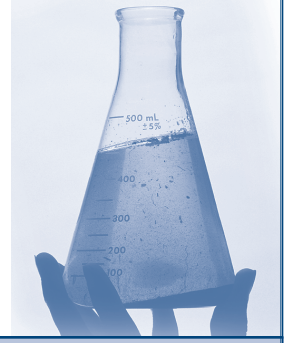


# LAB NOTES



## Growth Hormone

Growth hormone (GH) is a protein (single-chain polypeptide) that is produced by the pituitary gland and is vital for normal growth.<sup>1</sup> GH promotes the growth of many soft tissues, in cartilage and in bone.<sup>1</sup> GH deficiency exists when this hormone is absent or produced in inadequate amounts. GH deficiencies may be congenital or acquired, idiopathic or due to anatomic damage to the pituitary or hypothalamus. It is estimated that 10,000 to 15,000 children in the United States have growth failure due to growth hormone deficiency.<sup>1</sup> Signs of GH deficiency in children are decreased growth, hypoglycemia, decreases in muscle mass, and increased adipose tissue.<sup>2</sup> In adults the signs of deficiency are elevated lipids, increased abdominal obesity, decreased energy, decreased muscle mass, decreased cardiac output, sleep problems, reduced memory function, and decreased bone density.<sup>2</sup>

Growth hormone deficiency is moderately difficult to diagnose because the pituitary gland produces the hormone in bursts. Plasma concentrations of GH remain relatively low during most of the day, with one or two spikes 3-4 hours after meals.<sup>3</sup> Both adults and children show a significant increase in GH secretion 60-90 minutes after the onset of sleep.<sup>3</sup> Measurement of GH under random conditions is generally not of value and a single measurement usually cannot differentiate between normal variation and levels seen in pituitary disease. Because the basal serum level of GH is often low in normal individuals, it is essential to use provocative agents to stimulate GH secretion in order to evaluate a patient. A normal response to a provocative test points strongly against GH deficiency, but a single test is not considered diagnostic because as many as 20-30% of normal subjects may be unable to secrete adequate GH in response to a provocative agent at any given time.<sup>3</sup> Therefore, to diagnose GH deficiency it is necessary to demonstrate that the serum concentration of GH remains low after at least two different provocative agents. A child is considered deficient in GH if his/her GH level remains below 10ng/ml after a provocative agent.<sup>2</sup> For an adult, a GH level below 5ng/ml after stimulation is diagnostic for deficiency.<sup>2</sup> There are a number of pharmacologic agents that stimulate GH release, including arginine and clonidine.<sup>2</sup>

The protocol for growth hormone stimulation testing is determined by the doctor ordering the test, however the basic protocol is:

- Collect baseline growth hormone specimen.
- Infuse specified drug.
- Collect GH samples every 30 minutes up to 150 minutes.

HHLA has a unique program for collecting the specimens required for GH Stimulation testing. Our special GH Stimulation Lab-in-a-Box<sup>®</sup> kit meets all of your specific needs. The kit contains enough tubes to do multiple timed draws. The bar codes included are specific to each timed draw and therefore eliminate the need to write data on each tube. The requisition is designed specifically for GH stimulation testing and makes the ordering process extremely simple.



The Lab-in-a-Box<sup>®</sup>

1. "Growth Hormone Deficiency" pg 1-5, <http://www.hgfound.org/growth.html> copyright 1979, updated 11-11-2003, Human Growth foundation Inc.
2. American Assoc. of Clinical Endocrinologists Medical Guidelines for Clinical Practice for Growth Hormone use in Adults and Children 2003 Update, pg 1-13 Endocrine Practice Vol. 9 No.1 Jan/Feb 2003
3. "Growth hormone in growth hormone deficiency" pg 1-5 <http://bmj.com/cgi/content/full/325/1355/58> Dept of Pediatrics Paul Saenger