

## Insulin-like Growth Factor Binding Protein 3; IGFBP-3

Diagnosis and monitoring of growth disorders

### General information

**Collection container:** Serum with gel separator (Sarstedt brown top, 4.9mL adults / 1.1 mL paediatrics) or Serum (Sarstedt white top, 1.2 mL paediatrics only) or Lithium heparin plasma (Sarstedt orange top, 4.9 mL adults / 1.2 mL paediatrics)

**Type and volume of sample:** 1.0 mL whole blood is required as a minimum volume.

**Specimen transport/special precautions:** The tubes should be thoroughly mixed before transport to the lab.

### Laboratory information

**Method principle:** IGF-BP3 is analysed on an automated instrument using a chemiluminescent immunoassay.

#### Biological reference ranges:

*Nele Friedrich et al. Age- and Sex-Specific Reference Intervals Across Life Span for Insulin-Like Growth Factor Binding Protein 3 (IGFBP-3) and the IGF-I to IGFBP-3 Ratio Measured by New Automated Chemiluminescence Assays. J Clin Endocrinol Metab, May 2014, 99(5):1675-1686*

Females

Age (years)	Number of subjects	Lower limit (2.5% percentile)	Upper limit (97.5% percentile)
<1	104	1.05	3.61
1	168	1.22	3.94
2	23	1.39	4.36
3	50	1.55	4.75
4	67	1.71	5.10
5	93	1.85	5.34
6	153	1.95	5.46
7	184	2.02	5.57
8	188	2.10	5.69
9	176	2.18	5.83
10	198	2.27	5.98
11	160	2.36	6.12
12	111	2.44	6.24

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### Biochemistry

13	80	2.52	6.33
14	104	2.58	6.40
15	105	2.64	6.45
16	156	2.68	6.48
17	63	2.72	6.50
18	71	2.75	6.52
19	47	2.78	6.54
20-54	2913	2.29	6.57
55-80	2881	1.93	5.73
>80	182	1.93	5.85

### Males

Age (years)	Number of subjects	Lower limit (2.5% percentile)	Upper limit (97.5% percentile)
<1	107	1.11	3.52
1	189	1.29	3.86
2	24	1.47	4.29
3	23	1.64	4.69
4	32	1.80	5.05
5	35	1.94	5.31
6	87	2.04	5.43
7	110	2.10	5.51
8	96	2.15	5.60
9	63	2.22	5.73
10	108	2.30	5.88
11	139	2.39	6.03
12	96	2.46	6.15
13	122	2.53	6.24
14	136	2.58	6.29
15	122	2.61	6.31
16	177	2.64	6.32
17	106	2.66	6.32
18	62	2.68	6.33

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### Biochemistry

19	43	2.70	6.35
20-54	1471	2.22	6.37
55-80	2523	1.65	5.77
>80	176	1.63	5.46

### Tanner stage related reference ranges - IGF-BP3

-	Tanner	Age range	2.5% (mg/l)	97.5% (mg/l)
<b>Male</b>	I	6.1-12.9	2.71	5.26
	II	8.1-14.8	3.53	5.75
	III	10.9-16.0	3.73	6.39
	IV	12.4-17.1	3.37	6.20
	V	13.5-20.0	3.87	6.65
<b>Female</b>	I	5.8-12.1	2.80	5.24
	II	9.3-14.1	3.05	5.60
	III	9.3-15.1	3.93	6.01
	IV	11.8-16.6	3.80	6.36
	V	12.5-19.9	3.88	6.49

**Turnaround time:** 3 weeks

### Clinical information

IGF-BP3 is one of the main binding proteins for IGF-1 and can be used to help diagnose or monitor paediatric patients with growth hormone deficiency.

75-90% of IGF-1 in serum circulates as a 150kDa ternary complex bound to acid labile subunit (ALS) and IGF-binding protein 3 (IGF-BP3). There are six IGF-BPs secreted into the circulation but only IGF-BP3 and BP5 are induced by GH and therefore may be used as markers of GH deficiency.

The levels of IGF-BP3 are similar to IGF-I in that they are age, gender and tanner stage dependent; however, the influence of nutritional status is not as great as it is on IGF-I.

IGF-BP3 has a very high specificity for diagnosing GHD (>90%), therefore, low levels of IGF-BP3 are strongly suggestive of GHD. However, the sensitivity of IGF-BP3 in diagnosing GHD is much lower (<50%), so normal levels of IGF-BP3 do not necessarily rule out GHD.

#### Factors known to significantly affect the results:

Samples collected into oxalate or citrate are not suitable for analysis as these additives cause a negative bias in results.

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Biochemistry

Grossly haemolysed samples are unsuitable for analysis

**(Last updated February 2016)**