

Lipotrophin-PM™

Applied Nutraceuticals Research put cutting-edge technology to work when we produced Lipotrophin-PM™, a revolutionary non-stimulant fat-burner that employs potent pharmaceutical-quality herbal extracts to produce a product like no other.

Lipotrophin-PM contains Banaba Extract, an herb used in Eastern medicine for blood sugar control and nutrient repartitioning (24). Lipotrophin also incorporates Green Tea, a compound used in China for thousands of years to promote health in the mind and body. Green Tea has strong anti-oxidant properties, and its main ingredient, EGCG, has been shown to have significant metabolic benefits (5). Similarly, the matrix contains Bacopa Monnieri, an Ayurvedic herb that boosts thyroid function and conversion, which allows it to have potent fat-burning qualities. Bacopa is also considered to be an adaptogen, which is a classification of natural herb product that increases the body's resistance to stresses such as trauma, anxiety and bodily fatigue, and display the ability to balance endocrine hormones and the immune system to help the body to maintain optimal homeostasis (25). Mucuna Pruriens, the final ingredient in Lipotrophin-PM, contains large amounts of L-Dopa, a potent compound that allows for greater growth hormone release and deeper sleep (17). Mucuna has also been shown to have potent blood sugar-controlling effects as well. The combination of the ingredients in Lipotrophin-PM are specially combined into a powerful synergistic blend, designed to turn your body into a fat-burning machine, while promoting deeper, higher quality sleep.

Energy Metabolism, Banaba, and Green Tea

Insulin is necessary to allow for the conversion of carbohydrates into energy, which is needed to fuel intense exercise. Insulin receptors on the surface of cells act like gateways, allowing for the regulation of blood glucose (freed cellular energy) into a target cell, where it can be stored as glycogen (cellular energy in muscle cells) or triglycerides (cellular energy in fat cells). In essence, insulin is a storage hormone, and it does not discriminate *where* it stores nutrients, whether it be in fat cells, or muscle cells. After an individual has consumed a high carbohydrate diet for a long period of time (particularly one that is high in simple sugars, like that of many Americans), these insulin receptors begin to shut down (12). Because fewer and fewer of these gateways remain open to process carbohydrates into muscular fuel where it can be readily burned during exercise, the body requires greater and greater amounts of insulin to allow for carbohydrate metabolism. This greater production and utilization of insulin is called **insulin resistance**, and it usually manifests itself, at least initially, in weight and body fat gain. The reason for this is because blood glucose becomes more and more difficult to control and process into usable muscular energy, and larger amounts of blood glucose begin to find their way into fat cells, and stored as triglycerides. Insulin resistance is usually undetectable until complications (weight gain, high blood sugar) become apparent. After a significant period of insulin insensitivity, the pancreas (the organ that makes insulin) can lose the ability to produce enough insulin to effectively lower blood sugar. This condition is what is commonly known as Type II diabetes, which is both preventable and treatable through a proper exercise, diet and supplementation regimen. Type II diabetes can cause a host of health problems: loss of limbs, hyper-obesity, and even death (12). This is where mucuna pruriens and banaba extract are very relevant; as they both help the body manage blood glucose and increase insulin sensitivity. Although we can not technically claim that Lipotrophin-PM™ can treat or cure type II diabetes, there is ample clinical evidence that supports how these compounds help the body to process carbohydrates much more efficiently as an energy source, and not as a storage mechanism (as triglycerides in fat cells). Mucuna and Banaba keep the carbohydrate-processing cellular gateway open, allowing the body to metabolize carbohydrates in the most efficient form, and keeping them from being stored as fat.

Optimizing carbohydrate metabolism is very important, because fluctuations in blood sugar trigger the release of neurotransmitters (such as serotonin and dopamine) and insulin. It has been theorized that improvement of certain neurotransmitter levels along with lowered glucose and insulin levels can help reduce caloric intake significantly and encourage weight loss (23). An interesting 'side-effect' of tighter control of blood sugar and insulin levels is a significant tendency of mucuna and banaba to promote weight loss (an average of 2-4 lbs. per month) – without significant dietary alterations in diabetic patients/populations. In numerous recent studies, corosolic acid, the main ingredient in banaba, has been shown to significantly lower blood glucose and heighten insulin sensitivity, and subsequent studies have revealed similar results with mucuna pruriens. Banaba has also been shown to induce GLUT4 translocation, meaning that nutrients are repartitioned away from fat cells (where they are typically stored as fat), and placed preferentially within muscle cells, where the nutrients can be burned as fuel (19,20,21). The modulation of glucose and insulin levels and the redirection of nutrients away from fat cells reduces overall total caloric intake, fat storage, and encourages moderate weight loss (23). The less food/calories that are ingested, the less calories the body has to burn to achieve weight loss!

