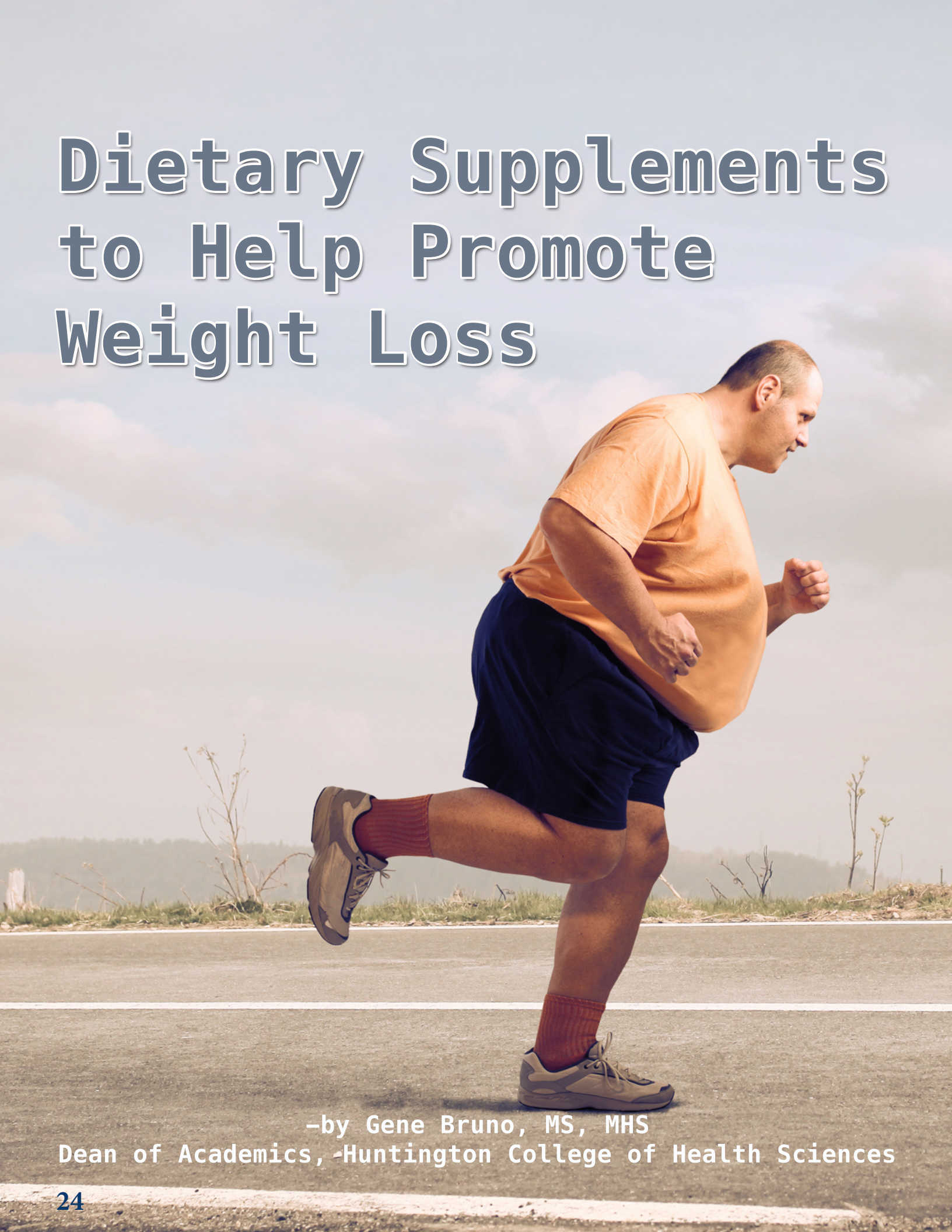
Dietary Supplements to Help Promote Weight Loss



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With at least two-thirds of the nation being overweight, effective approaches to promoting weight loss is an absolute health necessity.

