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## Overview

### Useful For

Diagnosis of acromegaly and assessment of treatment efficacy when interpreted in conjunction with results from glucose suppression test

Diagnosis of human growth hormone deficiency when interpreted in conjunction with results from growth hormone stimulation test

This test is **not** intended for use as a screen for acromegaly.

This test has **limited value** in assessing growth hormone secretion in normal children.

### Method Name

Immunoenzymatic Assay

### NY State Available

Yes

## Specimen

### Specimen Type

Serum

### Ordering Guidance

The recommended test for assessing growth hormone secretion in normal children is IGF1 / Insulin-Like Growth Factor 1, Serum.

The preferred test for acromegaly screening is IGF1 / Insulin-Like Growth Factor 1, Serum.

### Specimen Required

**Patient Preparation:** Fasting, 8 hours

#### Container/Tube:

**Preferred:** Serum gel

**Acceptable:** Red top

**Specimen Volume:** 0.6 mL

#### Collection Instructions:

1. If multiple specimens are drawn, submit each vial under a separate order.
2. Label specimens appropriately with the corresponding collection times.

### Forms

[If not ordering electronically, complete, print, and send an Oncology Test Request \(T729\)](#) with the specimen.

### Specimen Minimum Volume

0.5 mL

### Reject Due To

|                 |        |
|-----------------|--------|
| Gross hemolysis | Reject |
| Gross lipemia   | OK     |

### Specimen Stability Information

| Specimen Type | Temperature              | Time    | Special Container |
|---------------|--------------------------|---------|-------------------|
| Serum         | Refrigerated (preferred) | 7 days  |                   |
|               | Frozen                   | 90 days |                   |

## Clinical and Interpretive

### Clinical Information

The anterior pituitary secretes human growth hormone (hGH) in response to exercise, deep sleep, hypoglycemia, and protein ingestion. hGH stimulates hepatic insulin-like growth factor-1 and mobilizes fatty acids from fat deposits to the liver. Hyposecretion of hGH causes dwarfism in children. Hypersecretion causes gigantism in children or acromegaly in adults.

Because hGH levels in normal and diseased populations overlap, hGH suppression and stimulation tests are needed to evaluate conditions of hGH excess and deficiency; random hGH levels are inadequate.

### Reference Values

Adults

Males: 0.01-0.97 ng/mL

Females: 0.01-3.61 ng/mL

Reference intervals have not been formally verified in-house for pediatric and adolescent patients. The published literature indicates that reference intervals for adult, pediatric, and adolescent patients are comparable.

For SI unit Reference Values, see <https://www.mayocliniclabs.com/order-tests/si-unit-conversion.html>

### Interpretation

**Acromegaly:** For suppression testing, normal subjects have a nadir human growth hormone (hGH) concentration below 0.3 ng/mL after ingestion of a 75-gram glucose dose. Patients with acromegaly fail to show normal suppression. Using the Access ultrasensitive hGH assay, a cutoff of 0.53 ng/mL for nadir hGH was found to most accurately differentiate patients with acromegaly in remission from active disease with a sensitivity of 97% (95% CI, 83%-100%) and a specificity of 100% (95% CI, 82%-100%).(1)

**Deficiency:** A normal response following stimulation tests is a peak hGH concentration above 5 ng/mL in children and above 4 ng/mL in adults. For children, some experts consider hGH values between 5 ng/mL and 8 ng/mL equivocal

and only GH peak values greater than 8 ng/mL as truly normal. Low levels, particularly under stimulation, indicate hGH deficiency.

### Cautions

As the hGH test has limited value in assessing growth hormone secretion in normal children, IGF1 / Insulin-Like Growth Factor 1, Serum is recommended as the first test for assessing deficient or excess growth during childhood and adolescent development. IGF1 reference intervals for Tanner stages are available. Suspected causes of dwarfism should be diagnosed with the aid of provocative testing.

Elevated levels of human growth hormone indicate the possibility of gigantism or acromegaly, but must be confirmed with stimulation and suppression testing.

Growth hormone is secreted in surges; single measurements are of limited diagnostic value.

### Clinical Reference

1. Bancos I, Algeciras-Schimmich A, Woodmansee WW, et al: Determination of nadir growth hormone concentration cutoff following oral glucose tolerance testing using the Beckman Coulter ultrasensitive growth hormone assay patients with newly diagnosed acromegaly, acromegaly in remission, and healthy subjects. *Endocr Pract* 2013 Jun 27:1-26
2. Camacho-Hubner C: Assessment of growth hormone status in acromegaly: what biochemical markers to measure and how? *Growth Hormone IGF Res* 2000;10 Suppl B:S125-299
3. Nilsson AG: Effects of growth hormone replacement therapy on bone markers and bone mineral density in growth hormone-deficient adults. *Horm Res* 2000;54 Suppl 1:52-57
4. Strasburger CJ, Dattani MT: New growth hormone assays: potential benefits. *Acta Paediatr* 1997 Nov;Suppl 423:5-11
5. Okada S, Kopchick JJ: Biological effects of growth hormone and its antagonist. *Trends Mol Med* 2001Mar;7:126-132
6. Veldhuis JD, Iranmanesh A: Physiological regulation of human growth hormone (GH)-insulin-like growth factor type I (IGF-I) axis: predominant impact of age, obesity, gonadal function, and sleep. *Sleep* 1996;19:S221-224
7. Melmed S: Pathogenesis and diagnosis of growth hormone deficiency in adults. *N Engl J Med* 2019 Jun 27;380(26):2551-2562. doi: 10.1056/NEJMra1817346

### Performance

#### Method Description

The instrument used is the Beckman Coulter UniCel DXI 800. The Access Ultrasensitive human growth hormone (hGH) assay is a simultaneous one-step immunoenzymatic ("sandwich") assay. A sample is added to a reaction vessel along with polyclonal goat anti-hGH alkaline phosphatase conjugate and paramagnetic particles coated with mouse monoclonal anti-hGH antibody. The patient sample hGH binds to the monoclonal anti-hGH on the solid phase, while the goat anti-hGH-alkaline phosphatase conjugate reacts with a different antigenic site on patient sample hGH. After incubation in a reaction vessel, materials bound to the solid phase are held in a magnetic field while unbound materials are washed away. Then, the chemiluminescent substrate Lumi-Phos 530 is added to the vessel and light generated by the reaction is measured with a luminometer. The light production is directly proportional to the concentration of hGH in the sample. The amount of analyte in the sample is determined from a stored, multi-point calibration curve. (Package insert: Beckman Coulter Inc, Fullerton, CA, 03/2019)

**PDF Report**

No

**Day(s) Performed**

Monday through Saturday

**Report Available**

1 to 3 days

**Specimen Retention Time**

14 days

**Performing Laboratory Location**

Rochester

**Fees and Codes****Fees**

- Authorized users can sign in to [Test Prices](#) for detailed fee information.
- Clients without access to Test Prices can contact [Customer Service](#) 24 hours a day, seven days a week.
- Prospective clients should contact their Regional Manager. For assistance, contact [Customer Service](#).

**Test Classification**

This test has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

**CPT Code Information**

83003

**LOINC® Information**

| Test ID | Test Order Name   | Order LOINC Value |
|---------|-------------------|-------------------|
| HGH     | Growth Hormone, S | 2963-7            |

| Result ID | Test Result Name  | Result LOINC Value |
|-----------|-------------------|--------------------|
| HGH       | Growth Hormone, S | 2963-7             |