Moreover, *mucuna pruriens* has been documented to have some potent neurotransmitter-boosting effects (especially dopamine), which is also very noteworthy for weight loss. Low neurotransmitter levels (mainly dopamine and serotonin) can result in cravings for sugars and sweets (depression alleviated by “comfort eating”), and these cravings can wreck any type of diet or weight loss plan. The inclusion of *mucuna pruriens* and banaba extract in allows for a greater control of cravings and glucose utilization, benefiting the user by allowing for greater weight loss, through multiple non-stimulant mechanisms.

Green Tea is a versatile herb used for many centuries for a variety of maladies. Recent studies have determined Green Tea to be a strong fat burner that works through several different complementary mechanisms. It is composed mainly of catechins, pheophytins, chlorophylls, carotenoids, theanine, and a small amount of caffeine (1,2,4,5). EGCG, a catechin found in high amounts in Lipotrophin, is the most relevant compound, because it exerts a variety of important metabolic, nutrient partitioning, and appetite-controlling effects that contribute to significant weight loss. Green tea is a potent appetite suppressant, as the EGCG triggers the brain to secrete higher amounts of cholecystokinin (CCK), a peptide hormone that is vital in control of the appetite and the digestion of fat and protein (3,7). Green Tea also seems to have a nutrient-repartitioning quality, which means it has the ability to allow for the metabolism and utilization of macronutrients (carbohydrates and bound triglycerides as fuel), while disallowing others (like dietary fat) to be digested and stored. This nutrient-repartitioning quality is extremely important during weight and body fat loss, as EGCG allows the body to preferentially utilize fat as fuel over carbohydrates. Clinical studies on human subjects have confirmed this, showing that increases of preferential fatty acid oxidation over glucose have been noted in the majority of subjects while taking Green Tea. Another important piece of this puzzle has to do with the fact that the EGCG in Green Tea has been shown to inhibit the production of catechol-O-methyl-transferase (COMT). COMT is important to fat loss, because it is the enzyme that breaks down norepinephrine; therefore limiting the production of COMT allows norepinephrine to exert much stronger effects on the fat-burning cascade (4,6,7).

Mucuna Pruriens, Growth Hormone, Sleep, Thyroid and Bacopa Monnieri

Another important mechanism of action in the Lipotrophin-PM fat loss arsenal is the release of L-Dopa-induced growth hormone (GH) and L-Dopa-related control of carbohydrate cravings and blood sugar (8,10,11,12). The *mucuna pruriens* contained in Lipotrophin-AM is of the highest quality, and is standardized to 25% L-Dopa. There is plentiful documentation of L-Dopa's potent neurotransmitter-boosting effects, including its conversion to dopamine and its blood sugar controlling effects, both of which are very noteworthy for weight loss. Low neurotransmitter levels (mainly dopamine and serotonin) can result in cravings for sugars and sweets and depression, to which to most common response is “comfort eating”. Obviously, uncontrolled cravings can wreck any diet or weight loss plan. *Mucuna* helps stem this problem due to its properties that attenuate blood sugar levels, which is important because high blood sugar triggers higher insulin secretion and which results in high insulin levels. The inclusion of *mucuna pruriens* allows for a greater control of cravings and glucose utilization, benefiting the user by allowing for greater weight loss.

While *mucuna* limits blood sugar and controls cravings, it positively effects GH levels as well. As mentioned earlier, Lipotrophin-PM contains large amounts of L-Dopa, and L-Dopa is the only form of Dopamine that can cross the blood/brain barrier. Once L-Dopa is converted to Dopamine in the brain, it allows for a greater stimulation of GHRH (growth hormone releasing hormone), which directly stimulates increased growth hormone production. Acting directly, GH mobilizes fats from fat depots and decreases the rate of glucose intake and metabolism, and higher dopamine levels allow for control of cravings. Growth Hormone mobilizes fats through the regulation of HSL (Hormone Sensitive Lipase), which we have discussed earlier (8,13,14,15,16). This is extremely important part of the fat loss equation, as the more HSL released to liberate fatty acids that can be burned as fuel, the more significant your fat loss will be.

Bacopa Monnieri is the final ingredient in Lipotrophin. Studies have shown that Bacopa can increase T4 (thyroxine, a thyroid hormone) synthesis by up to 41% in mice, while allowing the uninterrupted conversion of T4 to T3. This is noteworthy, because thyroid hormone is metabolically active, and is an important component of fat loss. Conversion of T4 to T3 is an important aspect of this process, and is affected by increased levels of GH, which occurs during the usage of Lipotrophin-PM. T4 is synthesized from free tyrosine, and combined with iodine, and upon stimulation by TSH (Thyroid Stimulating Hormone), T3 and T4 are formed ((18,25). Thyroid hormone produced is about 90% T4 and 10% T3, and T3 is considered the biologically active component of thyroid, as T4 must be converted down to T3 for it to be active in target tissues (12). The production of thyroxine is regulated by TSH, and TSH is suppressed when T4 levels are high. GH decreases T4 levels due to heightened conversion to T3, and when T4 levels become too low, thyroid function becomes altered. The mechanism of action of Bacopa is crucial to this process, as it stimulates the continued synthesis of T4, providing a constant and readily available source of convertible material that will ultimately become T3 (25). This is extremely important to fat loss, because T3 is roughly ten times more

biologically active than T4, and T3 increases basal metabolic rate and body heat production, resulting in greater fat loss.

