

How to Burn Fat While You Sleep: The Science Behind Blade PM™

David M. Gundermann, M.Sc., Ph.D.

Chief Scientific Officer, Blue Star Nutraceuticals

Most supplement fat burners are stimulant-based and can only be taken in the morning and early afternoon. Stimulants are effective at increasing metabolic rate, promoting thermogenesis, and increasing the willingness to be active. However, fat burning does not only occur during the day time. In fact, long periods of fasting are where fat metabolism needs to be predominant. Periods such as sleep is such a time where the bulk energy to keep alive is from fat metabolism rather than any other fuel source. Blade PM™ harnesses this concept to exploit the process of fat burning during sleep to make it work more in your favor.

You may notice that you are at your lightest and leanest first thing when you wake up in the morning. This is because although you have not been physically active, your body has been metabolically active while you have been unconscious. A milieu of hormones and chemicals are surging through your body over the course of your slumber each for their own function burning through as much as 85% of your conscious basal energy expenditure. This seems counterintuitive considering the prolonged state of physical inactivity. Glucose utilization is highest during a wakeful state but the lowest during deep sleep.

During a good quality sleep, several things are working in your favor. Your body is dependent primarily on metabolizing fat for at least eight hours which is a large proportion of a 24-hour day to be focused on burning fat. During that time, you are not cheating on your diet, you're not tempted by unhealthy treats, or even being consumed by life's stressors. It's a time of pure energy expenditure without any calorie intake. When your body is this prime fat burning mode, it's time to take advantage of it!

Blade PM™ is a night-time product designed to be consumed at least one hour before sleep to give you three distinct benefits. 1) Appetite suppression to reduce late-night and midnight cravings to initiate a fasting phase earlier in the evening to enhance fat metabolism during sleep. 2) Sleep quality enhancement to further potentiate the natural opportunity to burn fat throughout the night, and the following day. 3) A non-stimulant boost of the fat burning pathways that are already turned on during sleep to maximize the amount of fat loss you can achieve in a given night. This makes Blade PM™ the only three-stage night time fat burner focusing on all aspects of fat loss while you sleep.

## CRAVING CONTROL

Eating carbohydrate-heavy or fatty foods right before bed is one of the most counterproductive practices to burn off excess body fat. This is because instead of entering sleep primed to be in a catabolic state, the body will be in a mode of storage. In the case of eating carbohydrate meals right before bed, this means glycogen synthesis until the storage capacity is full followed by an increase in carbohydrate oxidation and then the excess will be converted to fat. All of these processes are delaying, preventing and reversing fat burning respectively. In the case of eating fatty foods before bed, the lipids will predominantly be stored as fat in various tissues in the body before the body transitions to a catabolic state. The one macronutrient exception is protein, where the storage of amino acids comes in the form of muscle hypertrophy and during sleep there is an increased capacity for muscle growth. Furthermore, muscle growth is an energy demanding sequence that burns extra calories in the process. By skipping the late-night carbohydrates or fatty snacks, the body will have an advantage of already being in a post-absorptive, catabolic state upon the initiation of sleep. Moreover, without the high availability of excessive carbohydrates, the body will depend primarily on fat for the remainder of the night.

**CH-19 Sweet Pepper** contains a non-pungent capsinoid molecule called capsiate. The unique thing about capsinoids are their ability to reduce appetite and burn fat in a non-stimulatory way. Research has shown that ingestion of capsinoid-containing supplements not only reduces voluntary calorie consumption by 14% but specifically reduces the cravings for unhealthy fatty foods. Evidence suggests that capsiate also increases the “feel-good” hormone, dopamine, in the brain, which may play a role in a decreased desire to snack.

*Phaseolus vulgaris* is a popular food consumed for the purposes to reduce appetite, and food intake that is ultimately linked to a reduction in body weight. There is a high content of an  $\alpha$ -amylase inhibitor called phaseolin, which results in a suppression of carbohydrate metabolism and a reduced feed efficiency. This is the mechanism by which the impact of carbohydrates already in the diet is reduced, but not how it manages appetite. A particular lectin found in *P. vulgaris* called phytohaemagglutinin plays a much larger role with satiety control via manipulating gut hormone secretions. In a study of 12 young healthy men and women, 100 mg of *P. vulgaris* extract (PVE) suppressed the hunger hormone, ghrelin along with the desire to eat. Furthermore, it

was observed that compared to a placebo trial, glucose and insulin responses to a meal were significantly lower. With insulin being associated with nutrient storage and particularly fat gain, the reduced insulin levels with PVE pre-sleep are beneficial for fat loss through the night.

