



## Guggulsterones: Turn Up the Heat to **Burn More Fat**

#### by Derek Cornelius

as guggul. Just as that plant has unique and interesting names, so it also has unique and interesting effects on the human body.

Guggul is a tree that grows in India that exudes a resinous sap from its bark. The resin has been used for centuries in India's traditional Ayurveda medicine. In our modern world of advanced chemistry the sap is processed and purified and then standardized for its active constituents-Z and E guggulsterones. The two compounds are plant sterols that have a high degree of human bioactivity and have been shown in studies to affect many biological processes, including thyroid metabolism, cholesterol management and dermal, or skin, function. In each of those areas guggulsterones were shown to be highly effective modulators with neardruglike potency.

Bodybuilders are concerned with not only building solid muscle tissue but also reducing the amount of fat deposits. You may weigh 240 pounds and have a tremendous amount of muscular development, but if you have two inches of subcutaneous fat all over your body, you won't look all that great. You definitely won't be aesthetically pleasing, and some people might even call you doughboy. A thyroid-stimulating substance might be exactly what you need.

I first became interested in guggulsterones when I noticed studies on their thyroid-stimulating properties. I discovered that guggulsterones have a direct stimulating action on the thyroid gland through enzymatic mechanisms. One study concluded that they're a viable option for the treatment of hypothyroidal conditions. The warm feeling, the sweating and the rise in body temperature confirm guggulsterone's thyroid-stimulating ability. That's good news for those of us who are trying to lose weight-especially adipose tissue, or fat stores. When the thyroid gland is stimulated, it produces more thyroid hormones, such as thyroxin, which

ommiphora mukul is an herb known have a profound effect on the rate of metabolism, including a direct catabolic effect on adipose tissue. That means guggulsterones will stimulate your thyroid to produce more thyroid hormones, which in turn will raise your metabolic rate and burn more fat.

> Guggulsterones by themselves have been shown to work very well for fat loss, but I've found a combination that's nothing short of amazingguggulsterones and an ECA stack such as Adipokinetix. We already know that Adipokinetix is an extremely potent fat burner, but it does its work outside the realm of the thyroid. It made sense to me that if one could combine the fat-burning effects of the thyroid hormones with those of the adrenergic hormones (e.g., adrenaline), something very dramatic would result. Also, ECA stacks tend to decrease the amount of thyroid hormones circulating in the blood over time. Guggulsterones do a great job of inhibiting that reduction, thus keeping all physiological fat-burning systems operating at a maximum level.

> The final ways in which guggulsterones can benefit in the fight to burn fat involve ketogenic diets and growth hormone use. Over time ketogenic diets tend to reduce the thyroid's effectiveness by reducing the conversion of T4 to the more potent T3. Guggulsterones won't do anything to increase the conversion, but they will cause more T4 release, which in turn should increase T3 to some extent. Furthermore, although T4 is not as potent a metabolic regulator, it is functional and should inherently help boost the metabolic rate. Regarding GH use, anyone who has taken this potent hormone knows that it vastly reduces the amount of thyroid hormones that are produced by the thyroid gland. Again, although I've never tried it and don't know of anyone who has, guggulsterones should help lessen the thyroid-hormone-reducing effect.

> Although their fat-burning properties are what we're most interested in, guggulsterones also have an extremely beneficial effect on cholesterol and

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triglyceride levels. Numerous clinical studies have shown that they cause a 14 to 27 percent decrease in total cholesterol in a four-to-12week period, while triglyceride levels drop 22 to 30 percent. Even more interesting is the fact that guggulsterones support a high high-density lipoprotein (HDL), or "good" cholesterol, level and a low low-density lipoprotein (LDL), or "bad" cholesterol, level. Study after study confirms that guggulsterones are as potent as many of the current prescription drugs for lowering LDL cholesterol. Unlike their drug counterparts, though, guggulsterones have absolutely no negative side effects.

The cholesterol-reducing effect is important for anyone who's interested in keeping a healthy cardiovascular system-especially those who use steroidal compounds. Anabolic/androgenic steroids increase not only total cholesterol but also the ratio of LDL to HDL.

It's hard to imagine a compound that beneficial having any more benefits, but guggulsterones have also been proven as effective as the drug tetracycline in treating acne. In a 1994 study published in the Journal of Dermatology, 20 patients with nodulocystic acne were randomly given either tetracycline or guggulsterones. Both were taken daily for three months, and both produced a progressive reduction in the lesions in the majority of the patients. Tetracycline reduced them by 65.2 percent, while the guggulsterones produced a 68 percent reduction.

Who can benefit from guggul's effects? Well, who wouldn't like a better complexion? That's especially true for people on anabolic/androgenic steroids, as those drugs tend to increase the skin's oiliness and potential for acne.

Where else can you find a compound that will help you lose fat, improve your cholesterol profile and at the same time improve your com-



plexion? I've looked long and hard and have vet to find even one competitor. You should take 30 to 60 milligrams three times per day with meals, and always use a product that contains the highpotency, naturally extracted guggul.

