



**The Truth
About
Weight Loss
Supplements**

By Anthony Colpo

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Introduction

Weight loss supplements are *big* business. In 2001 alone, Americans spent a whopping \$3.9 billion on pills, powders and other concoctions purported to boost weight loss[1]. As you are about to learn, much of this money was spent on products that are largely useless.

Don't get taken in by bogus claims for ineffective diet pills, powders and creams. What follows is a discussion of the clinical evidence - or lack of it – behind the most popular weight loss supplements.

HCG – Human Chorionic Gonadotrophin

One of the latest fads to sweep the fat loss arena is the “HCG Diet”. HCG stands for human chorionic gonadotropin, a hormone used in fertility treatments and found naturally in the bodies of pregnant women to ensure the developing foetus receives enough calories. Most bodybuilders will instantly recognize the HCG pseudonym; pharmaceutically enhanced male lifters have long used HCG injections “post cycle” to kick start their natural production of testosterone, which typically shuts down during a steroid cycle.

Which raises the obvious question: why on earth would anyone use this stuff in an attempt to lose weight?

Pregnant Women and Indian “Fat Boys”

The idea of employing HCG for weight loss first occurred to one Dr ATW Simeons back in the 1930s. After studying pregnant women and treating “fat boys” in India with HCG who didn't lose weight yet allegedly reduced their hip circumference, Simeons came to the conclusion that HCG was an effective fat ‘mobilizing’ agent. He believed the observed change in body shape *“could only be explained by a movement of fat away from abnormal deposits on the hips, and if that were so there was just a chance that while such fat was in transition it might be available to the body as fuel”*. This, he surmised, would make it possible *“to keep a “fat boy” on a severely restricted diet without a feeling of hunger, in spite of a rapid loss of weight.”*[2].

Over the next 20 years, Simeons reportedly placed hundreds of his patients on a strict weight-loss regimen: a daily shot of HCG and two daily meals consisting of 100 grams of lean meat, some leafy vegetables, fruit and a piece of crispbread, for a total of no more than 500 calories a day.

In 1954, he claimed in the *Lancet* patients following the regimen for 40 days lost 20 to 30 pounds, and that 70% of them maintained their weight loss after going off the diet[3].

Other doctors began placing their own patients on Simeons' regimen and claimed similar successes. The use of HCG for weight loss spread and during the seventies, weight loss clinics using HCG flourished. Of course, a lot of dodgy things flourished in the 70s (ELO and bell bottom jeans, anyone?).

When the veracity of the HCG weight loss claims was put to the test in tightly controlled trials, the results painted an entirely different picture. Sure, significant weight losses were often observed on the Simeon regimen – but in most instances, identical weight losses were also observed in those eating the same diet but receiving a placebo. Any spectacular weight loss seen with the Simeons regimen was due to the extremely low calorie diet employed, not HCG.

After a string of failed trials and a series of statements from medical and health organizations discouraging the use of HCG for weight loss, its use gradually fell out of favour. In 1976, the Federal Trade Commission issued an order *“requiring five independent California weight reduction clinic operators [including two Simeons companies], among other things to cease failing to make conspicuous disclosure statements in advertising, and to potential purchasers that drugs used in weight reducing programs have not been approved by the Food and Drug Administration as safe and effective for weight control; drugs do not cause more attractive redistribution of weight; and treatment required adherence to a 500 calorie daily diet.”*[4]

However, after a long hiatus, the HCG weight loss claims are back. For this we can thank none other than infomercial king Kevin Trudeau.

The Ineffective Weight Loss Treatment ‘They’ Don’t Want You to Know About!

Trudeau's 2007 book, *The Weight Loss Cure They Don't Want You to Know About*, claims that *“an absolute cure for obesity was discovered almost fifty years ago”* but was *“suppressed”* by the AMA, the FDA, and *“other medical establishments throughout the world.”* Trudeau further claims that until now, *“this miracle weight loss breakthrough has been hidden from the public so that drug companies can make billions of dollars selling their expensive drug treatments and surgical procedures for obesity.”* The alleged *“cure”* consists of HCG injections plus a long list of do's and don'ts [5].

Rest assured, I need little convincing that governments, businesses and influential 'non-profit' organizations routinely feed us misinformation on health (and just about everything else) in order to further their own dubious agendas. But Trudeau's claim that the *“miracle”* weight loss effects of HCG (not a natural supplement but a pharmaceutical drug, remember) have been suppressed by governments and pharmaceutical companies is utter garbage. The truth is that the fat loss effects of HCG are far from miraculous – as we shall discuss shortly.

In 2007, the FTC charged Kevin Trudeau with violating a court order by misrepresenting the contents of the book [6]. In infomercials, Trudeau falsely claimed that the book's weight-loss plan is easy to do (it's not), can be done at home (well, I guess it can, if you can find a doctor or black market source for genuine HCG and are comfortable giving yourself the shots), and ultimately allows readers to eat whatever they want (gee, where have we heard that one before?).

Previous FTC action had led to a court order banning Trudeau from using infomercials to sell any product, service, or program except for books and other publications. The order specified he not misrepresent the content of the books. In 2008, the Court ruled that Trudeau had violated the previous order and ordered him to pay more than \$37 million. Trudeau's previous claims to fame include being sued by the FTC for claiming that a coral calcium product he sold cured cancer.

Clearly, anything promoted by Kevin Trudeau should be regarded with the utmost suspicion. But human hope, gullibility and sheer stupidity spring eternal. So let's take a look at the evidence (or lack of it) for HCG. What exactly did the clinical trials show?

