Growth Hormone	
Description	Growth hormone (GH) is a protein-based peptide hormone. It stimulates growth, cell reproduction and regeneration in humans and other animals. Growth hormone is a 191-amino acid, single-chain polypeptide that is synthesized, stored, and secreted by the somatotroph cells within the lateral wings of the anterior pituitary gland. Somatotropin refers to the growth hormone 1 produced naturally in animals, whereas the term somatropin refers to growth hormone produced by recombinant DNA technology, and is abbreviated "HGH" in humans. Growth hormone is used in medicine to treat children's growth disorders and adult growth hormone deficiency. In recent years, growth hormone replacement therapies have become popular in the battle against ageing and obesity. Reported effects on GH-deficient patients (but not on healthy people) include decreased body fat, increased muscle mass, increased bone density, increased energy levels, improved skin tone and texture, increased sexual function, and improved immune system function.
Indication	To identify diseases and conditions caused by either a deficiency (GHD) or overproduction of growth hormone (GH), to evaluate pituitary function, and to monitor the effectiveness of GH treatment. As part of an evaluation of symptoms suggestive of gigantism (in children) or acromegaly (in adults). Slow growth in stature, delayed maturational development (in children), decreased bone density and/or muscle strength, and increased lipids (in adults) all could be related to insufficient GH production.
Additional Info	Pituitary tumors are the most common cause of excess GH production but may also cause deficiencies. Presence of a pituitary tumor can affect GH production, but may also affect production of other pituitary hormones, such as ACTH (Cushing's syndrome) or prolactin (galactorrhoea). If the tumor is relatively large, it may inhibit all pituitary hormone production and cause damage to the surrounding tissues. Factors that can interfere with GH testing include: stress, exercise, and low blood glucose levels; drugs that can increase GH include: amphetamines, arginine, dopamine, estrogens, glucagon, histamine, insulin, levodopa, methyldopa, and nicotinic acid; drugs that can decrease GH levels: corticosteroids and phenothiazines; radioactive scan within week of test (with some laboratory methods).
Concurrent Tests	IGF-1, ACTH, TSH and glucose tolerance test, GH stimulation and suppression tests.
Dietary Requirements	N/A
Interpretation	*GH stimulation testing* is ordered when a child has symptoms of GHD, such as when: growth rate slows down in early childhood and is significantly shorter than others of similar age; TSH tests show that a child is not hypothyroid (low thyroid levels can also cause slowed growth); X-rays show delayed bone development; suspicion that pituitary gland is under-active. Once GHD is diagnosed, stimulation testing is done to confirm the diagnosis, along with IGF-1 to monitor the effectiveness of GH replacement (if indicated), and as a child reaches adulthood to see if continued supplementation is necessary. GH levels are also monitored in children who have received radiation therapy. Stimulation testing is ordered in adults when patients have symptoms of GHD and/or hypopituitarism, such as decreased bone density, fatigue, adverse lipid changes, and reduced exercise tolerance. Other hormone testing is done first to rule out other conditions that may cause

	similar symptoms. If GH levels are not significantly stimulated during a GH stimulation test (they stay lower than they should) and one has symptoms of GHD; other pituitary hormone levels are normal and/or controlled; IGF-1 level is low then it is likely that there is deficiency of GH. If TSH level is low, then that should be addressed first as thyroid deficiencies can cause symptoms similar to GHD. You may also have a more general decrease in pituitary function. *GH suppression testing* is done when children show signs of gigantism, when adults show signs of acromegaly, and/or when their doctor suspects hyperpituitarism. Suppression testing may be done when a pituitary tumor is suspected and may be used along with IGF-1 levels and other hormone levels to monitor the effectiveness of treatment for these conditions. Monitoring may continue at regular intervals for many years to watch for recurrence. Since GH is released by the pituitary in bursts, random GH levels are not very useful. GH levels will be higher first thing in the morning and will increase with exercise and stress. If GH levels are not significantly suppressed during a GH suppression test (they stay higher than they should) and one has symptoms of gigantism or acromegaly; other pituitary hormone levels are normal and/or controlled; IGF-1 levels are high then it is likely that too much GH is being produced.
Collection Conditions	Serum sample. Random GH tests are rarely useful.
Frequency of testing	N/A