Editor's note: Derek Cornelius is a respected bio chemist and the owner of Syntrax Innovations Inc.

# Adipokinetix: Faster Fat Burning Through Biochemistry

Adipokinetix is a supplement that mobilizes and burns stimulate, for they ultimately affect fat loss in a positive fat tissue without sacrificing muscle and organ tissue. You should be familiar with the ECA stack-a combination of ephedrine, caffeine and aspirin. Adipokinetix is similar to ECA but is a vast improvement. It takes fat mobilization and burning to a new level. Adipokinetix contains precise ratios of 1R,2S norephedrine HCl, caffeine, yohimbine HCl and now 50 milligrams of theophylline. The aspirin is left

out because some people are sensitive to it. Furthermore, aspirin is cheap, easy to get and can be easily added to the stack if you can tolerate it.

The first two compounds-1R.2S norephedrine and caffeine-work together in much the same way ephedrine and caffeine work. The difference is that studies have shown norephedrine to be the most potent and most thermogenic of the ephedrine alkaloids. Norephedrine also lacks some of the central-nervous-system-stimulating effects of ephedrine. In practical terms that means an individual will still feel a little wired but not nearly as much as he or she will feel with ephedrine. Another plus for norephedrine is that it doesn't have the negative associations that

ephedrine has-there are no Food and Drug Administration restrictions and no negative publicity. In the coming years norephedrine will definitely be the compound of choice for easy, effective weight loss-instead of the ECA stack, you'll hear about the NCA stack.

Norephedrine and caffeine work synergistically to drastically increase the body's production of adrenaline and noradrenaline-the adrenergic hormones-which bind to the adrenergic receptors. There are a number of different adrenergic receptors: the alpha sub 1, alpha sub 2, beta sub 1, beta sub 2 and beta sub 3. We are mainly interested in the alpha-sub-2, beta-sub-2 and beta-sub-3 receptors-for they're the ones that mainly affect fat loss and mobilization

Among other things, the beta-sub-2 and beta-sub-3 receptors are responsible for the mobilization and burning of adipose tissue; so they are the receptors that you want to

way. Another positive benefit of stimulating the beta-sub-2 receptors is an anticatabolic effect on proteinaceous tissues. Thus, you simultaneously lose fat without sacrificing much or any muscle tissue.

The other receptor that we're interested in is the alphasub-2 receptor. Studies have shown that it blocks the mobilization of adipose tissue. In terms of fat loss it's the bad



guy. In fact, it's the receptor that causes women to have a harder time losing adipose tissue-especially in their lower bodies. Women have many more alpha-sub-2 receptors than men, and they have an even greater number in their lower bodies. To combat those nasty receptors, we need a compound that's naturally occurring, easy to get, potent, lacking negative side effects and able to block them. Yohimbine is the answer.

Yohimbine does all of the above with an added bonus—it's a proven aphrodisiac. Thus, with Adipokinetix you can lose fat, preserve muscle tissue and at the same time increase your sex drive-regardless § of your gender. Both men and women benefit. Yohimbine vastly improves the effectiveness of the norephedrine and the

caffeine by allowing the increased adrenergic hormones to do their job. Basically, it cripples your body's negative feedback loop for maintaining your bodyfat.

The new formula also includes 50 milligrams of theophylline per capsule. The interesting thing about theophylline is its potent diuretic effect. When it's used in combination with an ephedrine alkaloid, a dual leaning effect ensues-vou burn excess bodyfat and eliminate excess fluid, reducing fluid retention.

Currently, there's no other product on the market like Adipokinetix. It's unique and destined to be the future of fat-loss pills.

-Derek Cornelius

Editor's note: Adipokinetix is available from Home Gym Warehouse, 1-800-447-0008.

## **Boost Your Stagnant Metabolism**

by Daniel Gwartney, M.D.

osing bodyfat is one of a bodybuilder's main goals—and possibly the most frustrating. After long periods of dieting you often hit a plateau. What happens when fat loss comes to a screeching halt? You redouble your efforts. You fumble around with your diet, supplements, cardio and so on, trying to increase your caloric expenditure and metabolic rate.

Despite the best intentions, however, many of those efforts are self-defeating. People who are trying to lose weight often experience a decrease in basal metabolic rate, or BMR, which is the number of calories you burn at rest. The frustrating part is that it happens following long periods of low-calorie dieting; stimulant use, including ephedra and caffeine; and excessive physical activity. Do any of those scenarios sound familiar?

The decrease in BMR is directly related to the level of thyroid hormone activity, which refers to the levels of two hormones released by the thyroid gland, thyroxine, or T4, and triiodothyronine, or T3. T4 is a low-activity thyroid hormone, and T3 is a highly active one. The overall thyroid hormone activity involves the total amount of thyroid hormones and their relative proportions. Optimal thyroid activity depends on necessary levels of the hormones and the rate of conversion of T4 to T3.

