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REPORT

Controlling Diabetes
The Natural Way

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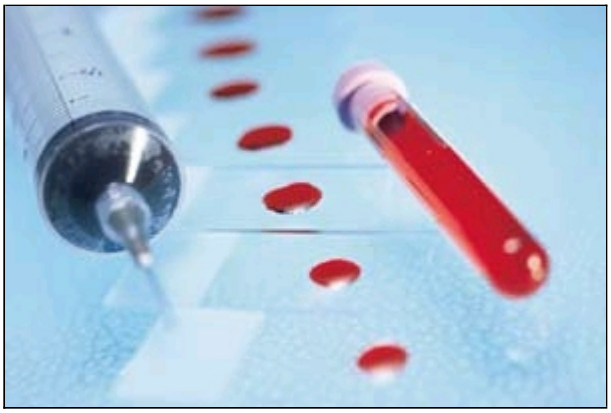
Presently, we have at hand a growing number of possible ways to combat the problem of Type II diabetes without having to resort to dangerous drugs!



Food restriction and exercise, with a view to weight control, are by far the most well espoused concepts by physicians and dietitians. But research has been surfacing to demonstrate that a nutritive approach to diabetes may yield favorable results without the expense and adverse effects of intensive drug therapy. Studies have shown, for instance, the ability to decrease diabetes risk through dietary and supplemental means, such as fiber-rich cereal foods, magnesium, chromium picolinate, biotin, coenzyme Q10 and conjugated linoleic acid (CLA).(1)

CLA, in particular, is a fairly new therapy, which may serve well to solve the lose-weight-gain-weight dieting syndrome, and improve insulin sensitivity. A growing body of scientific evidence is pointing to CLA as an effective weapon in the war against diabetes and the related widespread obesity problem.

While studies to date have shown CLA to be effective preventive therapy for cancer, atherosclerosis and other diseases, the latest findings presented at the 220th national meeting of the American Chemical Society (ACS), August 2000, suggest a role for the compound in both glucose control and weight loss.

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CLA has the therapeutic potential to alter fat body mass and help manage insulin resistance. One study, carried out by investigators at the University of Wisconsin-Madison, showed that CLA may help dieters to regain more muscle versus fat after they stop dieting. The study consisted of putting 71 obese subjects on a calorie-reduced diet and a moderate exercise program. In addition, 35 of them also took 3 grams of CLA daily (1 gram with each meal), while the other half of the group served as controls by taking a sunflower oil placebo. By the end of the six-month study period, both groups had shed about five pounds. However, while people generally gain about three times more fat than muscle (75% versus 25%) when their weight increases, the CLA group gained back more muscle and less fat, evening out the ratio to 50:50. Lead researcher, Dr. Michael Pariza, director of the university's Food Research Institute, suggests that CLA may work by blocking the function of the key enzymes involved in causing fat cells to expand, thus allowing fat cells to stay small. As such, says Pariza, CLA may prove beneficial as a weight management aid. Moreover, he explains, CLA also reduced fasting blood glucose levels and triglyceride levels. Since glucose levels usually surge after consuming a meal, reducing fasting levels are a good way to even out the highs and lows that diabetics aim to control. This research, however, did not draw

any connection between CLA and actual weight loss.

A Norwegian study, whose results were also reported at the American Chemical Society meeting, goes even further by suggesting that CLA may induce fat mass loss and muscle mass gain, independently of diet or exercise. In the study, 60 overweight subjects were randomized into five groups and administered different daily doses of CLA or placebo. While none of the participants were allowed to diet, those taking a CLA supplement experienced a statistically significant reduction in body fat mass, with the most dramatic results being seen among the 3.4 grams and 6.8 grams groups. Increases in lean body mass occurred in all CLA user groups, but was only statistically significant in those taking the highest (6.8 g) dose. However, the researchers report that fat-reducing benefits did level off, and that no additional effect on body fat mass was achieved beyond 3.4 g CLA per day.

Other findings reported at the ACS meeting specifically examined CLA's potential as an adjunctive therapy for the effective management of diabetes. At Purdue University, Indiana, a study involved 22 confirmed diabetics taking 6.0 grams per day of CLA or placebo oil for eight weeks. Results showed that 64% (versus 40% of placebo) of the subjects who took CLA had improvements in their insulin levels, while 83% (versus 10% of placebo) of them had improved leptin counts. Overall, those on CLA showed a moderate reduction in fasting blood-glucose levels, a decrease in triglyceride levels, improvement in serum leptin levels and free fatty acids. Previous studies by the same researchers found that, in a group of male diabetic rats, CLA normalized impaired glucose tolerance. The study's lead author, dietitian Martha Belury, concluded that using a non-pharmacological approach, such as CLA, in combination with pharmaceutical therapy, could help to delay and/or manage diabetes. As well, she believes that it could help to reduce health care costs and the side effects of long-term drug use.