HCG on Trial

The earliest published trial examining the effect of HCG on weight loss was conducted by Dr Stuart Carne[7]. The British physician had been using Simeon's protocol on overweight patients since 1959 with mixed results. It had become clear to Carne that strict adherence to the 500-calorie diet was essential for the plan to deliver results similar to those reported by Simeon. In order to determine whether HCG played any real role in the weight loss, or whether the extremely low calorie diet alone was responsible, he conducted two trials.

In the first, two groups of patients were given either HCG (125 IU daily, as prescribed by Simeons) or placebo injections containing a saline solution. According to Carne, both substances were presented to him in identical vials as a powder to be reconstituted, and numbered in random order. He did not know which contained HCG and which contained the placebo until the trial was over. In no case was a vial prepared for one patient and used for another. After six weeks, there was no significant difference in weight loss (21 versus 19 pounds in the HCG and placebo groups, respectively).

In the second trial patients were randomly selected to undergo the diet plus daily saline injections or the diet alone. And this is where things got interesting. After six weeks, there was a statistically significant greater weight loss in the group receiving saline placebo injections (22.4 versus 17.7 pounds in the placebo injection + diet versus diet only groups, respectively). Weekly weight loss was greater during the entire six week period with the placebo injections. The patients

receiving the saline injection also gushed on about how much easier it was to follow the diet and how much more energy they had when compared to their previous attempts to follow very low calorie diets.

Is there something “miraculous” about injectable saline that causes accelerated weight loss and increased energy levels?

Of course not. The real reason for the greater weight loss is hardly out-of-this-world. As Carne explained, the subjects receiving injections *“not only had to come to my surgery six days every week, but they were also weighed by me on my scales every day. Failure to lose weight from one day to the next or even worse, the slightest gain in weight, led to a careful review by me of their previous day’s diet. As one patient (a – schoolmistress) said to me: ” You know, Doctor, every time I look at a piece of food I think of what is going to happen when I get on your scales tomorrow morning.” On the other hand, those on the diet alone had only to report to me twice a week to be weighed. We might presume that when they were tempted by food they may have said to themselves: “Never mind if I do eat it, I can always make up for it in the next couple of days.”*

But what about the reports of diminished lethargy and increased energy that allow people to adhere to a normally intolerable intake of only 500 calories per day? Carne elucidated the real factor: *“It would be a boon to those who are overweight to have some drug that would enable them to lose weight safely without having to fight their appetite urges. C.G. is not an answer, nor does it seem appreciably to increase their weight loss if they do adhere to a very rigid 500-calorie diet. On the other hand, those on the diet alone constantly complained of feeling tired or weak. The patients on either C.G. or the inert placebo were keen to tell me how much benefit they got from the injections and how previously they had failed to keep to any diet they had tried (for obesity is usually a chronic disease and we rarely see a patient who has not tried other methods of shedding their excess weight).”*

In other words, the true value of the HCG and saline shots was their placebo effect. Tell someone to follow a 500-calorie diet and they’ll struggle to stick to it. But the moment you start sticking needles into people’s posteriors, they start to believe they are receiving some high-tech, super-effective fat loss agent. Buoyed by this knowledge, their mental outlook changes to such a positive degree they truly believe the treatment is favourably affecting their physiology.

The placebo effect, my friends, is very real. And it has made a lot of dietary and medical charlatans very, very rich over the years.

More Trials Debunk HCG For Weight Loss

We could write off HCG from Carne's results alone, but numerous other investigators have also examined the Simeon regimen. Let's see what they found.

In 1963, Dr. LS Craig treated twenty obese female clinic outpatients for a forty-day period with a 550-calorie diet similar to Simeon's and a daily injection of either chorionic gonadotropin or a placebo solution, administered in double-blind fashion[8].

All but one of the women lost weight during the treatment period. A weight gain of 2 pounds occurred in one woman who was treated with chorionic gonadotropin. The difference in loss of weight in the treated women and in the control subjects was insignificant. The average loss at the end of the treatment period was 6.5 pounds in the treated women and 8.8 pounds in the control subjects. Maximum loss in a treated subject was 23 pounds and in a control subject 17 pounds.

Among the fourteen women who agreed to have their body measurements taken before and after treatment, circumference of waist, hips or axillary area of the HCG and control subjects did not vary significantly.

Craig noted *"the losses were small and not uniform, suggesting varied adherence to the diet. The basal metabolic rate was increased in four treated patients and two control subjects. These changes could not be correlated with weight loss, apparent adherence to diet or protein-bound iodine levels."*

Capt. Barry W. Frank, MC, from the U. S. Army Hospital, Medical Service, Fort Carson, Colorado studied obese men and women given HCG or placebo[9]. Thrice weekly the subjects received an injection of either 200 mg HCG or placebo. The diet prescribed was an exchange-type diet consisting of 85 g of protein, 31 g of fat, 133 g carbohydrate and approximately 1,030 calories.

HCG devotees have criticised Frank for his use of a 1,030 calorie diet instead of Simeon's 500-calorie regimen. Frank deliberately chose the higher calorie intake to make the adherence to the diet easier for his subjects. Furthermore, 1,000 calories per day is still a very low calorie intake for most people – only the smallest sedentary female would fail to achieve a calorie deficit on such a low energy intake. If HCG was the miraculous *"fat mobilizing"* and satiating agent that it was purported to be, then it should have produced significantly greater fat loss at any degree of weight loss-inducing caloric restriction.