Most thyroid hormone is released in the form of T4 and needs to be converted to T3, a process that takes place in the liver and is regulated by caloric intake, rather than caloric expenditure. In simple terms, if you are bringing in lots of fuel—i.e., food—you can turn up the heat, literally and figuratively. If, however, you aren't bringing in enough calories, your body turns its thermostat down and you burn fewer calories. It makes sense, especially if you think of long-term survival.

So what can you do? Some advances have been made in terms of useful training methods and supplements. You can do your cardiovascular work first thing in the morning, possibly after consuming 200 to 400 milligrams of caffeine, along with plenty of water. Unfortunately, some of the effec-

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tive thermogenic supplements have been taken off the market. The ECA (ephedrine, caffeine, aspirin) combinations provided good results for many people, but some people abused them. Most of the other so-called fat-burners lack much promise.

Some products have been shown to be effective, including essential fatty acids, soy-protein isolates and the use of low-glycemic-index carbohydrates. New, theoretically thermogenic combinations are being introduced almost daily, including such agents as yohimbine, tyrosine and phenylalanine. Typically, they are added to ECA or a chemically related compound like synephrine or pseudoephedrine, so we may end up seeing the same problems.

All of those products, with the exception of soyprotein isolates, interfere with thyroid activity. That fact led to the development of Thyro Stak. It includes five ingredients that have been shown to support or enhance thyroid activity even in lowcalorie environments.

The main ingredient is an herb that has received little attention in Western medicine, though it's been used in Ayurvedic medicine for many centuries. *Commiphora mukul* contains a class of active compounds known as guggulsterones,<sup>1,2,3,4,5,6</sup> and, while there isn't a great deal of published research on the compounds, what there is indicates that guggulsterones, specifically guggulsterones Z and E, have thyroid-stimulating activity.<sup>5,6</sup> Subjects in those studies showed an increase in thyroid hormone levels and an increase in the conversion of T4 to T3. They showed lower cholesterol and blood triglyceride levels as well, further indicating increased thyroid activity.

Thyro Stak also contains phosphates, which are found in such high-energy compounds as ATP and phosphocreatine. Thyroid activity is closely linked to the amount of energy you have, so it's a good idea for everyone to take an ample amount of phosphates daily. Numerous studies have shown the effect of phosphate supplementation on metabolic rate. Of particular interest is a study published in 1996, which demonstrated that phosphates can prevent a decrease in T3 and an increase in resting metabolism in subjects who are on low-energy diets.<sup>7</sup> That, in addition to phosphates' positive effects on creatine storage, buffering lactic acid and increasing ATP, firmly establishes the value of including phosphates in Thyro Stak.

The product contains niacin, selenium and magnesium. Niacin plays a role in supporting the co-factors necessary for energy production, such as NAD(H) and NADP(H). More than 200 enzymes require NAD and NADP. NAD is involved in energy production, while NADP(H) is **Calories, your** 



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down and you burn fewer calories. It makes sense, especially if you think of long-term survival.

Thyroid activity is closely linked to the amount of energy you have, so it's a good idea for everyone to take an ample amount of phosphates daily. used in a variety of processes, including fatty acid synthesis, glutamate oxidation and antioxidant activity. Niacin has also been shown to decrease cholesterol levels. Some people are sensitive to the flushing effect of high doses of niacin, but the effect is short-lived, and it's possible to build up a tolerance with continued usage.

Selenium is a mineral that has received a great deal of attention in recent years. Selenium appears to have a major regulatory impact on the enzyme 5'-deiodinase, which converts T4 to T3.9 Low levels of selenium can impair thyroid conversion—but excess selenium also has a negative effect on thyroid conversion.

Magnesium is present in more than 300 identified enzymatic reac-



tions.<sup>10</sup> It's involved in glycolysis, the Krebs cycle and creatine phosphate production, among others. Magnesium even has a role in protein synthesis. Subjects in a 1992 study showed increases in strength and lean body mass after a few weeks of increasing their magnesium intake.<sup>11</sup>

There are a lot of valuable products available to bodybuilders these days. Thyro Stak is the first supplement designed to optimize thyroid function and metabolic control, and, as such, it can be help you break through those maddening diet plateaus.

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Magnesium

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## Burn More Fat With Ephedrine and Ephedra

### by Dan Duchaine

f Laura Fraser, the Good Houskeeping writer who recently surveyed the most popular natural diet aids, 1 wanted to be objective about ephedra, she could have looked up the word in a Chinese dictionary. Ephedra, roughly translates to "astringent" and "yellow." Instead, Fraser likes another definition for the Chinese herb: "legalized speed." Mainstream America has discovered a better, nonprescription fat-burning pill than the recently withdrawn dexfenfluramine (Redux), but a barrage of government-sponsored misinformation-paid for by our tax dollars-is contradicting 75 years of scientific research, not to mention 5,000 years of safe use in Chinese medicine! It's time to set the record straight, starting with giving credit where credit is due: The man who turned on the American public to this thermogenic health food is Paul Delia, a bodybuilder and gym owner from Pascagoula, Mississippi, who's also the owner of the supplement company AST Research.