While the need to incorporate a program of dietary modification and exercise is well-established, adjunct support using evidence-based dietary supplements may improve the effectiveness and speed of overall success. **Three such supplements include high viscosity polysaccharides/esterified fatty acids, green tea phytosome, and the amino acid L-carnitine.**

In 1994, researchers discovered that genetically obese mice were lacking a heretofore unknown hormone called leptin. When obese mice were injected with leptin, they became thin, vibrant and very healthy within weeks. Subsequently, other research demonstrated that leptin was involved in controlling fat storage and release.

If a person gets too fat, the extra fat produces more leptin which signals an area of the brain in the hypothalamus to stop being hungry, to stop eating, to stop storing fat and to start **"burning"** off some extra fat.

At first, scientists thought that administering leptin might also be the cure for human obesity. However, when overweight and obese people were tested for leptin it was found that they were not deficient, but rather had elevated levels of the hormone—so receiving extra leptin did not help.

The problem appeared to be that these people were "leptin resistant" (i.e., unable to properly respond to the leptin they had), so giving extra leptin did not help. In fact, it became apparent that obese and overweight individuals needed to lower leptin levels, not increase them.

Another consideration is that adipose tissue functions to some extent as an endocrine organ, secreting several adipokines including a small protein called adiponectin. Adiponectin plays an important role in regulating weight by increasing fatty acid oxidation. Furthermore, adiponectin production may, at least in part, be controlled by the hypothalamic actions of leptin.

High viscosity polysaccharides & esterified fatty acids

High viscosity polysaccharides are derived from acacia gum, and esterified fatty acids are from flax seed. High viscosity polysaccharides have been shown to significantly reduce appetite and food intake more effectively in humans than medium viscosity polysaccharides (glucomannan) or low viscosity polysaccharides (cellulose). Together with esterified fatty acids, this complex has been shown to lower leptin, signaling to the body to use both stored and dietary fat as energy. The improvement in body composition and percent of body fat is achieved through the interaction between the adipose tissue, brain and liver to reduce serum leptin.

Clinical research

In an 8-week placebo-controlled, double-blind study consisting of a moderately caloric restricted diet and cardiovascular exercise (30-60 minutes daily), the high viscosity polysaccharides and esterified fatty acids were given to 20 overweight women. The results were that the women experienced a 92% improvement over placebo in lowering body fat and a 62% improvement in reducing waist circumference (see graph). In addition, leptin levels were lowered by 42%, and adiponectin levels were increased by 53%.

No differences between frequency and type of side effects were observed between the placebo and supplement groups, so the high viscosity polysaccharides and esterified fatty acids supplement appears to be both effective and safe. The results of this eight week study and other research have shown that high viscosity polysaccharides and esterified fatty acids are capable of assisting in promoting fat loss and reducing the percentage of body fat , as well as promoting the reduction of stored fat by increasing fatty acid utilization in the fat cell, while promoting an enhanced muscle to fat ratio and the regulation of energy balance allowing for improved mental energy.

GREEN TEA PHYTOSOME

A fair amount of research has been conducted which demonstrates the value of green tea in supporting and promoting weight loss. Following is a review of that research, followed by a discussion of the new phytosome technology which can increase the effectiveness of green tea.

Green Tea, Thermogenesis & Fat Loss

In the American Journal of Clinical Nutrition, Dulloo et al reported on a 24-hour study in which, on 3 separate occasions, 10 healthy men were randomly assigned among 3 treatments: green tea extract (total daily intake: 270 mg EGCG and 150 mg caffeine), caffeine (total daily intake: 150 mg), and placebo, which they ingested at breakfast, lunch, and dinner. The results were significant increase in 24-h energy expenditure and a significant decrease in 24-h respiratory quotient.

Treatment with caffeine in amounts equivalent to those found in the green tea extract had no effect on EE and RQ. The research found that green tea has thermogenic properties and promotes fat oxidation beyond that explained by its caffeine content. Apparently, the EGCG also played a role in the process. The researchers concluded that "green tea extract may play a role in the control of body composition via sympathetic activation of thermogenesis, fat oxidation, or both."

In a 12-week, randomized, double-blind, controlled clinical trial, 132 overweight adults were randomly assigned to receive a beverage containing approximately 214 mg of EGCGs with 39 mg caffeine or a control beverage (39 mg caffeine, no catechins). Participants were asked to maintain constant energy intake and engage in >or=180 min/wk moderate intensity exercise, including >or=3 supervised sessions per week. 107 participants completed the study.