But it didn't.

The mean weight loss of the group treated with the hormone was 12.3 pounds and of the control group 11.5 pounds. There were no significant differences in weight loss, body girth measurements, or subjective symptoms of hunger.

Finally, Some Scientific Support?

The next two trials to be published both claimed to have found greater weight losses on patients treated with HCG. The first of these was reported by London doctor Philip Lebon, who assigned obese patients to Simeons' 500-calorie diet and either HCG or placebo injections[10]. Some of the patients received as many as 3 courses of treatment. Of those who underwent only one course of treatment, Lebon reports that patients given HCG lost 13.0 pounds, compared to 9.6 pounds.

While HCG proponents would no doubt embrace this supportive study, it is problematic for several reasons:

- In his paper, Lebon did not discuss randomization procedures, for the highly probable reason there were none. Scanning through the list of patients reveals several instances of identical surnames within the HCG and placebo groups, indicating that patients were manually and non-randomly assigned to the groups, in some instances on the basis of familial relationship.
- The paper is poorly reported, with age information missing for forty percent of the patients.
- Although data for 47 patients are originally presented in the HCG vs placebo trial, only 24 are considered in the final results.
- The length of treatment varied widely among patients, ranging from four to 40 days.
- The difference in weight loss is wholly explained by extreme differences in 'outliers'. The 24 patients whose results were considered were divided into four groups based on the degree of weight loss: "very good" (18 lbs or more), "good" (14-18 lbs), "fair" (10-14 lbs), and "poor" (less than 10 lbs). In both groups, there were 2 patients in the "good" category and 5 and 7 patients in the "fair" category in the HCG and placebo groups, respectively. The majority of patients fell into these two middle categories, and there was little difference between them. However, there were five patients from the HCG group in the "very good" category, but none from the placebo group. Meanwhile, in the "poor" category, there were three from the placebo group but none from the HCG group. Are these differences in the outlier groups a genuine artifact of the HCG treatment –

or purely due to chance? If larger studies of higher quality fail to confirm these results, then we have our answer

No offense to Lebon, who for all I know may have been a wonderfully upstanding citizen and conscientious practitioner, but both his trial and published paper were of highly questionable quality.

Asher and Harper to the Rescue?

The remaining supportive study was conducted by two doctors, one of which used HCG in his own practice to treat obese patients. Claiming that most of the previous non-supportive studies used protocols not exactly identical to those used by Simeon, they set out to correct this alleged discrepancy in their own double blind trial.

Asher and Harper compared twenty female patients on 500- to 550-calorie diets receiving daily injections of 125 IU of human chorionic gonadotrophin (HCG) with 20 female patients on isocaloric diets receiving placebo injections[11]. Patients in both groups were instructed to return for daily injections 6 days each week for a total of 36 injections (unless desired weight was achieved prior to this). The HCG group lost significantly more mean weight, had a significantly greater mean weight loss per injection, and lost a significantly greater mean percentage of their starting weight. The mean weight loss in the HCG group was 19.96 pounds and 11.05 pounds in the placebo group. The percentage of affirmative daily patient responses indicating “little or no hunger” and “feeling good to excellent” was also significantly greater in the HCG group than in the placebo group.

So at last, confirmation that HCG really does work for fat loss, right?

Not so fast.

Again, one of the critical tests of validity for research findings is that they are able to be replicated by other researchers. If you claim a certain finding in your research, but other scientists fail to replicate those results no matter how hard they try, then your findings are untenable.

So, seeking to replicate these results, researchers from the Letterman Army Medical Research Center in San Francisco randomized women to either HCG or placebo[12]. They recruited slightly more patients, of similar age, starting weight and height, than Asher and Harper. Each patient was given the same diet (the one prescribed in the Asher-Harper study), was weighed daily Monday through Saturday and was counselled by one of the investigators who administered the injections. Laboratory studies were performed at the time of initial physical examinations and at the end of the study. Twenty of 25 in the HCG and 21 of 26 patients in the placebo groups completed 28 injections. There was no statistically significant difference between the two groups in number of injections received,

weight loss, percent of weight loss, hip and waist circumference, weight loss per injection, or in hunger ratings.

Thus, Asher and Harper's results were not replicated. One of the authors (Harper) had a vested financial and professional interest in the Simeons protocol, as he used it in his own practise. However, both Asher and Harper adamantly maintain that a strict double blind protocol was adhered to at all times during the study. Let's give them the benefit of the doubt and see if anything else may have affected the results.

Reading through the Asher and Harper paper, we learn that of the forty patients starting the study, 17 of 20 in the HCG group and 13 of 20 in the placebo group completed 30 or more injections. This would suggest a greater lack of compliance, for reasons unknown, in the placebo group. The authors acknowledged this but believed that an appetite-suppressing effect of HCG was responsible. However, other researchers have continually failed to detect this mystical appetite suppressing effect.

We also learn that the patients followed their regimens for different lengths of time, and not all received their injections in the intended manner. Patients were to return to the office six days each week for 36 injections *"unless the desired weight was achieved prior to this"*. According to the authors: *"The majority of these missed injections were for legal misses, i.e., holidays (the study was done between August and February and holiday injections were not required). In addition...some patients did not receive shots during the time of heavy menstrual flow and a few of the misses occurred because of trips and for other "excused" reasons.*"[13]

The authors deny any of this could significantly have affected the results, but nonetheless the picture quickly begins to emerge that compliance and control in this study was less than optimal.

