

# IGF-2

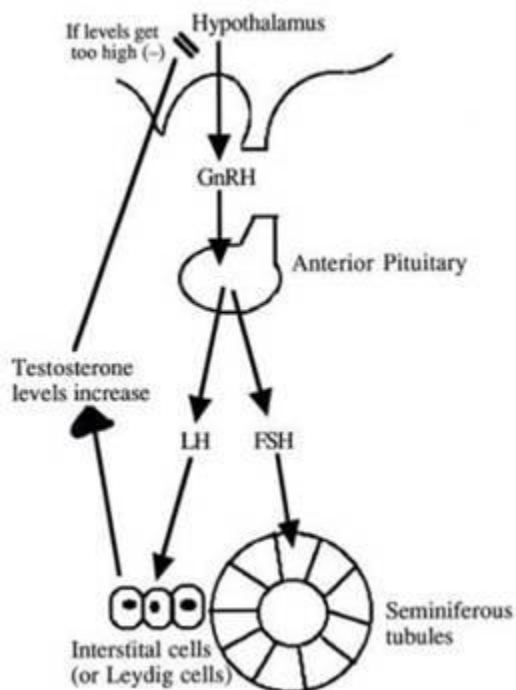
IGF-2™ is a powerful blend of the strongest legally available herbal compounds, perfectly standardized to provide the highest quality and effectiveness. IGF-2™ incorporates Safed Musli, Mucuna Pruriens, Dodder Seed, and Rhodiola Rosea combined into a specific, synergistic formula that produces amazing results faster than would ever be expected from an over-the-counter preparation.

Safed Musli (*chlorophytum borivillanum*) is an Ayurvedic herb used for centuries to improve physical strength and male fertility, and in more recent animal studies has been shown to significantly increase testosterone levels (4,5,6,27, 28). Mucuna Pruriens, another Ayurvedic herb, contains high concentrations of L-Dopa, a compound responsible for increasing endogenous GH and testosterone secretion (12,29,30,31,32). Dodder Seed (*Cuscuta Chinesea*) is an herb used by the Chinese for centuries to treat male impotence and infertility, which has been shown to increase cAMP production (cyclic AMP – a precursor to ATP, the primary cellular energy molecule), as well as testosterone levels (24). Rhodiola Rosea is an adaptogenic herb that has been shown in animal studies to boost ATP, glycogen, and Creatine Phosphate levels, and has been shown in humans to decrease physiological stress while increasing memory, alertness, and energy (18-23).

## **Chlorophytum Borivillanum and Mucuna Pruriens: A Potent Testosterone and GH-Enhancing Stack**

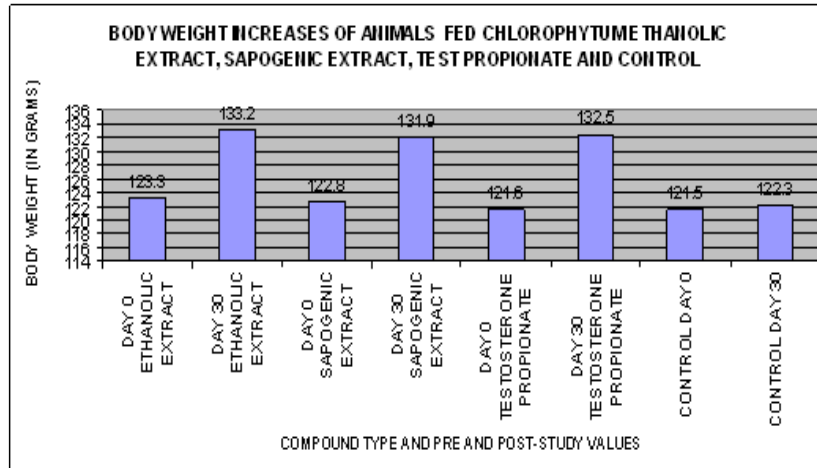
The two principle components of IGF-2, Mucuna Pruriens and Safed Musli (*Chlorophytum Borivillanum*), are a potent testosterone and Growth Hormone (GH)-boosting combination. Recent studies have shown that mucuna pruriens can increase natural testosterone production through inhibiting prolactin and thereby increasing luteinizing hormone (LH) levels (12,29-32). Prolactin is a hormone that has a regulatory role over gonadotrophic hormone secretion, meaning that it can suppress the action and release of these important hormones (1,3). This is important because gonadotrophic hormones control the entire process of male testosterone production, and luteinizing hormone (a gonadotrophic hormone directly responsible for spermatogenesis and natural testosterone production) is a key factor in the control of endogenous male androgen production. Prolactin can directly suppress the secretion of luteinizing hormone, an action that can hinder natural testosterone production significantly, thus not allowing optimal levels of the hormone to be produced by the testes (1,3). By inhibiting prolactin, mucuna pruriens increases endogenous testosterone levels dramatically, resulting in increased lean body mass gains and better recovery (29-32).

