body

A person who has abnormally low levels of three or more pituitary hormones AND low levels of IGF-1 generally receives a diagnosis of GHD without further testing.

If early tests point to a diagnosis of GHD, the endocrinologist may order a test to measure GH itself.

## Stimulation (stim) tests

The pituitary gland puts out 6 to 10 random bursts of GH over the course of the day and night. GH stays in the body only a few minutes. This makes GH levels very difficult to measure. To deal with this challenge, physicians use a type of test that:

- 1. Stimulates the pituitary gland to see if it produces a burst of GH, and**
- 2. Measures how much GH the body makes**

These are called “stim tests”—short for “stimulation” of the pituitary gland.

The test usually involves fasting overnight, and then a series of blood samples are taken in the doctor’s office over a period of several hours. The blood samples must be sent to a special laboratory to measure the amount of GH they contain.



## **Why is it important to treat GHD?**

### **GHD treatment: a commitment to health...**

If you have growth hormone deficiency, effective treatments can make a big difference. Treatment usually involves replacing the missing growth hormone with a daily injection that you can do yourself. It's a big commitment, but it's worth it.

## **Help is available**

Medications for GHD are expensive and they usually require pre-approval from insurance companies. That's why many companies that make GHD treatments have programs to help you and your doctor go through every step of the process. There's support for getting started and staying on track with your medication routine.

**See page 14 for more places to turn for help.**

## Questions to discuss with your doctor

- Am I a candidate for growth hormone treatment? If yes, why?
- Are there other forms of treatment for growth hormone deficiency (GHD) besides growth hormone?
- What benefits can I hope to achieve with treatment?
- What side effects may occur and how do we manage them?
- How long may it take to see results?
- How long will I need to remain on treatment?
- Are all growth hormone medications the same?
- What is the easiest way for me to give myself growth hormone?
- Will the medication sting?
- Are there different products or devices to choose from?
- Which options or features are important to me when choosing a growth hormone device?
  - > A needle hider (so I don't have to see the needle when I have an injection)
  - > Disposable
  - > Loading medication is not required
  - > Prefilled cartridge
  - > Reconstitution (adding sterile liquid to a powder) not required
  - > Multiple doses in one pen
  - > Push-button injecting
  - > Storage flexibility (no refrigeration)
- How do I take growth hormone when I travel?
- What other medications am I taking that might affect my growth hormone dose?
- How do I fill my prescription?



## **ADDITIONAL RESOURCES**

**You can also find information and support from these organizations:**

### **The Hormone Foundation**

The public education affiliate of The Endocrine Society

8401 Connecticut Avenue, Suite 900

Chevy Chase, MD 20815-5817

Tel: 1-800-HORMONE (467-6663)

[hormone.org](http://hormone.org)

### **Human Growth Foundation**

997 Glen Cove Avenue, Suite 5

Glen Head, NY 11545

Tel: 1-800-451-6434

[hgfound.org](http://hgfound.org) | [hgf1@hgfound.org](mailto:hgf1@hgfound.org)

### **The MAGIC Foundation**

6645 W. North Avenue

Oak Park, IL 60302

Tel: 1-800-3MAGIC3 (362-4423)

[magicfoundation.org](http://magicfoundation.org)

### **Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)**

National Institutes of Health, DHHS

31 Center Drive, Bldg. 31

Rm. 2A32 MSC 2425

Bethesda, MD 20892-2425

Tel: 301-496-5133

[nichd.nih.gov](http://nichd.nih.gov)

### **Pituitary Network Association**

P.O. Box 1958

Thousand Oaks, CA 91358

Tel: 805-499-9973


[pituitary.org](http://pituitary.org)

Regional Support Groups at:

[pituitary.org/support](http://pituitary.org/support)



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