While Asher and Harper's patients received 36 injections over a variable number of days (exact information not published), all of the Letterman study participants received 28 injections over a 32-day period.

Another significant difference between the two studies is that all the patients in the Letterman study *"had the added reinforcement to comply by peer pressure as they all reported daily to the clinic at the same time and developed a certain "group spirit" which the Asher-Harper patients did not have."* Whether this any extra motivation from this camaraderie overrode any appetite suppressing effect HCG, or whether the alleged appetite suppressing effects of HCG are simply a myth, could not be discerned from this study. What we do know is that was a more strictly conducted endeavour that completely failed to replicate the results of Asher and Harper.

Lebon 1966 and Asher and Harper 1973 are the only two published and allegedly double blind trials that have reported positive results for HCG. Both feature problematic methodology and both have been disproved by many more trials of higher quality.

Interestingly, Asher and Harper briefly mention in their paper an earlier trial they had performed that failed to find any weight loss benefit for HCG. This study was never published.

HCG Continues its Downward Slide into Weight Loss Purgatory

In the largest trial examining HCG for weight loss, two hundred two patients participated in a double-blind randomized crossover study of HCG vs placebo[14]. "Crossover" means that all subjects in the study receive both HCG and placebo during alternate and randomly assigned periods. Serial measurements were made of weight, skin-fold thickness, dropout rates, reasons for dropping out, and patient subjective response. There was no statistically significant difference in any of these measures between those receiving HCG vs placebo during any phase of this study.

Greenway and Bray randomized forty women to receive injections of either HCG or placebo 6 days a week for 6 weeks[15]. As well as weight loss and subjective rating of hunger, the researchers measured the circumference of the mid-thigh, chest, hip and upper arm. Weight loss was identical between the two groups, and there were also no differences in hunger nor localized body measurements.

Miller and Schneiderman performed a double blind crossover trial of HCG vs placebo and observed no significant differences in weight loss, mood, hunger, and no apparent difference in adherence to diet compared to placebo[16]. In contrast, a significant difference was found in the ability of subjects to lose weight in the first four weeks of the study in contrast with the second four weeks, no matter which agent was used.

In a double-blind, placebo-controlled study by Bosch et al, the effects of HCG on weight loss were compared with placebo injections[17]. Forty obese women (body mass index greater than 30 kg/m²) were placed on the same diet supplying 1200 calories per day and received daily injections of saline or HCG, 6 days a week for 6 weeks. A psychological profile, hunger level, body circumferences, a fasting blood sample and food records were obtained at the start and end of the study, while body weight was measured weekly. Subjects receiving HCG injections showed no advantages over those on placebo in respect of any of the variables recorded. The researchers concluded "*there is no rationale for the use of HCG injections in the treatment of obesity.*"

After a nine-day control period, six hospitalized obese women were placed on 500 calorie diets and were given 125 IU of human chorionic gonadotropin (HCG)

intramuscularly daily for 30 days[18]. Another five obese women consumed identical diets but received placebo injections. Mean weight loss in the two groups was almost identical, and there were no differences in reduction of triceps skinfold thickness or circumferential body measurements of the chest, waist, hips, and thighs. Patterns of change of a variety of plasma and urine substrates, electrolytes, and hormones were similar in the two groups and consistent with semistarvation and weight loss.

A 1996 meta-analysis examining eight uncontrolled and 16 controlled clinical trials of HCG for weight loss concluded *“there is no scientific evidence that HCG is effective in the treatment of obesity; it does not bring about weight-loss or fat-redistribution, nor does it reduce hunger or induce a feeling of well-being.”*[19]

The Oral HCG and Obesity Website

If you run a Google search for “HCG Diet”, one of the first results to show will be for “The oral hCG (Human Chorionogonadotropin) and obesity website” run by a Daniel Belluscio M.D. from Argentina. Of the oral HCG regimen, Belluscio’s website claims: *“This reliable and effective method for obesity management has been validated by the appropriate Double-Blind studies”*. When one clicks on the provided hyperlink to view these studies, they are taken to a page <http://www.hcgobesity.org/hcg1.htm> featuring a single unpublished, non-peer reviewed report of a study allegedly conducted by Belluscio and two other doctors.

In this study, the volunteers drank their HCG instead of being injected with it. There were two HCG groups receiving a low and higher dose, and a placebo group.

The abstract states *“Female obese volunteers participating in a double blind study, and submitted to the administration of an oral presentation of hCG (Human Chorionogonadotropin) plus a VLCD (Very Low Calorie Diet), decreased specific body circumferences and skinfold thickness from conspicuous body areas more efficiently than Placebo+VLCD -treated subjects.”*

As one proceeds to read through the body of the study, one is confronted with a poorly written mountain of statistical gobbledegook that a skeptical mind would strongly suspect is designed to downplay the fact that HCG failed to achieve statistically significant differences in the overwhelming majority of body composition measures.

Close inspection of these results shows that the study in no way *“validated”* oral HCG as a *“reliable and effective method for obesity management”*. If anything, the results show oral HCG is basically a waste of time and money, and that one would be far better served using proven superior fat loss methods with an established track record.

The doctors claimed that *“our results indicate that specific [skinfolds] are highly responsive to hCG pharmacological intervention (upper and lower umbilical)...The greater response was obtained in those regions where the corresponding circumference assessments resulted in nearly significant or significant decreases through the trial period”*.