**Figure 1: THE MALE HORMONAL PATHWAY**



Moreover, the ethanolic and sapogenic extracts of *Chlorophytum Borivilianum* have been shown in animal studies to increase testosterone and body weight significantly (*see below*), and in some instances, these increases have been comparable to testosterone propionate, a potent anabolic steroid (4-6, 26-28). *Chlorophytum* seems to act as a phytoandrogen (an herbal substance that acts on the androgen receptor), and anecdotal data from products containing this compound also point to increased testosterone and lean body mass (4-6, 26-28). While the mechanism of action for *Chlorophytum* is poorly understood, and more research on the compound must be conducted, it seems to act in a manner very similar to testosterone, in both terms of strength and lean body composition (26-28).

**Figure 2: BODY WEIGHT INCREASES DURING A STUDY USING CHLOROPHYTUM**



Another positive benefit of IGF-2 is growth hormone (GH) enhancement. The main standardized ingredient of *Mucuna pruriens* is a L-Dopa, a potent compound that has been shown to significantly increase levels of growth hormone in human subjects in an orally viable manner. L-Dopa does this through inhibiting hypothalamic somatostatin secretion. Somatostatin is important because it inhibits GH secretion directly from somatotrophs. Therefore, by inhibiting somatostatin via taking L-Dopa (found in IGF-2), overall mean serum GH will increase significantly.

**Figure 3: Injectable Growth Hormone**



This is good news for anyone looking to build muscle, as GH stimulates skeletal muscle cells to grow (hypertrophy) and, in some cases, divide (hyperplasia). GH can also have significant positive effects on fat loss as well, as it mobilizes fats from fat depots and decreases the rate of glucose intake and metabolism (1-3, 7-11, 16-17).

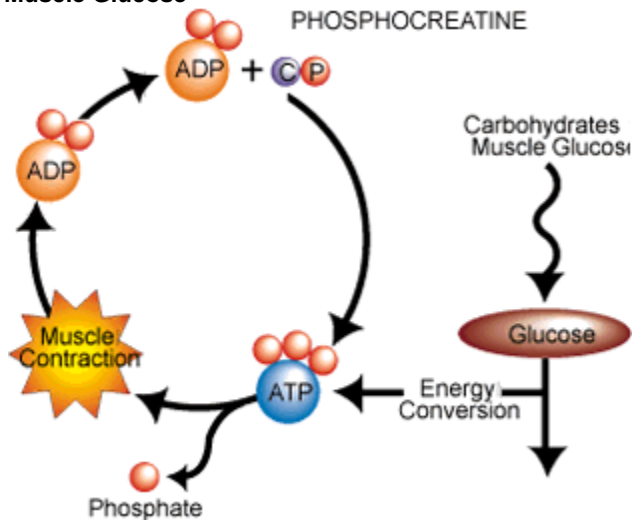
**Dodder Seed and Rhodiola Rosea**

Dodder Seed is another important component of IGF-2™ as it also activates the second messenger system, and subsequently causes adenylate cyclase to generate cAMP from ATP (1, 24-26). cAMP generation has a variety of effects on tissue and glandular activity, but the most notable is the stimulation of the thyroid to produce thyroxin (promoting elevated fat burning). Increased cAMP levels to also activate the protein kinase enzyme, which in turn activates hormone-sensitive lipase (HSL) in targeted tissues(10-11, 13-15,17) and signals for the production of luteinizing hormone, which elevates testosterone levels in males (1-3,25). Elevations in these two hormones can cause a marked increase in fat as body fuel, as well as a strong correlation to decreased body fat and increased muscle mass, density and strength (1-3, 10-11).