#### **Coulda Been Kazabol**

"Matter of fact, I wasn't thinking about thermogenesis," Paul said. "I just wanted to be kick-ass strong in the gym, but I didn't wanna go fruitcake with amphetamine use, so I started looking into the body's closest thing: adrenaline. I stumbled onto ephedrine back in '87. I read that it was a milder but longer-lasting form of adrenaline, the body's numero-uno fright, flight or fight hormone. So I asked the Food and Drug Administration (FDA) how I could sell ephedrine, which was an over-thecounter asthma medicine at the time. What a pain! The label had to have specific words, in a type that was a certain size. I even had to have an FDA-approved label glued on-and it had to be bombproof so it wouldn't fall off. I was determined, though, and Dymetadrine 25 was launched."

The problem with over-the-counter, refined ephedrine, is that you can't stack just anything in the tablet with it, unless you get an FDA approval for the combination, like the ephedrine-and-theophylline combinations in Bronkaid and Primatene tablets. Right after AST's Dymetadrine 25 sales started shooting through the roof, Cybergenics put out an herbal capsule stack containing ephedra, the unrefined-and, more important, unregulatedherb stacked with caffeine and called it Cyber-Blast. Before then I'd thought that all Cybergenics products were crap, but I had to admit that Cyber-Blast was pretty good. It was a sneaky way of stacking ephedrine and caffeine without the FDA's butting in-and keep in mind that up to this point nobody had yet mentioned fat burning. I knew that many health food stores were reluctant to sell pure ephedrine, and even Cyber-Blast looked too druglike for them; so in 1992 Next Nutrition's David Jenkins and I resurrected my 10-year-old Ultimate Orange and called it "Tang With a Bang."

In the '80s hardcore bodybuilders had this maxim: Real bodybuilders don't read—let alone believe—scientific research. It was very hard to look things up back then—before at-home Internet Medline access. We had to go to the medical libraries and pour over hundreds of bound volumes called *Index Medicus*—and all we found out was that "Steroids don't work." If I'd been really on the ball back then, I would have known about the extensive history and refinement of the ephedrine-and-caffeine theromogenic stack, but I was a know-it-all, a dumbshit. Rather than discuss the research in the haphazard way I discovered it, here's a chronological outline of the scientific developments regarding ephedra and ephedrine.

#### It's Not Some Pinko-Commie Plot

Ephedrine is a white, refined nonprescription drug. Ephedra is a soot-colored herbal, and there are numerous ephedra varities—about 40—that are grown in many desertlike climates. In America we have a variant called *Ephedra nevadensis*, also known as Mormon tea. Unrefined ephedra has two distinct isomers, lephedrine and d-pseudoephedrine. For example, the Chinese mahuang (*Ephedra sinica*) is mostly l-ephedrine. Mormon tea, though, is mostly the much-less-stimulating d-pseudoephedrine. So, when you buy the herbal variety, you get some pseudoephedrine with your ephedrine.

The ephedrine alkaloid (2-methylamino-1-phenyl-1-propanol) was introduced in the Western medical community in 1923<sup>2.3</sup> As its potency is about 85 percent that of the body's noradenaline (in itself a weak adenaline), people tried ephedrine for a host of illnesses over the years: asthma, heart block, narcolepsy, depression, hypotension<sup>4</sup> and some forms of insulin-induced edema.<sup>5</sup> At present the approved use of ephedrine is for mild asthma.

#### Hamlet's Hometown Hits the Big Time!

The first instance of ephedrine being used as a weight-loss drug took place in Elsinore, Denmark, in 1972.<sup>6</sup> Dr. Eriksen, a general practitioner working in the small town, had noticed that many of his asthmatic patients had reduced appetites when they used a triple stack of ephedrine, caffeine and phenobarbitol. The narcotic was included to quell the jitters—or it was a canny business move aimed at hooking the patients into buying more. By 1977, 70,000 people were taking the so-called Elsinore pill. That same year the Danish government issued a "ceaseprescribing" warning to all doctors about the product after a number of skin rashes, attributed to the phenobarbitol. were reported.

#### Dissin' Doc Eriksen

The revival of ephedrine and caffeine as an obesity-fighting drug has been an unusually long and cautious process, considering there are nu-

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merous studies from 1923 onward showing the effects of ephedrine and methylxanthines (caffeine and theophylline) on bronchial dilation in humans. Even Dr. Eriksen didn't make the connection that ephedrine other ratios and caffeine formed a thermogenic compound that increased energy expenditure. He thought it was simply an appetite suppressant. It but wasn't until 1981 that a traditional research study "proved" that ephedrine with caffeine reduced appetite.6 Before that academia stalled the research, invoking the infamous NIH clause: Not-Invented-Here. Poor Doc Eriksen was the Rodney Dangerfield of the fat-loss field.