In other words, there was no greater weight loss <http://www.hcgobesity.org/images/figure1abc.gif> in the HCG groups, and no significant difference in changes of any body composition measure except for a mere two skinfold measures in the upper and lower umbilical areas of the stomach.

Belluscio et al also claim, *“hCG-treated volunteers (G1+G2) showed a trend to improvement of inter-personal contacts and mood control when confronting upsetting or conflicting situations.”* When researchers claim a “trend” towards a certain finding, it means there was no statistically significant finding. In a larger study with similar findings, the “trend” may reach statistical significance; of course, if that larger study was ever performed, the finding may not be replicated at all.

Sorry folks, but if I’m going to start injecting myself with fertility medications in the hope of getting shredded, I’m going to need far more convincing evidence than a badly written, unpublished, non-peer reviewed Internet “study” that failed to demonstrate clinically meaningful differences between the HCG and placebo groups.

HCG: Humanity’s Chronic Gullibility

Despite its clinically demonstrated inefficacy, interest in HCG as a weight loss agent continues to grow. According to the *LA Times*, *“more and more online companies are promising to supply the injections. The shots can come at a significant cost: Online prices range from \$30 to more than \$600 for a month’s supply. And they have side effects. Simeons noted that his female patients often became pregnant while on the shots, and today, in fact, HCG is approved by the Food and Drug Administration as a fertility treatment.”*[20]

Other companies are getting around the legal ramifications of selling real HCG by offering oral “homeopathic” HCG. In other words, a product that effectively contains no HCG.

A fool and his money...

Ephedrine/Caffeine Combination

Ephedrine is derived from various plants belonging to the genus *Ephedra* (family Ephedraceae). Ephedrine was once widely prescribed as a decongestant and as

a bronchodilator in the treatment of asthma. While it continues to be used for such purposes, its popularity has waned due to the availability of newer, more effective drugs. For medicinal use, ephedrine is most commonly taken in its hydrochloride and sulfate forms. In traditional Chinese medicines, the herb *Ma Huang* (*Ephedra sinica*) contains ephedrine as its principal active constituent.

During the nineties, ephedrine hydrochloride became a highly popular fat loss agent. Supplements containing *Ma Huang* or standardized Ephedra extracts were also widely available in health food stores and used for the same purpose. Ephedrine/ephedra use became popular among bodybuilders, fitness contestants, athletes and the general public.

Things started to turn sour when case reports of adverse reports allegedly related to ephedrine/ephedra use began surfacing. In 1997, the FDA began a campaign against ephedrine/ephedra which eventually resulted in a ban on ephedrine alkaloids marketed for reasons other than asthma, colds, allergies, other disease, or traditional Asian use. In April, 2005, the U.S. District Court for the District of Utah ruled that the FDA did not have proper evidence that low dosages of ephedrine alkaloids are actually unsafe, but in August, 2006, the U.S. Court of Appeals for the Tenth Circuit in Denver upheld the FDA's final rule declaring all dietary supplements containing ephedrine alkaloids adulterated, and therefore illegal for marketing in the United States[21]. Ephedrine is, however, still legal in many applications outside of dietary supplements, and as of May 2007, ephedrine can be purchased via the Internet.

My purpose here is not to recommend ephedrine or to discuss the legalities of its purchase and use. I will simply present a brief rundown of the research examining its effect on fat loss. Here are some of the key findings:

- Both ephedrine and herbal ephedra supplements have consistently demonstrated the ability to accelerate fat loss in controlled clinical research[22-30].
- Ephedrine/ephedra work best for fat loss when taken simultaneously with caffeine (caffeine enhances the effect of ephedrine, but has no effect on its own).
- The ephedrine/caffeine combination works both by suppressing appetite and stimulating an increase in energy expenditure. The increase in energy expenditure appears to be met entirely by fat burning[31].
- The most commonly used dosage in clinical trials is 20 milligrams ephedrine and 200 milligrams caffeine, taken three times daily (for a daily total of 60 milligrams ephedrine /600 milligrams caffeine).

- The ephedrine/caffeine combination produced greater weight loss than the once popular but now defunct diet drug dexfenfluramine[32].
- In contrast to ephedrine, pseudoephedrine does not increase weight loss[33].

What kind of results are observed in double-blind, placebo-controlled studies of the EC stack? A 6-month study comparing the EC combo (20/200 mg dose) with placebo in women eating a calorie restricted diet observed weight losses of 16.6 and 13.2kg, respectively[34]. An eight week trial by the same researchers found no difference in overall weight loss, but a significant repartitioning effect of EC; the EC group lost 4.5 kg more body fat and 2.8 kg less lean mass[35]. Yet another 8 week study observed a 2.2kg weight loss for EC (and aspirin) versus 0.7 kg for placebo[36].

As for studies using herbal versions of the EC combo, a 6-month trial using Ma Huang and Kola nut (at a dose of 90/192 mg/day ephedrine alkaloids/caffeine) decreased body weight by 5.3 kilograms, compared to 2.6 kilograms on placebo. Body fat losses were 4.3 versus 2.7 kg in the EC and placebo groups, respectively[37].

An 8-week trial by the same researchers found mean weight and body fat losses of 4.0 kg and 2.1 % in the group taking a Ma Huang/Guarana supplement (supplying 72 mg/day ephedrine alkaloids and 240 mg/day caffeine)[38].

