

Insulin-Like Growth Factor Binding Protein 3 (IGFBP-3)

MDL Test Number: 620

Methodology: Immunoassay

CPT Codes: 83520 x 1



Specimen Collection Platform:

Serum in Serum Separator Tube (SST)

Turnaround Time:

24 - 72 hours

Stability:

Room temperature

Test Additions*:

30 days to add tests

Specimen Collection:



1. Immediately after blood collection, invert the tube(s) gently 5 times to ensure mixing of clot activator.



2. Allow the tube to rest upright for at least 30 minutes after collection to ensure proper clotting.



3. Centrifuge for at least 15 minutes at 2200-2500 RPM within one hour of collection.



4. Do not remove the stopper or pour off serum.



What is IGFBP-3?

IGFBP-3, short for insulin-like growth factor binding protein 3, is a protein made mainly by the liver. Its job is to carry insulin-like growth factor 1 (IGF-1) through the bloodstream. About 95 percent of the IGF-1 in circulation is bound to IGFBP-3, which makes IGFBP-3

the main carrier of this growth factor. Binding also shields IGF-1 from being cleared quickly, stretching the time it stays active in the blood from minutes to several hours.

The liver makes IGFBP-3 in response to growth hormone, so the amount in the blood reflects how much growth hormone the pituitary gland, a small gland at the base of the brain, has been releasing over recent days. Growth hormone itself is released in short bursts, and a single growth hormone measurement can read high or near zero depending on the minute the blood was drawn. IGFBP-3 does not behave that way. It holds steady through the day, so one sample gives a usable picture. Levels are highest in early adulthood and fall gradually with age, which is why the expected range is set by age band.

Why test for IGFBP-3?

A healthcare provider may order an IGFBP-3 test to measure how much of this protein is present in the blood. Common reasons include:

- **Evaluating an adult for growth hormone deficiency**, alongside IGF-1, when fatigue, reduced muscle mass, increased body fat, or low bone density point toward a problem with the pituitary gland
- **Investigating suspected growth hormone excess, called acromegaly**, in which a benign pituitary tumor releases too much growth hormone, and IGFBP-3 rises along with IGF-1
- **Assessing pituitary function after surgery, radiation treatment, a head injury, or a pituitary tumor**, where growth hormone is often the first of the pituitary hormones to be lost
- **Looking into pituitary damage caused by severe blood loss around childbirth**, known as Sheehan syndrome, in which the gland loses part of its blood supply, and several hormones fall together
- **Helping interpret an IGF-1 result**, since nearly all IGF-1 travels bound to IGFBP-3, and the two are read together
- **Following an adult who is receiving growth hormone replacement**, to check that the treatment is having the expected effect



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Special Instructions:

- **Biotin supplements:** Biotin, sold on its own as vitamin B7 and included in many hair, skin, and nail products, can interfere with this test. The manufacturer reports that a sample containing biotin at 1500 nanograms per milliliter shifts the result by no more than 10 percent, and that higher amounts may give an incorrect result. No stop-taking interval has been established for this test, so patients should tell the ordering provider about any biotin they take and follow that provider's advice on timing.
- **Collection timing:** No special timing is needed. Unlike growth hormone itself, IGFBP-3 does not rise and fall through the day, so the sample may be drawn at any time, and the patient does not need to fast.
- **Growth hormone treatment:** In a patient already receiving growth hormone, the result reflects the treatment rather than what the pituitary gland is producing on its own. The ordering provider should know whether treatment has started and how long it has been running.
- **Comparing results over time:** IGFBP-3 methods differ from one another, and the same sample can give different numbers on different systems. When results are being tracked over time, use the same test at the same laboratory each time so the comparison is meaningful.

Limitations:

Every laboratory test has limits. For IGFBP-3, the main ones are:

- This test measures IGFBP-3 between 0.1 and 16 micrograms per milliliter. Adult results sit well inside that span. A sample reading above the upper value can be diluted and measured again, and the reported number is calculated from that dilution.
- IGFBP-3 depends on growth hormone, but growth hormone is not the only thing that moves it. Poor nutrition, liver disease, kidney disease, thyroid disease, and serious illness all lower it. A low result, therefore, does not on its own establish growth hormone deficiency, and a normal result does not rule it out.
- The expected range falls steadily from early adulthood onward, so a result has to be read against the range for the patient's age. A value that would be ordinary at 25 can be clearly high at 75.
- A small number of patients carry natural antibodies in their blood — often people who work closely with animals or who have received certain antibody-based treatments — that can interfere with the test and produce an unexpected result.
- Growth hormone deficiency in an adult is not diagnosed from a binding protein alone. Current guidance rests on stimulation testing, in which growth hormone is measured after a challenge designed to provoke its release, with IGF-1 and IGFBP-3 used as supporting evidence.
- An IGFBP-3 result is one piece of a larger picture. It is meant to be read together with the patient's symptoms, medical history, and other test results — never on its own.

Reference Range(s):

IGFBP-3 is measured in micrograms per milliliter ($\mu\text{g/mL}$). Because levels fall gradually with age, the expected range is set in five-year age bands across adulthood. The bands below are shown as examples of the pattern; the laboratory applies the band that matches the patient's age:

- **Ages 21 to 25** (the highest adult levels): **3.4–7.8 $\mu\text{g/mL}$**
- **Ages 46 to 50:** **3.3–6.7 $\mu\text{g/mL}$**
- **Ages 66 to 70:** **3.0–6.2 $\mu\text{g/mL}$**
- **Ages 81 to 85:** **2.2–4.5 $\mu\text{g/mL}$**

A result outside these ranges is not automatically a problem, and a result inside them does not rule one out. Only the ordering provider can interpret what a given number means for a given patient. Patients should always go by the reference range printed on their own laboratory report.

Analyte	Disorder	Expected Value*
IGFBP-3	Adult growth hormone deficiency	↓
IGFBP-3	Hypopituitarism	↓↓
IGFBP-3	Acromegaly	↑
IGFBP-3	Chronic liver disease	↓
IGFBP-3	Postmenopause (natural)	↓

*↓ – Decreased, ↓↓ – Markedly Decreased, ↑ – Increased.

What are some references that discuss the medical necessity of testing IGFBP-3?

1. Melmed S. Pathogenesis and diagnosis of growth hormone deficiency in adults. *N Engl J Med*, **380**, 2551–2562 (2019).
2. Yuen KCJ, et al. American Association of Clinical Endocrinologists and American College of Endocrinology guidelines for management of growth hormone deficiency in adults and patients transitioning from pediatric to adult care. *Endocr Pract*, **25**, 1191–1232 (2019).
3. Giustina A, et al. Consensus on criteria for acromegaly diagnosis and remission. *Pituitary*, **27**, 7–22 (2024).
4. Fleseriu M, et al. Hormonal replacement in hypopituitarism in adults: an Endocrine Society clinical practice guideline. *J Clin Endocrinol Metab*, **101**, 3888–3921 (2016).
5. Karaca Z, et al. Sheehan syndrome. *Nat Rev Dis Primers*, **2**, 16092 (2016).
6. Cappola AR, et al. Hormones and aging: an Endocrine Society scientific statement. *J Clin Endocrinol Metab*, **108**, 1835–1874 (2023).



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