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Possible mechanisms

There are several theories about how CLA may effect its glucose-normalizing, fat-reducing actions in the body. Researchers at Purdue University, for example, suggest from their findings that CLA may work by activating the nuclear hormone receptors located in the liver, peroxisome proliferator-activated receptors (PPARs), which they demonstrated in vivo in liver and adipose tissues in mice and rats. In addition to fueling PPAR activity, CLA acts similarly to ligands of PPAR gamma, called thiazolidinediones, which are potent insulin sensitizers and form the basis of current anti-diabetic drugs in use. In fact, the Purdue research demonstrated that, in rats, a CLA-containing diet was equally effective to a diet containing thiazolidinedione in normalizing impaired glucose. PPARgamma is also expressed in certain types of human cancers, which scientists are now considering as a therapeutic target for the prevention and treatment of cancer. In vitro and in vivo studies have shown that CLA is able to promote apoptosis and inhibit cancer cell proliferation, possibly also by activating PPARgamma in susceptible tumors.(2)

Other research has pointed out that one of the mechanistic possibilities behind CLA's ability to reduce body fat may be through increased energy expenditure. Researchers at the Pennington Biomedical Research Center, Baton Rouge, Louisiana, observed that energy expenditure sped up in CLA-fed mice after just one week of administering the nutritive compound to them.(3) They also reported that the change was sustained for at least six weeks, which would suggest an alteration of metabolism rate.

Another study, carried out by investigators at the National institute of Health and Nutrition in Tokyo, Japan, found that a reduction in body fat was mainly the result of CLA-induced apoptosis of preadipocytes.(4) Meanwhile, a set of four in vitro experiments by researchers at the University of North Carolina-Greensboro led scientists there to conclude that, “CLA may exert its antiobesity effects by inhibiting proliferation, attenuating triglyceride content and/or inducing apoptosis of preadipocytes.”(5) In comparing preadipocyte cultures treated with CLA against controls treated with either albumin or linoleic acid, they found that the CLA-treated fat cells' ability to grow in size and multiply became impaired. As well, these cells exhibited a drop in triglyceride levels, and an increase in the number of apoptotic cells.

CLA Prevents Cancer and Atherosclerosis

A Cornell University study shows that CLA reduces breast cancer risk.(6) Animal experiments similarly exhibited that only 50% of rats feeding on CLA butter developed mammary tumors when administered high doses of carcinogens, compared with 93% of the rats on a control diet. Other research has shown CLA's ability to slow the progression of, and reverse, atherosclerosis. An animal study involving cholesterol-fed rabbits showed that dietary levels of CLA amounting to 1% caused atherosclerosis to regress by 30%, and that even at concentrations as low as 0.1%, CLA was able to inhibit atherogenesis.(7) The researchers declared that this was the first study to exemplify the “substantial regression of atherosclerosis being caused by diet alone.”

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The new evidence about diabetes, compounded by the prevalence of obesity, speaks clearly to the fact that this disease is on the rise, and that no one in America is safe. This presents all the more reason to utilize every resource, including a dietary arsenal, to combat this disease. The role of scientists appears to be one of racing against time to overtake a raging obesity epidemic that turns individuals into a bull's eye target for diabetes to cast its aim, as well as trying to devise sophisticated pharmacological therapies for undoing the ills of the sugar-fueled pathology. In the meantime, though, people don't have to sit idly by as their

internal glucose meter sets the pace for the perilous yo-yo effect of blood sugar that soars and then dives, driving their body to shut down vital functions such as the ability for the eyes to see, or for their heart to pump blood. Instead, we can resort to a grass roots approach that embraces fundamental tools such as diet, exercise and tapping into the promise of potent food-derived agents to provide us with a means of prevention, or improved disease management to ward off the harrowing complications of diabetes.

CLA raises metabolism

Recent reports suggest that CLA seems to help improve the ratio of lean body mass to fat body mass, with particularly measurable effects on reducing adipose fat and increasing muscle mass. While these findings sound promising, scientists are still trying to figure out how CLA seems to exert these impressive weight control changes in the body. A number of animal studies to date have helped to elucidate possible ways in which CLA works. A team of California researchers recently conducted a study involving mice to examine the effects of CLA supplementation on body weight, energy intake (the amount of calories consumed), and energy expenditure (the amount of calories burnt). Their results showed that CLA reduced adipose fat depot weights in animal subjects by about 50%, although no significant effects were noted with regards to body weight or energy intake (J Nutr 2000;130:2471-2477).

In the current study, researchers administered 1% (1gram per 100 grams of body weight) admixture of CLA to mice for a 5-week period, and compared them with control mice not receiving any CLA treatment. Taking measurements of body weights, energy intakes and energy expenditure on a weekly basis, the results demonstrated that CLA was able to reduce adipose depot weights by about 50%. In fact, according to results, CLA increased energy expenditure by an average of 7.7% throughout the 5-week study period. This effect seemed to be independent of any changes to body weight or energy intake, which were not significant. The expression of uncoupling protein (UCP), which acts to help burn off calories as a way on controlling fat storage, also was unaffected by CLA.

In one of their earlier animal studies, the same researchers found that CLA supplementation led to a sharp reduction of adipose depot weight ranging from 43 to 88% (Am J Physiol 1998 Sep;275[3 Pt 2]:R667-672). Meanwhile, a similar study carried out more recently demonstrated that CLA seemed to effect its fat reducing benefits regardless of whether rodents were fed a low-fat or high-fat diet (J Am Coll Nutr 2000 Aug;19[4]:487S-493S). This bodes positive for the potency of CLA as a therapeutic agent in weight control since high-fat diets are typically associated with a slowing metabolic rate. The same study also showed that CLA did not affect food intake, suggesting that the fatty acid does not reduce body fat content by a means of suppressing appetite. The results of the most recent study would suggest, as the authors conclude, that CLA works to reduce body fat stores by increasing metabolic rate.

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