A 12-week trial of a supplement whose main ingredients were Ma Huang, Kola Nut and Green Tea (supplying caffeine 210 mg/day and ephedra 72 mg/day) observed weight and bodyfat losses of 3.5 kg and 7.9 %, respectively. The corresponding losses in the placebo group were only 0.8 kg and 1.9%[39]. The EC supplement increased RMR by 8%, which underscores another important point: EC use will not counter one's gluttony. Don't expect the modest increase in energy expenditure from EC to prevent the inevitable weight gain that will come from eating hundreds of excess calories each day. For EC to work, it must be used in conjunction with calorie restriction and/or exercise.

The ephedrine/caffeine combination is an effective and widely studied fat loss supplement. In studies lasting up to 6 months, it has demonstrated a very low rate of adverse effects. Please keep in mind that prospective clinical trial participants are carefully screened and any individuals with possible contraindications to the studied agent are excluded from participation. Do *not* use ephedrine or ephedra if you suffer cardiovascular, liver, kidney, Parkinson's or thyroid disease, high blood pressure, prostate disorders, mental illness, depression. Do not take ephedra/ephedrine if you are prone to headaches or anxiety, nor if you are taking monoamine oxidase inhibitor medications. If you decide to experiment with ephedra/ephedrine, you do so of your own volition and at your own risk. In order to avoid negative legal ramifications, anyone

contemplating ephedra/ephedrine use should carefully check the legal status of these products in the jurisdiction in which they live.

Verdict: No doubt about it - ephedrine/ephedra, when combined with caffeine, accelerates fat loss. However, legal impediments to purchase may make the above discussion moot for many readers. Those with contraindications to ephedra/ephedrine should steer clear of products containing them.

Citrus Aurantium

When the legal status of ephedrine and ephedra started looking shaky, worried supplement manufacturers quickly began introducing “ephedra-free” products containing *Citrus Aurantium*. Derived from Bitter Orange, *Citrus Aurantium* extracts were eagerly embraced as metabolism-boosting, fat-loss enhancing replacements for ephedra.

When some of my clients experimented with *Citrus Aurantium* years ago and experienced no discernable effect, I promptly assigned it to the scrap heap of supplement history. Recent research has proven me correct; in fact, one 8-week study detected a slightly greater weight *gain* in the *Citrus Aurantium* group than in the placebo group[40]. Don’t waste your money on *Citrus Aurantium* – as a replacement for ephedra, it fails miserably.

Verdict: An ephedra wannabe that fails to deliver.

Green Tea

Tea extracts, especially those from green tea, are currently being pumped as effective fat loss agents. Current evidence indicates that you should take the hype with a pinch of salt.

A recent 3-month study with overweight women found that a green tea extract supplying 1125 mg tea catechins and 225 mg caffeine per day offered no weight or fat loss advantage over placebo[41]. An earlier study by the same researchers found that a green tea extract offered no advantage over placebo in preventing weight regain among subjects who had recently lost weight[42].

A study published in the January 2005 issue of the *American Journal of Clinical Nutrition* caused much commotion when researchers reported that an oolong tea extract increased fat loss. Those who bothered to read the study for themselves quickly realized the results were little to be excited about.

For twelve weeks a group of Japanese men consumed, in double blind fashion, one bottle daily of an oolong tea mixture containing 690 milligrams of catechins or a bottle of oolong tea containing only 22 milligrams of catechins. Oolong tea is

produced by halting the fermentation process before the leaves are fully blackened, resulting in a beverage that is 'between' green and black tea.

The men's maintenance energy requirements were calculated, and they were then instructed to consume 90% of this figure each day. During the week, the men ate from set menus in the cafeteria at the company where they all worked (the company who marketed the drink tested in the study). On the weekends and public holidays they ate in accordance with the recommendations in provided guidebooks.

After 12 weeks, the men drinking the high potency oolong tea lost 2.4 kg, while those drinking the low potency control tea lost 1.3 kg. Of this weight loss, the high potency tea group shed 1.4 kg of fat compared to 700g in the control group. Waist circumference decreased 3.4 cm in the treatment group, and 1.1 cm in the control group[43].

To lose an extra 700 grams of fat over 3 months is better than nothing, but hardly an earth-shattering result. There's nothing wrong with judicious use of tea, particularly in light of evidence that suggests it may protect against cancer. Just don't expect it to help you lose a whole lot of weight, as clinical evidence suggests the results will range from minimal to none.

Verdict: Drink tea if you like the taste or wish to reap the potential health benefits. If you wish to lose weight, put down the kettle and go do a workout.

Conjugated Linoleic Acid (CLA)

CLA has been touted as a fat loss agent since the mid nineties. However, the majority of placebo-controlled studies have reported no effect of CLA on weight loss when used in doses as high as 6 grams per day[44-55]. One of these trials actually found greater reductions in visceral fat in the placebo group[56]. Other CLA trials have generally found little effect on overall weight status but small favorable changes in fat or lean mass status[55, 57-67]

Of the studies that did report positive results, the changes were hardly awe-inspiring. The longest-running double-blind trial (12 months) compared the effects of two different CLA supplements with a placebo. The average overall weight changes in the CLA groups were -1.1 and -1.8 kilograms, compared to +0.2 kilograms in the placebo group. Body fat changes in the CLA groups were -1.7 and -2.4 kilograms, compared to +0.2 kilograms in the placebo group. Lean mass did not change with placebo, but increased 0.6 and 0.7 kilograms with CLA[56].

