
Growth hormone

Summary

- Growth hormone is produced by our brain's pituitary gland and governs our height, bone length and muscle growth.
 - Some people abuse synthetic growth hormone in the mistaken belief it will help them increase muscle size and strength.
 - Growth hormone abuse can cause an irreversible condition called acromegaly, which is the overgrowth of bones in the face, hands and feet.
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The **pituitary gland** is a structure in our brain that produces different types of specialised hormones, including growth hormone (also referred to as human growth hormone or HGH). The roles of growth hormone include influencing our height, and helping build our bones and muscles. Natural levels of growth hormone fluctuate during the day, seemingly influenced by physical activity. For example, levels rise when we exercise.

Growth hormone levels increase during childhood and peak during puberty. In this phase of development, growth hormone promotes the growth of bone and cartilage. Throughout life, growth hormone regulates the fat, muscle, tissue and bone in our bodies, and other aspects of our metabolism such as insulin action and blood sugar levels. Growth hormone levels naturally reduce from middle age onwards.

Most commonly, doctors prescribe synthetic growth hormone to help children who have impaired hormone levels to reach their full height.

However, there is a black-market trade in synthetic growth hormone, particularly among athletes, bodybuilders and those whose positive body image depends on looking muscular. These people may take growth hormone (in combination with other muscle-building substances) in the mistaken belief that it will boost their muscle strength. However, any improvement in muscle strength is actually due to other muscle-building substances, such as **steroids**.

How growth hormone works

Our bones need enough growth hormone during our childhood and adolescence in order to lengthen to adult proportions. Growth hormone prompts our liver to make a substance called insulin-like growth factor (IGF-1). This and other similar compounds are involved in bone growth.

Growth hormone for children

Some children lack sufficient natural growth hormone to grow to their full height. Taking synthesised growth hormone can help them reach their full height. For example, children may be prescribed human growth hormone in cases of poor growth due to growth hormone deficiency, **Turner's syndrome**, and kidney failure. However, research suggests that a child with normal levels of growth hormone, who takes the synthesised version, will not grow any taller than they would have naturally, unless they take very large amounts. Children who are experiencing stunted or slowed growth should have their natural growth hormone levels checked by medical professionals before they are prescribed any medication for their condition.

Growth hormone for adults with growth hormone deficiency

Adults with growth hormone deficiency (which may result from problems with the pituitary gland or hypothalamus) may have symptoms including:

- poor bone density (which can lead to osteoporosis if untreated)
 - reduced muscle mass
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- fatigue
- depression
- poor memory
- increased body fat around the waist.

They can benefit from treatment with growth hormone injections, which can help:

- increase bone density, thereby preventing fractures
- increase muscle mass
- increase energy levels
- increase the capacity for exercise
- decrease body fat
- reduce the risk of heart disease.

Side effects of growth hormone use

Approximately one third of people who use synthetic growth hormone will experience side effects. These may include:

- fluid retention (which leads to swelling in the arms and legs)
- joint and muscle pain
- carpal tunnel syndrome
- high blood sugar levels
- high cholesterol levels.

Acromegaly and growth hormone

Acromegaly is a disorder caused by excess levels of growth hormone, most commonly as a result of a tumour in that person's pituitary gland. It causes an irreversible overgrowth of bones, particularly those of the face, hands and feet. The person's skin is also affected and becomes thick, coarse and hairy. Other side effects include high blood pressure and heart disease. If the tumour occurs in childhood, then increased height may occur leading to gigantism.

Long-term use of synthetic growth hormone can also cause acromegaly, but not gigantism. This is because it is impossible for an adult to grow taller using synthetic growth hormone. The ends of the long bones (epiphyses) in the mature skeleton are fused in adults. High doses of growth hormone can only thicken the person's bones rather than lengthen them.

Any increase in muscle size due to use of synthetic growth hormone is actually the result of an increase in connective tissue, which does not contribute to muscle strength. For this reason, use of synthetic growth hormone does not lead to increase muscle strength. In fact, in the long term, muscle weakness (including weakness of the heart) can be a result.

Creutzfeldt-Jakob disease (CJD) and growth hormone

In the past, growth hormone used to treat people was extracted, at autopsy, from the pituitary glands of people who had died. In some countries (not including Australia), it was discovered that a progressive and incurable disease of the brain called **Creutzfeldt-Jakob disease** (CJD), which results in dementia and death, was in rare cases transmitted by this method.

Nowadays synthetic growth hormone is used, and there is no risk of CJD.

Other chemicals used to increase muscle size

Some athletes or bodybuilders who abuse growth hormone in an attempt to gain muscle size and strength also use other medications or illicit drugs to speed up their physical transformation. The dangers of mixing these different chemicals are not fully known.

Some of the substances people may use include:

- **steroids** – synthetic versions of the male sex hormone testosterone. These build muscle tissue and aid rapid recovery
- **amphetamines** – to aid in fat loss
- beta-blockers – to counteract trembling, a common side effect of steroids
- diuretics – to counteract fluid retention (by making the person urinate).

Treatment for abuse of synthetic growth hormone

Giving up synthetic growth hormone can be extremely difficult for adults whose positive body image depends on looking large and muscular. Some users continue to take the hormone, even though it is affecting their health and wellbeing.

Counselling may help you to stop using synthetic growth hormone. See your doctor for information and referral, or contact an **alcohol and other drug service** in your area.

Where to get help

- Your doctor
- Endocrinologist
- Alcohol and other drug service
- **DirectLine** Tel 1800 888 236 – for 24-hour confidential alcohol and other drug counselling, information and referral
- **Australian Pituitary Foundation** Tel. 1300 331 807

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