#### Bat-Man (No, Not the Pedophile in the Comic Books)

From the late '70s the research was showing that ephedrine causes energy expenditure in various laboratory animals, but it took about nine years for human studies to tart appearing.7.2.8.9 Obscuring the central issue was a debate that was going on at the same time about the existence in humans of brown adipose tissue (BAT), which is a heat regulator in many mammals. Some of the initial research was incorrect in showing that humans had BAT between their shoulder blades, as the heat increase that appeared to take place was due to increased blood effect flow. Humans do have a small amount of BAT surrounding their kidneys,10 but its thermogenic effect on the whole body is small.

When scientists agreed that ephedrine was thermogenic in humans, they still had no firm recommendations of ephedrine dosage. Some studies showed the best thermogenic response at the lowest dosage, 10 milligrams.2 Others showed that 20 milligrams created no increase in

#### If It Works for Asthma...

You'd think that a scientist would have thought of the obvious sooner: If ephedrine and caffeine combinations work well together in treating asthma, they should be similarly effective for thermogenic benefits. Caffeine is thermogenic at the higher dosages, 11,12,13,5 so the ephedrineand-caffeine stack should have at least an additive thermogenic effect.<sup>14,15,16,17,9,18</sup> It was only in 1992 that a team of Danish researchers **Study.** established the ideal synergistic ratio of ephedrine to caffeine at 1-to-10.2 They tried other ratios but discovered that 20 milligrams of ephedrine gets a maximal thermogenic effect with 200 milligrams of caffeine. Note tht those were the amouynts used in the '92 study. Many bodybuilders tend to double the dose to 40 milligrams and 400 milligrams, but there's no evidence that the greater amounts cause a greater energy expenditure. Then, again, some people do it that way because they like it.

Methylxanthines weren't the only substances that showed promise when they were stacked with ephedrine. There was also aspirin. The studies are wildly conflicting on that subject.19,20 An initial study in the '80s showed a doubled thermogenic response in obese women, but another similar experiment showed no enhanced effect in lean women. What's more, although many of the popular herbal ephedrine stacks in- herbal clude the aspirin precursor white willow bark, there are no published studies showing that ephedrine, caffeine and aspirin are any better than ephedrine ephedrine and caffeine alone.21

#### So What's the Damn Problem?

If ephedrine has been around for so many years, and the research shows it to be effective and safe for weight loss, why is it that Good Housekeeping and the FDA have a vendetta against the ephedrine-andcaffeine stack? Many doctors like to say that it's dangerous, but they're white willow the same doctors who embraced dexfenfluramine, even though the published research showed that ephedrine and caffeine was not only more **bark**, **there** thermogenic but was longer lasting as well (50 weeks vs. Redux's sixmonth-only effects).<sup>10</sup> I don't usually cast stones, but we wouldn't have **are no** an ephedrine problem if Herbal Ecstasy hadn't become so popular.

When ephedrine was used only by asthmatics, truck drivers, athletes published and dieters, it was pretty much below the horizon of public scrutiny, but the Herbal-X variants appealed to the worst possible segment of the Studies population: adolescents. Many teenagers have a veneer of invulnerability, especially if a powerful stimulant is declared to be "all natural" and so, persumably, safe. Teenagers plus natural high equals abuse plus emergency room visits. Although I'm no friend of the FDA, I feel that ephedrine, the agency could have moved faster against those Herbal-X-type products, the way it did when the herbal fen-phens hit the market.

The FDA can't ban ephedrine outright, but it can control the claims made on the labels. The agency has been threatening to take control of **aspirin are** herbal ephedra-calling for a maximum dose of eight milligrams, not allowing it to be combined with additional stimulants and requiring any better with a label warning that users should take no more than three doses a day. The way the FDA arrived at those doses is not, obviously, based on any published research. Fortunately, at this point ephedrine-and-caffeine stack is still here.

#### **How Ephedrine Really Works**

If you didn't have a sympathetic nervous system, which branches off **alone**. your middle spinal column, ephedrine wouldn't work. No matter, as you'd be dead anyway. The sympathetic nervous system controls all those automatic bodily functions you don't think about: heart rate, res-

Although many of the popular stacks include the aspirin precursor showing that caffeine and than ephedrine and caffeine

Although a alkaloid in its it's modified hydrochloride or sulfate salt in the refined faster absorption. Herbal longer to

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Ephedrine's span of activity is about six hours.
Although a water piration, perspiration, even bowel movements. One of the more interesting aspects of the sympathetic nerves is what they do when you eat too many carbohydrates. Beyond the digestion energy and glucose being converted into either glycogen or triglyceride, some of the extra calories are burned off as heat.<sup>22,7,8</sup> It's the thermogenic effect of carbohydrates. The sympathetic nerves secrete a milder form of adrenaline called noradrenaline, which needs hormone receptors to work. The receptors in question are called andrenergic receptors, and the human body has two main types and a number of further subdivisions: alpha (1 and 2) and beta (1, 2, 3, and 4).
In animals, switching on the beta-receptors with noradrenaline via insulin burns excess fat calories in beta-1, -2 and -3 receptors, especially in the BAT areas. Humans, having very little BAT, mostly burn glucose

**insoluble** in the BAT areas. Humans, having very little BAT, mostly burn glucose and glycogen in skeletal muscle and the liver in something called the Cori cycle, in which carb calories are converted to lactate, and recycled back into glucose and glycogen in the liver <sup>23,10</sup>

alkaloid in its natural state, the betas but with some alpha effects as well.