## **RELAXATION BLEND**

Poor sleep quality is highly prevalent in the modern society. Of many consequences, hormonal dysregulation and metabolic dysfunction are among them. There are many underlying mechanisms how either short sleep duration, or poor sleep quality can both influence a myriad of metabolic factors. Consecutive nights of sleep restriction increases cortisol levels and induces acute insulin resistance. Excessive cortisol tends to increase glucose utilization, insulin secretion and decrease adiponectin levels, all of which are associated with fat gain. Concomitantly, stress further impairs a variety of sleep quality measures and furthers perpetuates decrements in fat metabolism. Thus, a decreased sleep duration not only reduces the opportunity for fasted fat burning, but the increased glucose utilization also reduces the overall fat being burned during the night. Additionally, the hormonal dysregulation, particularly, acute insulin resistance upon rising, favors fat gain for the following day. It has been shown that even one night of sleep restriction can impact the following day's insulin sensitivity. Decreased sleep quality is associated with an increase in ghrelin and a decrease in leptin, both of which leads to an increase in hunger and appetite the following day. One study observed that a partial sleep restriction for two nights, caused an 18% reduction in leptin, a 28% elevation in ghrelin and a near 24% increase in hunger and appetite rating.

Many studies have shown an association between short sleep duration and weight gain suggesting that sleep improvement may be a feasible countermeasure to address excess body fat. Blade PM™ contains a combination of valerian, glutamine and melatonin in order to encourage premium sleep quality to maintain healthy metabolic parameters and the ultimate fat burning potential.

**Glutamine** has a calming effect and counteracts symptoms of stress to aid with the onset of sleep. This is particularly beneficial for individuals who experience exhaustion, sleeplessness or even a lack of concentration. These symptoms are associated with a deficiency of glutamic acid. The body produces glutamic acid from dietary glutamine, which is then used as a precursor to GABA. GABA is the most

important inhibitory neurotransmitter of the brain like a natural brain sedative. Supplementing with glutamine can restore GABA production and promote relaxation prior to sleep. **Valerian root extract** is commonly used in teas to relax due to its inclusion of a sesquiterpenoid known as valerenic acid. This compound is also known to influence GABA receptors which function to reduce central nervous system activity. It has a sleep-inducing, anxiolytic and muscle relaxant effect with oral supplementation. The inclusion of glutamine and valerian in Blade PM™ will assist with an early onset of sleep and an improved sleep quality.

**Melatonin** is the final ingredient in the relaxation blend to improve sleep quality. It is a natural lipophilic hormone synthesized by the pineal gland in the brain and plays a prominent role in the regulation of tiredness and sleep, but it does much more than that. Melatonin also regulates other hormones such as growth hormone and leptin during sleep. Leptin is considered an anorexic hormone and its expression and signaling in the brain is crucial for burning fat. The effects of a well-rested sleep are pervasive through the following day with optimal leptin signaling, insulin signaling, and fat metabolism. The impact on ghrelin and leptin also help control appetite upon rising leading to less snacking, unhealthy cravings and overall food intake.

## **METABOLIC BOOSTING BLEND**

During sleep, fat metabolism is prominent without the stimulation of the CNS. Blade PM™ takes advantage of this aspect with the inclusion of chlorogenic acid, *Coleus forskohlii*, and black ginger.

**Chlorogenic acid** is a major constituent of green coffee extract that has significant fat burning characteristics. Recent evidence suggests that chlorogenic acid activates fat metabolism in the liver, reduces lipogenesis and suppresses body fat accumulation in a non-stimulatory fashion. In a study of overweight adults, 700 mg of decaffeinated green coffee extract containing 50% chlorogenic acid was associated with reductions in bodyweight, BMI, and percent body fat. Blade PM™ uses the same decaffeinated ingredient with 50% chlorogenic acid for this fat burning purpose.

*Coleus forskohlii* is another perfect non-stimulant fat burner especially due to its inverse effects with caffeine. For this reason, *C. forskohlii* should only be used at night with other relaxants rather than stimulants. Known as Indian Coleus, the active constituent is in *C. forskohlii* is called forskolin which has been shown to induce

lipolysis in fat cells. At a dose of 250 mg for 12 weeks *Coleus forskholii* was shown to significantly improve fat loss in overweight men. It is also great for men due to its propensity to also aid testosterone production during sleep.

*Kaempferia parviflora* is the secret sauce to Blade PM™. As a lesser known anti-obesity agent, *K. parviflora* has been tested in animals and humans for its fat burning effects. *K. parviflora* is also known as black ginger in Thailand and is known to exhibit a plethora of health benefits. *K. parviflora* extract (KPE) reportedly suppresses body weight increases, body fat accumulation and glucose intolerance. Oral intake of KPE increases energy expenditure and fat utilization in a stimulant-free mechanism. A 2015 research study in humans found that 100 mg of KPE increased brown adipose tissue activation and increased energy expenditure at 30-, 60- and 90-minutes postingestion. Other human KPE studies have shown a reduction in bodyweight, and specifically decreases in fat size, volume and mass. KPE has showed up to a 38.7% decrease in adipocyte size, up to a 27.3% decrease in fat volume and up to a 46.4% decrease in fat mass without any change in food intake, The active constitutive of KPE is thought to be 5,7- dimethoxyflavone (DMF). Mechanistically, researchers have observed an activation of AMPK activity. This non-stimulatory pathway activates a cascade of events that enhances beta-oxidation and restricts fatty acid synthesis. Furthermore, KPE reduces the expression of adipogenic transcription factors to reduce fat production.