The results were a trend toward greater loss of body weight in the catechin group compared with the control group. In addition, percentage reductions in total abdominal fat area (-7.7 vs. -0.3) and subcutaneous abdominal fat area (-6.2 vs. 0.8) were significantly greater in the catechin group. In addition, catechin also promoted healthy fasting serum triglycerides (TG) levels already within a healthy range. These findings suggest that green tea catechin consumption enhances exercise-induced changes in abdominal fat and serum TG.

In a 3-month, open study, 70 overweight men and women, 20 to 69 years of age, received two capsules, twice daily of green tea extract standardized at 25% catechins expressed as EGCG (270 mg EGCG per day). After 3 months, body weight was decreased by 4.6% (-3.5 kg) and waist circumference by 4.48% (-4.14 cm). The authors indicated that green tea extract exerts its activity by via inhibition of lipases and stimulation of thermogenesis. Inhibition of lipases (in this case gastro and pancreatic lipases) may lead to a reduction in the amount of dietary fat that is absorbed.

In a randomized placebo-controlled double blind parallel trial, 76 overweight subjects matched for sex, age, BMI, height, body mass, and habitual caffeine intake were put on a very low calorie diet for four weeks (weight loss period or WL), followed by three months of weight maintenance (WM). During the WM period, the subjects received a green tea-caffeine mixture (270 mg epigallocatechin gallate and 150 mg caffeine per day) or a placebo. Subjects were considered to be habitual low caffeine consumers if caffeine consumption was typically < 300 mg/d, or habitual high caffeine consumers if caffeine consumption was typically > 300 mg/d.

The results were that subjects lost a significant amount of their original body weight ($P < 0.001$). Weight loss was significantly higher (-6.7 kg) in the high caffeine intake groups than in the low caffeine intake groups (pooled groups; -5.1 kg; $P < 0.01$).

Satiety in the fasted state before breakfast increased significantly during WL in the low caffeine intake group ($P < 0.001$). In the high caffeine intake group, satiety was already high in the fasted state before breakfast ($P < 0.05$), and did not change with supplementation. Satiety did not differ between prospective treatment groups. High caffeine consumers reduced weight, fat mass, and waist circumference more than low caffeine consumers; resting energy expenditure was reduced less and respiratory quotient was reduced more during WL ($P < 0.01$). During WM, the low caffeine consumers taking the green tea supplement continued to reduce body weight, waist, respiratory quotient and body fat, whereas resting energy expenditure was increased compared with a restoration of these variables with placebo ($P <0.01$). In the high caffeine consumers, no additional effects of the green tea-caffeine mixture were observed during WM. No adverse effects occurred.

In Physiology & Behavior, Auvichayapat et al reported on a 12-week, single-blind, randomized, controlled trial in which 60 overweight subjects in Thailand consumed a Thai diet containing 3 meals (2000 kcal/day) for 12 weeks, prepared by the Nutritional Unit at Srinagarind Hospital. The subjects were equally randomized into two groups, with the green tea group receiving one 250 mg capsule green tea (33.58 mg EGCg), after breakfast, lunch and dinner, and the placebo group receiving a placebo equivalent.

The results (see table below) were that the green tea group experienced a statistically significant loss in body weight (-2.7 kg or about 6 lbs) at the end of 12 weeks compared to baseline. The placebo group also lost weight, but the amount was not statistically significant compared to baseline. The green tea group also experienced a statistically significant increase in daily resting energy expenditure, while the placebo group did not.

The authors of the study concluded that green tea can reduce body weight in overweight Thai subjects by increasing energy expenditure and fat oxidation.

	Green Tea	Placebo
Body weight (kg)	-2.7 ($p< 0.05$)*	-2.0
BMI	-2.97	-1.88
Body fat (%)	-3.8	-2.77
Resting Energy Expenditure (kcal/d)	+61 ($p< 0.05$)*	+38

* Compared to baseline

A systematic review and meta-analysis of 15 randomized controlled trials (RCTs) (n = 1243 patients) of green tea catechins (GTCs) (including those trials with and without caffeine) on anthropometric variables, including body mass index (BMI), body weight, waist circumference (WC), and waist-to-hip ratio (WHR) was conducted.