For a trial that lasted a full year, these results are miniscule. This trial used a daily dose of 4.5 grams CLA (supplying 3.4-3.6 grams per day of active CLA isomers). Even when purchasing from one of the most competitively priced online

supplement retailers, a year's worth of CLA at this dosage will still set you back \$172 (plus shipping)[57]. If you're happy to part with \$172 for the chance of losing an extra 1.7 - 2.4 kilograms of fat over the space of a year, then good luck to you. Personally, I'd rather deposit the money in an interest-earning account and shed some serious fat by spending more time on my bike.

The body composition changes seen in the remaining handful of positive studies, using up to 6.8 grams per day of CLA, are similarly uninspiring[58-66]. A recent and widely publicized paper published in the *American Journal of Clinical Nutrition* that would appear to contradict this sentiment is worthy of comment. This paper pooled the results of various CLA trials and concluded that CLA “*does have a beneficial effect on human body composition.*”[67] How significant was this beneficial effect? The authors concluded that CLA at a daily dose of 3.2 grams resulted in an average reduction in fat mass of 90 grams a week.

Verdict: If you think the minor fat loss effects of CLA are worth parting with your hard-earned money, then knock yourself out. If not, leave the CLA supplements on the shelf and get your intake of this fatty acid the way nature intended – from animal fats (fat from grass-fed animals, by the way, has a higher CLA content than that from grain-fed animals[68,69]).

Forskolin

Forskolin is an extract from the roots of the *Coleus forskohlii* plant. Forskolin caused a ripple of excitement in 2005 when a study with overweight men found reductions in body fat, increases in lean mass, and raised testosterone levels. During the 12-week study, the men taking the forskolin supplement (ForsLean®, 250 mg of 10% forskolin extract twice a day) lost 0.07 kilograms of bodyweight, dropped 4.52 kilograms of fat, and gained 3.71 kilograms of lean mass. Those taking the placebo gained 1.20 kilograms of bodyweight and 1.57 kilograms of lean mass, and lost 0.51 kilograms of fat[70].

Whilst these clinical results are quite impressive, I am currently reluctant to recommend forskolin supplements for weight loss. ‘Real life’ experience with forskolin doesn’t seem to have replicated the promising results of the aforementioned trial. Furthermore, another trial with mildly overweight women using a similar dose of ForsLean® did not yield any statistically significant weight loss or body composition changes[71].

I’m holding off for further supportive research before I will consider recommending forskolin. For those who wish to go ahead and try it anyway, powdered forskolin can be purchased cheaply online[72]. Just don’t be surprised if noticeable results are not forthcoming.

Verdict: More research required.

Sesamin

Sesamin is an extract derived from, as the name would suggest, sesame seeds. Over the last few years, sesamin supplements have been marketed primarily to bodybuilding/fitness-oriented audiences as a fat loss agent.

I searched the literature and could not find a single human trial examining the effect of sesamin on weight or fat loss. I did find some research papers showing that sesamin can increase fat oxidation in the liver of rodents[73-79], but that doesn't necessarily translate to a reduction in actual body fat. For example, Japanese researchers observed increased fat-burning in the liver of rats fed CLA and sesamin, but there were no changes in the little critters' body fat mass[80].

Given that clinical human weight loss data is non-existent, and that sesamin supplements are rather expensive, I could not even begin to recommend them for weight loss at this point in time.

Verdict: Wait for supportive research using human subjects.

Hydroxycitric Acid (HCA)

Unlike other supplements that are purported to turn your metabolism into the physiological equivalent of a Lamborghini on nitrous, HCA's claimed mechanism of action involves plain old appetite suppression.

As such, HCA probably won't hold much appeal for those eternally hopeful folks wanting a pill that allows them to devour as much food as they please and yet still lose weight. Nonetheless, despite its distinctly unsexy mode of action, HCA has found its way into many fat loss supplements.

So does HCA actually work? Well, some[81-85], but not all[86,87], clinical trials involving free-living subjects have detected greater weight losses in subjects receiving HCA.

In one of these, overweight females were prescribed 1,200 calorie/day diets as part of a double blind, placebo-controlled study. One group of subjects ingested 400-mg caplets of *Garcinia cambogia* (the herb from which HCA is derived) 30-60 min prior to meals for a total dose of 2.4 g/day (1.2 g/day HCA). The remaining participants ingested placebos. After 12 weeks, the HCA group lost 3.7 kilograms compared to 2.4 kilograms in the placebo group[84].

Another trial, conducted in India, examined the effect of different HCA preparations in overweight subjects. One group was given a daily dose of 'HCA-SX' (providing 2800mg of HCA per day), while another group was given the same dose of HCA-SX plus 400 mg of elemental chromium and 100mg of gymnemic acid (a blood sugar-lowering herbal extract also purported to have

appetite suppressing qualities). A third group was given a placebo. The supplements (and placebo) were taken in three equally divided doses 30–60 min before breakfast, lunch and dinner for 8 weeks. All subjects included in the study were provided a daily diet of 2000 calories. The subjects also participated in a walking exercise program for 30 minutes per day, 5 days a week.

After eight weeks, the HCA-SX group lost 4.53 kilograms, and the HCA-SX/chromium/ gymnemic acid group lost 5.69 kilograms. Weight loss in the placebo group was only 1.6 kilograms[81].

Verdict: Although the results are inconclusive, currently available data suggests HCA may exert an appetite suppressing effect that assists weight loss.

Calcium and Dairy Products

In the early 2000s, a number of researchers reported epidemiological associations between higher dairy and calcium intakes and lower bodyweight. This attracted much media attention, which in turn caused thousands of overweight dairy consumers to wonder why they were so corpulent. The reason is simple: neither dairy products nor high calcium intakes will cause any noticeable weight loss.