Rhodiola Rosea also displays some individualistic qualities of greater ATP enhancement and creatine phosphate storage in animal studies (18-20, 23). At the Tomsk State University and Medical Institute in Russia, mice were administered Rhodiola supplementation and made to swim to exhaustion twice a day for six days. At the end of the testing period, muscle biopsies were performed, with the Rhodiola-treated mice having 17% greater ATP levels 45% greater creatine phosphate stores, and 53% greater muscle glycogen levels, while having lower intramuscular concentrations of lactic acid and ammonia (21-22).

**Figure 4: The ATP-PCr System**

**Carbohydrates**  
**Muscle Glucose**



The rosavin and salidroside content of Rhodiola Rosea has also been shown to have significant effects on stress reduction in human studies by reducing cortisol release, while optimizing levels of key brain chemicals such as serotonin and dopamine that function together to maintain a healthy response to stress (18-23). Blocking cortisol is a very important effect, as cortisol breaks down muscle tissue and increases body fat, slowing the metabolism and lowering immune function. Rhodiola has been shown to also have adaptogenic qualities, allowing the human body to work harder during stress, while at the same time maintaining higher energy reserves (18-23). This is important to hard-training athletes because intense stress and strain can cause significant increases in stress hormone levels like cortisol, thus diminishing results (18-23).

### **Synergy**

The ingredients in IGF-2™, precisely blended to optimal ratios together produce a powerful synergistic combination. Synergism of hormones occurs in situations where more than one hormone produces the same effects at the target cell, and their combined effects are amplified. Safed Musli and Mucuna Pruriens, as mentioned before, increase testosterone and growth hormone release, leading to more rapid muscular growth, along with increased recovery and noticeable strength increases (1,10,11,12,16,17).

1. Marieb, E. *Human Anatomy and Physiology, 6th Edition*. (2004). Pearson Benjamin Cummings, San Francisco.
2. Singh R, Artaza WE, Taylor WE (2005) Testosterone inhibits adipogenic differentiation in 3t3-L1 cells: nuclear translocation of androgen rec. complex w/ catenin. *Endocrinology* 16210377