## CONCLUSION

Collectively, the formulation for Blade PM™ makes for a very unique fat burning product with absolutely no-stimulants. To be taken with or after your last meal, the effects of Blade PM™, the first phase starts working immediately to reduce any further unhealthy cravings for the remainder of the night, and put your body in a catabolic fat burning state to start your sleep off right. In the next phase, relaxants and sleep aids take over to ensure not only a quick onset of sleep but also an improved sleep quality through the night. A good night's sleep is paramount to achieving fat loss goals via hormone regulation and metabolic transitions through the night lasting through to the next day. Without a high quality and adequate duration of sleep, weight loss progress is nearly impossible. Finally, to boost fat burning during the night, the clinical doses of the world's most powerful, yet non-stimulatory, fat burning agents are used to optimize

the metabolic pathways fat-burning while you sleep. This three phase approach makes Blade PM™ a one-of-a-kind tool to any fat loss goals.

## References

1. Alonso-Vale MI, Andreotti S, Peres SB, Anhe GH, das Neves BorgesSilva C, Neto JC, Lima FB. Melatonin enhances leptin expression by rat adipocytes in the presence of insulin. *Am J Endocrinol Metab.* 288(4); E805-E812, 2005.
2. Donga E, van Dijk M, van Dijk G, Biermasz NR, Lammers GJ, van Kralingen KW, Corssmit EP, Romijn JA. A Single Night of Partial Sleep Deprivation Induces Insulin Resistance in Multiple Metabolic Pathways in Healthy Subjects. *J Clin Endocrinol Metab.* 95(6); 2963-2968, 2010.
3. Kawabata F, Inoue N, Yazawa S, Kawada T Inoue K, Fushiki T. Effects of CH-19 Sweet, a Non-Pungent Cultivar of Red Pepper in Decreasing the Body Weight and Suppressing Body Fat Accumulation by Sympathetic Nerve Activation in Humans. *Biosci Biotechnol Biochem.* 70(12); 2824-2835, 2006.
4. Lee S, Kim C, Kwon D, Kim MB, Hwang JK. Standardized *Kaempferia parviflora* Wall. Ex Baker (Zingiberaceae)P Extract Inhibits Fat Accumulation and Muscle Atrophy in ob/ob Mice. *Evid Based Complement Alternat Med.* doi: 10.1155/2018/8161042, 2018.
5. Matsushita M, Yoneshiro T, Aita S, Kamiya T, Kusaba N, Yamaguchi K, Takagaki K, Kameya T, Sugie H, Saito M. *Kaempferia parviflora* extract increases whole-body energy expenditure in humans: roles of brown adipose tissue. *J Nutr Sci Vitaminol.* 61(1); 79-83, 2015.
6. Mullington JM, Chan JL, Van Dongen HP, Szuba MP, Samaras J, Price NJ, Meier-Ewert HK, Dinges DE, Mantzoros CS. Sleep loss reduces diurnal rhythm amplitude of leptin in healthy men. *J Neuroendocrinol.* 15(9); 851-854, 2003.
7. Meng S, Co J, Feng Q, Peng J, Hu Y. Roles of Chlorogenic Acid on Regulating Glucose and Lipids Metabolism: A Review. *Evid Based Complement Alternat Med.* doi:10.1155/2013/801457, 2013.
8. Spadafranca A, Rinelli S, Riva A, Morazzoni P, Magni P, Bertoli S, Battezzati A. *Phaseolus vulgaris* extract affects glycometabolic and appetite control in healthy human subjects. *Br J Nutr.* 209; 1789-1795, 2013.
9. Stohs S, Badmaev V. A Review of Natural Stimulant and Nonstimulatn Thermogenic Agents. *Phytother Res.* 30(5); 732-740, 2016.
10. Westerterp-Plantenga MS, Smeets A, Lejeune MPG. Sensory and gastrointestinal



- satiety effects of capsaicin on food intake. *INT J Obes.* 29(6); 682-688, 2005.
11. Yoshino S, Kim M, Awa R, Kuwahara H, Kano Y, Kawada T. Kaempferia parviflora extract increases energy consumption through activation of BAT in mice. *Food Sci Nutr.* 2(6); 634-637, 2014.
  12. Yoshino S, Awa R, Miyake Y, Fukuhara I, Sato H, Ashino T, Tomita S, Kuwahara H. Daily intake of Kaempferia parviflora extract decreases abdominal fat in overweight and preobese subjects: a randomized, double-blind, placebo-controlled clinical study. *Diabetes Metab Syndr Obes.* 11; 447-458, 2018.