Results indicate that GTCs with caffeine decreased BMI, body weight, and WC but not WHR compared with caffeine alone. GTC ingestion with caffeine also significantly decreased body weight when compared with a caffeine-free control. Studies that evaluated GTCs without concomitant caffeine administration did not show benefits on any of the assessed anthropometric endpoints.

The authors concluded that the administration of GTCs with caffeine is associated with modest, but statistically significant, reductions in BMI, body weight, and WC.

Green Tea, Phytosome Technology & Weight Loss

Phytosome technology creates intermolecular bonding between individual polyphenol molecules and one or more molecules of the phospholipid, phosphatidylcholine (PC). Molecular imaging suggests that PC molecule(s) enwrap each polyphenol; upon oral intake the amphipathic PC molecules likely usher the polyphenol through the intestinal epithelial cell outer membrane, subsequently accessing the bloodstream.

PC itself has proven clinical efficacy that contributes to phytosome in vivo actions..... As a molecular delivery vehicle, phytosome technology substantially improves the clinical applicabilities of polyphenols and other poorly absorbed herbal actives, including those found in green tea.

This was demonstrated in a study during which human volunteers were supplemented with single doses of green tea polyphenol catechins in free or phytosome form. Epigallocatechingallate (EGCG) was chosen as a biomarker for green tea catechin absorption. The results were that green tea catechins were absorbed more extensively when administered as phytosome rather than as free catechins.

In a multicenter clinical trial, 100 overweight subjects of both genders were placed on a hypocaloric diet (about 1,850 and 1,350 kcal daily for men and women, respectively). Fifty of those subjects also received 300 mg of green tea phytosome daily.

After 90 days of treatment, significant weight loss and decreased body mass index (BMI) were observed in the group taking the green tea phytosome (30-lb loss in the green tea group compared to an 11-lb loss in the diet-only group). Besides the effect on weight and BMI, biochemical parameters (LDL-, HDL-, and total cholesterol, triglycerides, growth hormone, insulin-like growth factor-1, insulin, and cortisol) were favorable in both groups.

The authors concluded that the high safety profile of the product and the total absence of adverse effects observed during and after the trial suggests that green tea phytosome is a safe and effective tool for weight loss.

L-CARNITINE

The amino acid L-carnitine is most concentrated in tissues that use fatty acids as their primary dietary fuel, such as skeletal and cardiac (heart) muscle. In this regard, L-carnitine plays an important role in energy production by chaperoning activated fatty acids (acyl-CoA) into the mitochondrial matrix to be metabolized.

In short, L-carnitine is required for mitochondrial beta-oxidation of long-chain fatty acids for energy production. Essentially, if you want to burn body fat, you need L-carnitine.

Carnitine insufficiency

Unfortunately, research suggests that being overweight is associated with carnitine insufficiency. Furthermore, long term ingestion of very low calorie diets causes a decrease in plasma carnitine.

Green Tea Farm in Asia

Now consider that, endogenously, the body only synthesizes about 20 mg, representing approximately 10% of the daily need, and that a well balanced diet with adequate sources of animal protein could supply an additional 100-300 mg of L-carnitine.

In total, these facts provide a convincing case for the use of supplementary use of L-carnitine as an adjunct to an effective approach for weight management.