In summary, our exhaustive research into fat metabolism has produced the creation of an effective, powerful new fat burning formulation that outperforms the big brands, providing you with a wide range of benefits. Applied Nutraceutical's Lipotrophin-PM can reduce physical fatigue through better sleep patterns, while dramatically increasing fat metabolism, even while at rest to help get you the body you have always wanted!!

1. agua T, Komine Y, Soga S, Meguro S, Hase T, Tanaka Y, Tokimitsu I (2004). Anti-obesity actions of green tea: possible involvements in modulation of the glucose uptake system and suppression of the adipogenesis-related transcription factors. *Biofactors* **22**(1-4): 135-140.
2. Carlson A (2005). Ingestion of a tea rich in catechins leads to a reduction in body fat and malondialdehyde-modified LDL in men. *Am J Clin Nutri* **81**(1): 122-129.
3. Greenough A, Cole G, Lewis J, Lockton A, Blundell J (1998). Untangling the effects of hunger, anxiety, and nausea on energy intake during IV cholecystokinin octapeptide (CCK-8) infusion. *Physiol Behav* **65**(2): 303-310.
4. Fink A, Rex A, Voits M, Voight JP (1999). Major biological actions of CCK- a critical evaluation of research findings. *Exp Brain Res* **123**(1-2): 77-83.
5. Chantre P, Lairon D (2002). Phytomedicine. Recent findings of green tea extract AR 25 (Exolise) and its activity for the treatment of obesity. *Phytomedicine* **9**(1): 3-8.
6. Dulloo AG, Seydoux J Girardier L, Chantre P (2000). Green tea and thermogenesis: Interactions between catechin-polyphenols, caffeine, and sympathetic activity. *Int J Obes Relat Metab Dis* **24** (2): 252-258.
7. Kao YH, Hilpakka RA, Liao S (2000) Modulation of endocrine systems and food intake by green tea epigallocatechin gallate. *Endocrinology* **141**(3): 980-7.
8. 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.
9. 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.
10. Jensen MD (2003) Effects of growth hormone administration on human obesity. *Obes. Res.* **11**(2). 170-5.
11. The thyroid gland. *Endocrinology: An Integrated Approach* by Stephen Nussey and Saffron Whitehead (2001). Published by BIOS Scientific Publishers Inc.
12. 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.
13. 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.
14. Parikh et al, (1990) *Indian Drugs.* Chem Abs **27**: 353. \
15. Ahmad S et al (1991) Conference of Pharmacology and Simposium on Herbal Drugs (New Delhi), March 1991, **15**:26.
16. Manyam BV (1995) *J. Altern. Complement Med. Fall.* **1**(3) 244-255.
17. Takahashi Y, Kipnis M, Daughaday WH (1968) Growth hormone secretion during sleep. *J Clin Invest* **47**(9): 2079-2090.
18. 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.
19. Department of Clinical Nutrition, Suzuka University Medical Science (2004). Corosolic Acid induces GLUT4 translocation in genetically type 2 diabetic mice. *Biol Pharm Bull* **2004 Jul.** **27**(7): 1103-5.
20. Judy WV, Hari SP, Judy JS, Naguib YM, Passwater R et al. (2003). Antidiabetic activity of a standardized extract (Glucosol) from *Lagerstroemia speciosa* leaves in Type II diabetics. A dose-dependant study. *J Ethnopharmacol* **87**(1) 115-117.
21. Miura T. et al. (2006). Antidiabetic effects of corosolic acid in KK-Ay in diabetic mice. *Biol Pharm Bull* **29**(3): 585-587.
22. Fukushima M. et al. (2006). Effect of corosolic acid on postchallenge plasma glucose levels. Translational Research Informatics Center, Foundation for Biomedical Research and Innovation, **1-5-4**, Minatojimaminamimachi, Chuo-ku, Kobe, Japan.
23. Liu L. et al. (2001). An Extract of *Lagerstroemia speciosa* L. Has Insulin-Like Glucose Uptake-Stimulatory and Adipoctype Differentiation-Inhibitory Activities in 3T3-L1 Cells. *J of Nutr.* **131**: 2242-47.
24. Hong H, Maeng W (2004). Effects of malted barley extract and banaba extract on blood glucose levels in genetically diabetic mice. *J Med Food.* **7**(4): 487-90.
25. Rai D, Bhatia P, Palit G, Pal R, Singh S, Singh HK (2003) Adaptogenic effect of Bacopa Monnieri. *Pharmacol Biochem. Behavior* **75**(4): 823-830.
26. Sairam K, Dorababu M, Goel RK, Bhattacharya SK (2002) Antidepressant Activity of Bacopa Monnieri in experimental models of depression in rats. *J Pharmacy and Pharmacology* **52**(11): 425-31.