A review of controlled clinical trials involving calcium supplementation for weight loss found no beneficial effect[88].

Ditto for dairy products. Two small clinical trials conducted by Zemel et al, published in 2004 and 2005, found greater weight loss in subjects randomized to dairy-rich diets[89,90]. However, no other group of researchers has ever been able to replicate these results in the controlled clinical setting[91-97]. Even a subsequent trial by Zemel et al failed to duplicate their earlier results[97]. Given that the high-dairy subjects in the two anomalous studies experienced weight loss commensurate with the degree of calorie restriction they underwent, the most likely explanation is that those on the dairy-poor diets did not restrict calories to the required level or were less physically active during the trials. In the remaining trials, the subjects in both the high-dairy and low-dairy groups experienced weight loss outcomes in accord with those seen in previous studies utilizing similar degrees of calorie restriction.

Verdict: Sorry to break this to you, but that hot fudge sundae will not help you lose weight. Neither will taking calcium supplements.

Hoodia Gordonii

A relatively recent addition to health food store shelves, Hoodia is being marketed as an appetite suppressant. I went looking for supportive data and could only find research showing that rats *injected* with a glycoside extracted

from Hoodia subsequently reduced their caloric intake[98]. What this means for humans taking oral Hoodia supplements is anyone's guess; I couldn't find any studies examining its use in real live humans.

Readers should be very careful when extrapolating the results of animal research onto humans; calcium and DHEA, for example, produce weight loss in rodents but do little in healthy humans.

Verdict: Wait for supportive human data.

Fish Oil

Fish oil has attracted an avalanche of attention over the last decade, and deservedly so. In clinical trials with human subjects, supplementation with the long-chain omega-3 fatty acids found in fish oil has shown benefit in the treatment of asthma, Alzheimer's, rheumatoid arthritis, cardiovascular disease, depression, schizophrenia, infant health, pregnancy outcomes, kidney disease, menstrual problems, ulcerative colitis, Crohn's disease and cystic fibrosis[99-121].

A number of studies suggest that fish oil may also help accelerate fat loss. A recent study by Czech researchers is noteworthy as it was conducted under metabolic ward conditions. As part of the trial, 20 severely obese women were randomly assigned to a very low calorie diet (525 calories per day, comprised of 40 g protein, 70 g carbohydrates and 9 g fat) and 60 minutes of light to moderate exercise per day. Some of the women also received an omega-3 supplement derived from fish oil. The supplement delivered 2.8 grams per day of omega-3 fatty acids consisted with a 2:1 ratio of EPA and DHA.

After 21 days, the fish oil group lost 7.55 kilograms, compared to 6.07 kilograms in the diet-only group. The fish oil group reduced their waist circumference by 5.5 centimeters, and their hip circumference by 4.8 centimeters. The corresponding reductions for the diet-only group were 3.3 and 2.5 centimeters, respectively. The differences in weight loss and waist circumference were not statistically significant, but the difference in hip measurement was[122].

In another trial, 6 healthy subjects were fed, during two separate 3-week periods, a 2,470-calorie diet containing 52% carbohydrates, 16% protein, and 32% fat. This was not a metabolic ward study - the free-living subjects were supplied with food and ate their assigned meals at the research center. During the second 3-week period, the subjects replaced 6 grams of their fat intake with 6 grams of fish oil. This dose of fish oil supplied 1.1 grams of EPA and 0.7 grams of DHA. Overall weight declined by a similar amount during both periods (0.7 kg vs 0.55 kg during the fish oil and non-fish oil phases, respectively). However, there was a statistically significant difference in the amount of fat lost (0.88 kg vs 0.3 kg during the fish oil and non-fish oil phases, respectively). There was also a trend

for greater lean mass accrual on the fish oil diet (+0.2 kg versus -0.24 kg). While overall energy expenditure was unaffected by fish oil, the rate of fat oxidation increased when the subjects took fish oil[123].

Verdict: Research so far suggests fish oil really does have a small fat loss effect, at least in the short-term. Given that: 1) most Westerners eat way too many omega-6 fats and not enough omega-3s, and: 2) fish oil supplementation has been shown to exert a whole host of beneficial health effects, this is a supplement worthy of serious consideration. Just stick to the dosages used in clinical studies and no more, as excessive fish oil use may impair immune function and cause excessive bleeding times.

Chitosan, Fiber Supplements, 'Lipotropic' Supplements, Cellulite Pills and Creams, Herbal 'Slimming' Teas, Grapefruit.

Verdict: You've got to be joking.

About the Author



Anthony Colpo is an independent researcher, physical conditioning specialist, and author of the groundbreaking books *The Fat Loss Bible* and *The Great Cholesterol Con*. Since 1991, he has been helping people from all walks of life get in the best shape of their lives.

Anthony has earned a reputation as an exacting, no-holds-barred commentator with a talent for explaining research findings in a manner readily understandable to the layperson.

Anthony is also the guy that unscrupulous diet 'gurus' and shoddy scientists love to hate. He has a knack for dissecting untenable diet and health claims and exposing, with unrepentant and unassailable logic, the absurdity of such claims.

For more information on Anthony's acclaimed books, visit the following web sites:

The Fat Loss Bible

<http://www.thefatlossbible.net/>

The Great Cholesterol Con

<http://www.thegreatcholesterolcon.com/>

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