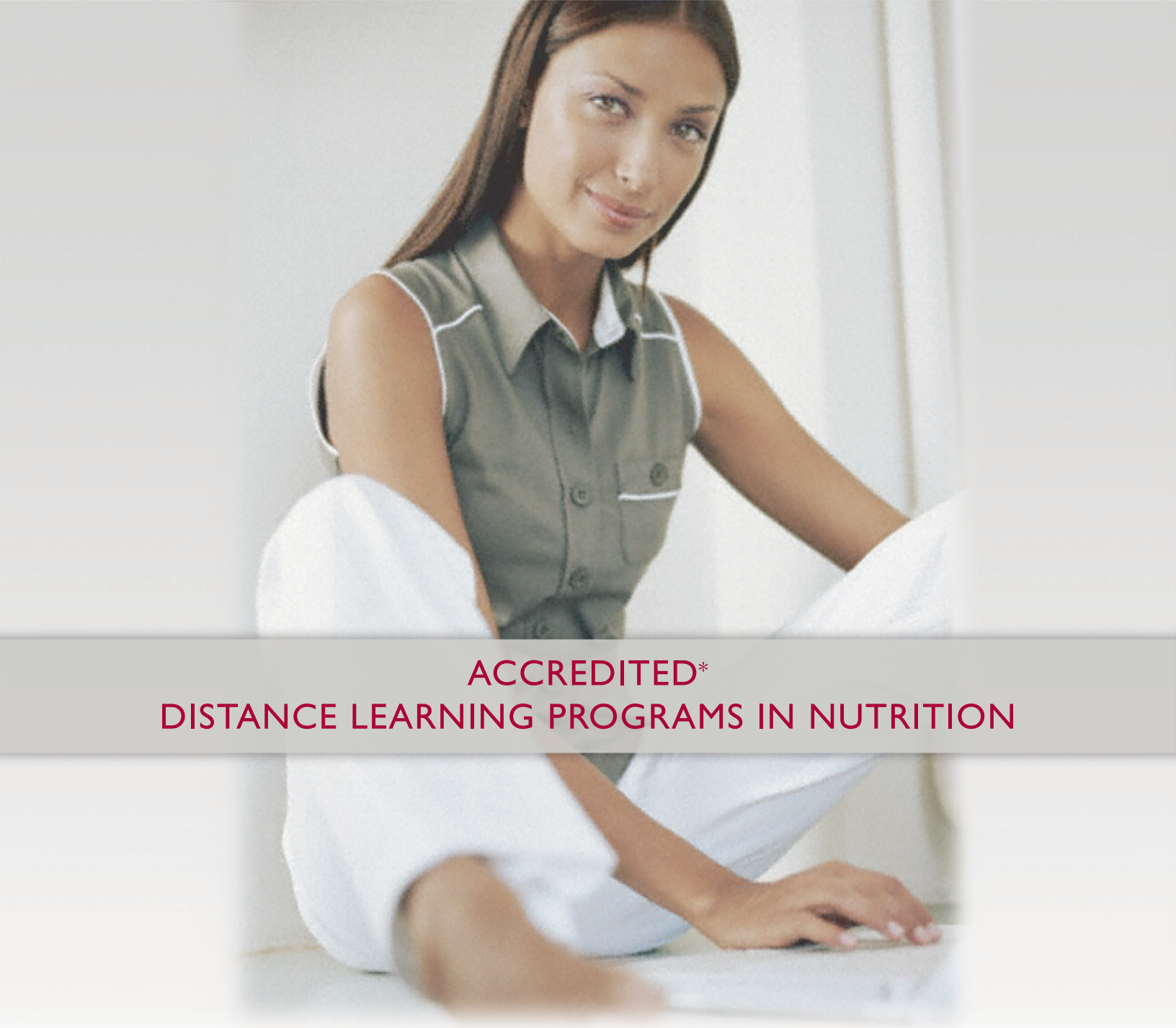
Clinical research

In 1997, a landmark Chinese study was published, reporting on a three-month study of eighteen obese adolescents given 2 grams of L-carnitine per day or placebo, along with physical training and diet program.

The results were that the L-carnitine group lost an average of ll.24 lbs, while the placebo group lost an average of 1.14 lbs. The difference was highly statistically significant ($p<0.001$) and exhibited a more significant reduction in weight than those in the control group.

In a German clinical study, 91 overweight subjects followed a 1,200 kcal daily diet for four weeks, with half of the subjects also receiving 3 grams of L-Carnitine daily. Both groups were also prescribed a program of physical activity.

The results were that the group using the L-carnitine lost an average of 9.7 lbs and 1.50 points of their BMI, while the diet-only group lost 7.8 lbs and 1.22 points off their BMI. The difference in weight loss between the two groups were statistically significant ($p=0.046$).



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