3. Hikim, Bashim, Taylor (2004) Androgen Receptor in Human Skeletal Muscle and Cultured Muscle Cells: Up regulation by androgen treatment. *The J. of Clin. Endo. And Metab.* **89**: 5245-5255.
4. Kaushik, N (2005) Saponins of Chlorophytum Species. *Phytochemistry Reviews*. **4**(2-3): 191-196.
5. Rath, S (2003) Botanical source of safed musli. *Sachitra Ayurved*. **55**(11): 866-869.
6. Deepak and Bhatnagar (2004) Pharmacognostical evaluation of Chlorophytum borivillanum root, *Ancient Science of Life*. **24**(1): 30-37.
7. Richelsen B (1999) Effect of growth hormone on adipose tissue and skeletal muscle lipoprotein lipase activity in humans. *J Endocrinol Invest*. **22**(5):10-15.
8. Dimaraka EV, Jaffe CA, Bowers CY, Marbach P (2003) Pulsatile and nocturnal growth hormone secretions in men do not require periodic declines of somatostatin. *Am J Physiol Endocrinol Metab*. **285**(1): 163-170.
9. Jensen MD (2003) Effects of growth hormone administration on human obesity. *Obes. Res*. **11**(2). 170-5.
10. The thyroid gland. *Endocrinology: An Integrated Approach* by Stephen Nussey and Saffron Whitehead (2001). Published by BIOS Scientific Publishers Inc.
11. Eggo MC, Bachrach LK, Burrow GN. (1990) Interaction of TSH, insulin and insulin-like growth factors with thyroid growth and function. *Growth Factors*. **2**(2-3). 99-109.
12. Rathi SS, Grover JK, Vats V. (1999) The effect of momordica charantia and Mucuna pruriens in experimental diabetes and their effect on key metabolic enzymes involved in carbohydrate metabolism. Department of Pharmacology, All India Institute of Medical Sciences, Ansari Nagar, New Delhi.
13. Parikh et al, (1990) *Indian Drugs*. Chem Abs **27**: 353. \
14. Ahmad S et al (1991) Conference of Pharmacology and Simposium on Herbal Drugs (New Delhi), March 1991, **15**:26.
15. Manyam BV (1995) *J. Altern. Completment Med. Fall*. **1**(3) 244-255.
16. Takahashi Y, Kipnis M, Daughaday WH (1968) Growth hormone secretion during sleep. *J Clin Invest* **47**(9): 2079-2090.
17. Kar A, Panda S, Bharti S (2002) Relative efficacy of three medicinal plant extracts in the alteration of thyroid hormone concentrations in male mice. *J Ethnopharmacol* **81**(2): 281-85.
18. Saratikov AS et al. (1987). Rhodiola Rosea is a valuable medicinal plant (Golden Root). **Tomsk, Russia: Tomsk State University Press.**
19. Sandberg F (1998) *Herbal Remedies and Herbal Magic*. Stockholm, Sweden: Det Basta; p. 223.
20. Narr H, (1993) *Phytochemical and Pharmacological investigation of the adaptogens: Rhodiola crenata and Rosea* {dissertation}. Munich, Germany: Faculty of Chemistry and Pharmacy, Ludwig-Maximilians-Universitat MYchnen.
21. Salnik BU (1970) Effect of several stimulators on central nervous system energy metabolism during muscular workload {dissertation}. **Tomsk, Russia: Tomsk State Medical Institute.**
22. Adamchuk LB (1969) Effects of Rhodiola on the process of energetic recovery of rat under intense muscular workload {dissertation}. **Tomsk, Russia: Tomsk State Medical Institute.**
23. Revina TA (1969) Effect of stimulators of the central nervous system on carbohydrate and high energy phosphorylated compound metabolism in the brain during intense muscular workload {dissertation} Tomsk, Russia: Tomsk State Medical Institute.
24. Wang, H (1998) Analysis of Dodder seed- A review of literature. *Biomed Chromatogr* **12**(1): 27-30.
25. Courtesy of Ergo-Light.com. *The Pathway Page*. Biosynthesis of Androgens and Estrogens.
26. Berdanier, Carolyn D.; Dwyer, Johanna T.; Feldman, Elaine B. (2007). Handbook of Nutrition and Food. Boca Raton, Florida: CRC Press.
27. Thakur M. and Dixit V.K.\* *EFFECT OF CHLOROPHYTUM BORIVILIANUM ON ANDROGENIC & SEXUAL BEHAVIOR OF MALE RATS* Indian Drugs 2006 April 43(4): 300-306
28. Kothari S.K., *Safed Musli (Chlorophytum borivillanum) revisited*, Journal of Medicinal and Aromatic Plants. 2004, 26, 60-63.
29. Saxena S and Dixit V.K: *Role of total alkaloids of Mucuna pruriens Baker in spermatogenesis in male rats*, Indian Journal of Natural Products. 1987, 3(2), 3-7.
30. Unnithan A.R. and Tandon V.L: *Role of growth hormone in spermatogenesis in male rats*. Indian Journal of Experimental Biology. 1982, 20, 734-737.
31. Modi KP, Patel NM, Goyal RK. *Estimation of L-dopa from Mucuna pruriens LINN and formulations containing M. pruriens by HPTLC method* Chem Pharm Bull (Tokyo). 2008 Mar; 56(3): 357-359.
32. Tharakan B, Dhanasekaran M, Mize-Berge J, Manyam BV. *Anti-Parkinson botanical Mucuna pruriens prevents levodopa induced plasmid and genomic DNA damage*. Phytother Res. 2007 Dec; 21(12): 1124-6.