> **Dalified** Ephedrine's span of activity is about six hours. Although a water-insoluble alkaloid in its natural state, it's modified with a hydrochloride or sulfate salt in the refined forms for faster absorption. Herbal ephedras take longer to reach the bloodstream.

> > The odd thing is that ephedrine is considered a fat burner, but it does that by using up the glucose and the glycogen in the skeletal muscle and liver. Only an insignificant amount of direct fat burning occurs in the BAT around the kidneys.

he refined<br/>forms for<br/>fasterEphedrine actually raises both blood glucose and insulin.24 Most low-<br/>calorie diets can cause increased nitrogen excretion, but just the oppo-<br/>site happens when you add ephedrine to the low-calorie equasion. The<br/>effects are similar to those of growth hormone or people on a low-calo-<br/>rie diet: It makes the body rely on fat calories without sacrificing amino<br/>acids in the muscle for glucose production.

#### Where Does Caffeine Fit In?

The body has built-in regulating mechanisms so that noradrenaline secreted from the sympathetic nerves is modulated in its effect. Methylxanthines all seem to work on one of the energy precursors in the cells, cyclic andenosine-monophosphate (cAMP), in conjunction with the increase in cAMP due to the effect of noradrenaline on the beta-2 receptors. There was a debate over the years as to what the primary action of the methylxanthines are: They either block adenosine or inhibit phoshodiesterase (PDE), the enzyme that degrades the phosphate in cAMP. Caffeine has both effects, but PDE turned out to be the



primary substance that intensifies ephedrine's thermogenic effect.<sup>13</sup> Chemists have produced better caffeines that have greater PDE inhibitition (the most promising is enprofylline), which doesn't influence heart rate as much, but none of the methylxanthine derivatives have been approved yet. Other substances, like forskolin, can potentiate ephedrine, forskolin has a greater adenosine-blocking effect while affecting the heart more.<sup>24</sup> After 12 Weeks of ephedrine use thyroid

#### What About Aspirin?

The transient autocrine hormones called prostaglandins can, in some cases, inhibit the release of noradrenaline. As mentioned above, some obese women respond dramatically to aspirin stacked with the ephedrine in studies, while less obese women didn't fare as well. You don't have to wait for further studies to find out what works for you. Once you've established a consistent body temperature rise with ephedrine and caffeine (a \$6 digital mouth thermometer will give you the info nicely), you can try adding 300 milligrams of aspirin and see if your body temperature shows an increase from the previous ephedrine and caffeine elevation.

#### The Really Weird Stuff About Ephedrine

The andrenergic receptors are distributed through most cells and organs in the body. At times the beta stimulation from ephedrine can actually increase some hormones. For example, thyroid hormone is elevated after about four weeks of chronic ephedrine use. Get this, however: After 12 weeks of ephedrine use thyroid hormone is lower than nor-

Thyroid hormone is elevated after about four weeks of chronic ephedrine use. Get this, however: thyroid hormone is during the initial

One of the chief drawbacks to most lowcalorie diets is the reduction of high-density lipoprotein additive. called good levels.<sup>16</sup> cholesterol. Adding ephedrine to a low-calorie diet restores HDL to near

mal—but thermogenesis is greater than it was during the initial metabolic rise. What the hell is happening?

Eventually, many of the beta-1 and beta-2 receptors will resist the ephedrine and noradrenaline stimulation, but the body won't freeze you solid. when beta-1s and beta-2s are downregulated, another thermogenic receptor increases. When that odd effect was reported in humans in 1995, the researchers assumed it was the fat-burning beta-3 receptor.<sup>26</sup> Recently, however, the beta-3 premise was discounted when the human-specific beta-4 receptor was discovered.

#### More Information

Studies have shown that only caffeine–and none of its metabolites, the chief one being paraxanthine—is thermogenic with ephedrine. What's more, research shows that part of the grapefruit rind called naringin puts off the breakdown of caffeine to paraxanthine—and grapefruit blossome are even better—so some ephedra stacks have that additive.

(HDL), the socalled good

#### The DEA Plays Hardball

The United States Drug Enforcement Agency (DEA) doesn't like ephedrine. Technically, a smart criminal chemist can make ephedrine into amphetamine. To thwart that, many of the refined ephedrines contain another ingredient that makes them almost impossible to convert: guaifenesin (a mucous-expeller, yuck!). Since the summer of 1997 the DEA has required that all interstate shippers of ephedrine register with the agency. A health food store doesn't need a DEA license to sell ephedrine for in-store sales, but anyone who wants to sell it to out-ofstate customers via mail order has to have that license. the punch line is, the DEA stopped the issuing licenses after August '97.

#### **Worst-Case Scenario**

What will happen if the FDA gets every one of its proposed regulations governing ephedra approved? Will products like Ultimate Orange or Twinlab's Ripped Fuel become illegal? Not to worry: There are plenty of other naturally occurring compounds just as potent as ephedrine and caffeine—or more so.<sup>27</sup>

#### What About Herbal Fen-Phen?

In essence, the various herbal fen-phens are in the spirit of the origi-

nal Elsinore pill: two stimulants (ephedra and caffeine) with a mild antidepressant (Saint-John's-wort). While there's no research showing that the antidepressant makes a stack more thermogenic, overstimulation caused by the ephedrine and caffeine is a very valid complaint from many users. I wouldn't be surprised if one of the anti-anxiety herbs like red ginseng didn't turn out to be a better choice. Once you establish a consistent

#### Bottom Line: The Best Ephedra Stack, Bar None

Here are some tipe for fnding a good product.

1) Read the label thoroughly. Ephedras can vary in potency. Multiply the total ephedra per does by the potency percentage to determine the amount of active ephedrine (335 milligrams of raw ephedra times 6 percent gives you 20 milligrams of active ephedrine). The ideal does for the thermogenic effect is to take about 20 milligrams three times a day, or every six hours. If you use more, you may get a better workout due to more contractile force in the muscles, but you won't necessarily get a better thermogenic effect.

2) The caffeine dose should be 10 times the ephedrine dose. You'll have to do the same arithmetic to arrive at the active caffeine content. The two chief sources of herbal caffeine are kola nut and guarana.

3) Once you establish a consistent body temperature elevation with ephedrine and caffeine, you can try 300 milligrams of aspirin to see if you get a further thermal enhancement. **aspirint to see** 

4) Refined naringin is not generally available. If you want to try a grapefruit juice chaser, the more bitter the better.

5) Take the product continuously for a while—don't stop for a while. Ephedrine-caffeine thermogenesis is better at 12 weeks and is still significant at week 50! If the animal-based research holds true, downregulating the beta-1 and beta-2 receptors creates more true fat-burning receptors in the body.

6) The ephedrine-and-caffeine combination has proven unusually safe over the years. Some individuals who are prone to cardiac ailments, hypertension and other medical conditions should stay away from all stimulants. Yes, strokes and heart attacks have occurred while people were using ephedrine—and some cases the victims were seemingly healthy individuals. It appears to be a random occurrence. One case of death from stroke involved a man who used 10 to 20 25-milligram ephedrine tablets a day for 23 years, while another fatality occurred with a healthy 15-year-old football player.

Just remember that herbs and plants are potent drugs. Bodybuilders and dieters have access to a vast unregulated pharmacy called a health food store; however, the drugs are only safe when used with caution and common sense. But don't wait for the *Good Housekeeping* Seal of Approval.

Once you establish a consistent body temperature elevation with ephedrine and caffeine, you can try 300 milligrams of aspirin to see if you get a further thermal enhancement.

normal levels.

## Bodybuilders and dieters have access to a vast unregulated pharmacy called a health food store; however, the drugs are only safe when used with caution and common sense

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8 Bodybuilding Supplement Guide

## Q: How do I lose my love handles and get that lean, ripped-waisted look?

A: Most people make drastic cuts in their calorie intake when they're motivated to lose weight, and they lose lots of muscle. They also have no energy and eventually go on an eating binge because their cravings careen out of control due to the starvation mechanism. Here are the things you need to do to lose fat while maintaining muscle:

*1*) Gradually cut your calories. Each week reduce your daily intake by 50 to 100. That should prevent the starvation mechanism from kicking in and help you preserve muscle.

2) Don't eat the same thing every day. Slight calorie fluctuations will also help keep the starvation mechanism at bay.

3) Don't reduce your daily calories below 2,200. Eating less than that can reduce your nutrient intake to levels that are too severe for a healthy body.



4) If you need to get leaner after you've been

holding your daily calories at 2,200 for a few weeks, gradually ramp up your activity. Fast walking is probably the best fat burner around. If you do it on an empty stomach—say, first thing in the morning it's even better. No matter when you do your aerobic exercise, always try to fast for a few hours beforehand. That will force your body to use fat for fuel rather than the glucose circulating in your bloodstream.

Fat-Burning Q&A

5) Weight train five to seven days a week. The more often you jolt your metabolism with weight training, the more fat you'll lose. Remember, muscle tissue is the true fat incinerator.

*6*) You have to eat small, balanced meals and eat them often. Eating five to six times a day is perfect. See the back of this book for a complete diet.

7) Strive to eat balanced meals at most of your feedings—45 percent carbs, 30 percent protein and 25 percent fat. Lean more toward protein, especially as the day wears on, as it will help spare muscle tissue. Carbs eaten at night tend to favor fat deposition, so cut carbs in the late afternoon and evening.

8) Never eat carbs alone, and always look for low-glycemic carbs—the ones that don't shoot up your insulin levels, which can cause more fat deposition.

9) Try not to eat anything after 7 p.m.

10) Use a couple of good fat-burning supplements, such as Syntrax Innovations' Adipokinetix and Muscle-Link's Thyro Stak. If you can't afford one of those, try two cups of coffee before you train. The caffeine will step up the fat burning.

-Steve Holman, editor in chief, IRONMAN

#### Q: I've ordered Muscle-Link's Thyro Stak. How exactly do I use it?

A: Thyro Stak, which is essentially a blend of guggulsterones and phosphates along with other supporting nutrients, is designed to help maintain a normal thyroid function in conditions that would otherwise

Suggulsterones have been shown to stimulate the thyroid gland to release thyroid hormone. **Phosphates** have been shown to increase the rate of conversion of ne low-activity thyroid hormone, T4, to the higheractivity T3.



cause a decrease in thyroid activity. Thyro Stak, unlike the pharmaceutical preparations Synthroid and Cytomel, is not a source of active thyroid hormone. That's an important distinction. Thyro Stak will allow your body to maintain a degree of regulation, rather than subjecting it to whatever dose people assault their bodies with in an attempt to meet weight-loss or bodyshaping goals.

Guggulsterones have been shown to stimulate the thyroid gland to release thyroid hormone. Phosphates have been shown to increase the rate of conversion of the low-activity thyroid hormone, T4, to the higher-activity T3. If you have a normal thyroid function, your body keeps your thyroid at a normal level when it's in a well-fed and rested state. When you subject yourself to stress, thyroid function and activity drop, giving vou that sluggish state in which you have no energy, and fat loss grinds to a standstill. That stress may come from dropping calories below maintenance, dropping carbs, using stimulants, lacking sleep, mental stress, etc.

You have to combine Thyro Stak with some effort to get the results. If you're consuming 3,000 calories a day or hundreds of grams of carbs, Thyro Stak may not make a difference, as your body is not stressed. It needs to recognize a low-energy state that will cause it to lower the ac- amino acids tivity of the thyroid before the "normalizing" action of Thyro Stak will take effect. I wish I could offer you a magic pill. It would make me mil- are lions, as few people want to put forth any honest effort. For those of you who do, Thyro Stak will help you keep the fires burning, even when metabolized in you're pushing yourself to the max.

I recommend you keep your calories at near maintenance, give or take the liver. a couple hundred, exercise vigorously and push the water for eight weeks. By then your body will probably have adapted by shutting down BCAAs can your thyroid activity. That will happen faster if you're not sleeping well or you use a stimulant for weight loss like the ephedrine-caffeine-andaspirin stacks or Adipokinetix. You don't need to stop using those when you start using Thyro Stak, however, although you should watch your metabolism dose response because you may become resensitized to the stimulant properties of those products. Increasing the dose of Thyro Stak will not and go directly provide any additional benefits. Unless you want to resort to pharmaceuticals, which I don't recommend, you have to give your programs a **into muscle**, little time and a lot of effort.

I don't recommend the ECA stacks because of the possibility for ad- where they verse reactions; however, since they facilitate fat loss by increasing the metabolism and working directly on the fat cells, users of both Thyro Serve as Stak and ECAs will probably see greater results.

—Daniel Gwartney, M.D. nitrogen

#### O: Do branched-chain amino acids burn fat?

A: The branched-chain amino acids (BCAAs) include leucine. isoleucine and value, and they are so named because of their chemical synthesis of structures. The recommended dietary allowance for BCAAs amounts to about three grams a day, but that doesn't take into account people who other vital regularly engage in intense exercise.

BCAAs have several unique properties that other amino acids don't amino acids. In have. For example, while most amino acids are metabolized in the liver, BCAAs can bypass liver metabolism and go directly into muscle, where **doing so, they** they serve as nitrogen donors for the synthesis of other vital amino acids, such as glutamine and alanine. In doing so, they exert an anti- exert an catabolic action in muscle.

BCAAs may also aid muscular endurance by opposing the entrance anticatabolic of free tryptophan into the brain. Tryptophan, like the BCAAs, is an essential amino acid; however, in the late stages of exercise, when action in BCAAs begin to be used as a fuel substrate, more tryptophan enters the brain, where it's rapidly converted into serotonin, a brain neurotrans- muscle. mitter that imparts a feeling of fatigue. Since BCAAs block the entrance of tryptophan into the brain, the theory is that taking them before extended exercise sessions will prevent premature fatigue.

donors for the

While most

bypass liver