

Harvesting the health promise of conjugated linoleic acid

Research round-up: The rising health potential of CLA

An overview of the latest research findings, for nutrition professionals

New research results are strengthening the case for conjugated linoleic acid (CLA) as one of the most promising food nutrients to aid in the battle against chronic disease.

This unique fat, found naturally in beef and dairy products, is showing considerable potential for human health benefits related to cancer, heart disease, obesity, diabetes, kidney disease and bone density.

Though research is in early stages and based largely on animal models, the potentially broad and clinically significant benefits of CLA have earned it increasing recognition as a wonder nutrient of the future.

"We are very excited and encouraged by the new research knowledge on CLA," says Dr. Spencer Proctor, a world leader in blood cholesterol research and Director of the Metabolic and Cardiovascular Diseases Laboratory at the University of Alberta. "We are learning that CLA is important for many human biological systems and has excellent potential to support human health."

Canadian scientists are part of a growing international base of CLA researchers who are working to understand and harvest the promise of CLA. Major advances are expected over the next five to 10 years.

"Cancer is one of the best examples of recent CLA research progress," says Dr. Catherine Field, a leading researcher on the effect of nutrition on the immune system and Professor of Human Nutrition at the University of Alberta. "For a food nutrient, the potential CLA is showing to aid in the treatment and prevention of cancer is remarkable."

The ABCs of CLA

At a fundamental level, the strong potential of CLA stems from the unique health boosting properties of this fatty acid, its apparent broad distribution in the human body and growing evidence of its significant role in a variety of human biological systems.

First identified in the late 1970s, the term CLA describes a group of isomers of linoleic acid, which is a good fat and one of the omega six essential fatty acids.

Although CLA is technically classified as a trans fat, it is essentially a good trans fat different from industrially processed trans fat. CLA is different because it is formed naturally in dairy and beef and does not share the harmful properties made through the hydrogenation of vegetable oils. Rather, this natural trans fat may be health promoting with an important role to play in the human body.

In fact, in recognition of CLA potential health benefits, Health Canada did not include CLA as part of the total trans fat value in the new nutrition label.

The mechanisms of CLA are not well understood. But there are indications that CLA, when digested, is taken up by phospholipids, the class of fats that serve as the principal structural component of cell membranes. This would explain the apparent pervasive distribution of CLA in the body and its significance for a number of biological systems.

Natural benefits

Natural CLA is formed in the gut of ruminant animals when microorganism activity adds hydrogen to linoleic acid. The CLA that results from this process retains the essential health facilitating properties of linoleic acid. In addition, it features the ability to displace bad fat and the ability to act as an anti-carcinogen. While synthetic forms of CLA have been developed for both commercial supplements and research purposes, many leading scientists believe the CLA found naturally in beef and dairy products may offer the best avenue for developing CLA health potential.

There are many different CLA isomers. However, two of these – CLA 9,11 and CLA 10,12 – have been linked to health benefits and studied extensively for biological function. These two CLA isomers are known to be present in beef and dairy products.

Also known to be present in beef and dairy products is vaccenic acid, which recent research has revealed as a precursor to CLA 9,11. This precursor can be converted into CLA once inside the human body.

Early research findings

To date, most CLA research using mixtures of CLA isomers has concentrated on the impact of CLA in

animal models for a variety of chronic diseases. This research has delivered encouraging results.

Dramatic cancer progress. The most advanced area of CLA research is cancer treatment and prevention. Early studies show feeding CLA to animals can reduce the growth and formation of cancer – a remarkable finding for a food nutrient. As a next step, scientists are investigating CLA in human tissue studies, and human clinical trials could soon follow.

For cancer researchers, one of the most exciting things about CLA is its wide potential for guarding against many types of cancer and its apparent relatively strong potency. For example, those investigating the potential of fatty acids have long concentrated on omega three fatty acids, derived from fish oil, which have shown significant promise. At first, indications were that CLA would act in the same way as omega three, but study results point toward CLA as having quite different mechanisms and producing an anti-cancer effect at a much lower concentration.

If proven true in humans, the identification of a fatty acid that could be fed at a lower level than omega three and deliver clinical outcomes would represent a major breakthrough in cancer treatment.



CLA's cancer-fighting effect has held up in all the major animal models of cancer that are used for testing drug efficacy. These include primarily models for breast cancer and the colorectal cancers, along with models for some forms of leukemia and liver cancer, including hepatoma.

Among other key findings, early research indicates the major isomers CLA 9,11 and CLA 10,12 appear to act differently in relation to various forms of cancer. This opens the door to fighting cancer with CLA through more than one pathway. Overall, there is more work to be done in terms of cancer research in order to sort out how the different CLA isomers impact the many different types of cancer. Most studies to date have used cocktails of many different CLA isomers, but newer studies are using more purified mixtures and that trend will continue as the research progresses.

Another landmark finding is CLA appears to affect both the growth and death of cancer. This is of great significance to cancers such as breast cancer, which are characterized by mutated genes that stop cell death. This opens potential for CLA to act in the manner of some chemotherapy drugs by "turning on" the death process of cancer cells. A benign food ingredient with this activity would be a remarkable tool for cancer treatment.

Heart healthy benefits. Cardiovascular disease is another key research front. Early animal studies have indicated feeding animals CLA improves the profile of fats in the blood, particularly reducing high levels of low-density lipoproteins (LDL), which are associated with the disease.

Results have also indicated CLA may influence an inflammatory-related mechanism that reduces the disease pathology. Further animal studies are underway to examine CLA links to guarding against heart disease, and the research effort is shifting to focus more on human studies.

Anti-obesity evidence. In the area of obesity, results are also very encouraging. Various animal studies are linking CLA to increased energy expenditure, increased body muscle and reduced body fat.

Further studies are being done to confirm these results and determine how much weight can be lost and where it can be lost in humans, based on specific strategies.

Ties to diabetes. Also related to the obesity benefits is the positive potential for type II diabetes. Though research knowledge is very limited, there is some indication that CLA may play a role in normalizing glucose metabolism.

Kidney disease potential. Among the most recent CLA research findings is CLA progress related to kidney disease. One of the first animal studies set to be published indicates that a combination of CLA isomers can significantly reduce the rate of the disease pathology, and researchers are eager to follow up on that result.

Osteoporosis significance. Bone density is another groundbreaking area, with indications that CLA plays a role in supporting healthy bones and guarding against osteoporosis. Research is at a very early stage, with results of the first major studies yet to be published.

Driving new progress. Overall, the CLA research effort is progressing steadily and is expected to gain strong momentum over the next decade.

While research related to cancer has advanced to include new studies using human tissue, CLA research in general is progressing to a more specific focus on particular CLA isomers and the differences between natural and synthetic CLA. There is also a major new push to understand CLA mechanisms, which will open the door to further potential for human trials and health claims.



Boosting CLA in beef and dairy

With all the health promise of CLA, considerable research has also been done in livestock production, to investigate the opportunity for increasing CLA levels in beef and dairy products.

Studies have confirmed ruminant meats and dairy products already contain natural CLA, and there is strong potential to enhance these levels through a variety of livestock production strategies, including simple livestock dietary changes.

These increases would potentially allow consumers to take in a substantial portion of CLA by simply substituting beef and dairy products from conventionally raised animals with products that have enhanced CLA levels.

Managing public expectations

For health professionals, at this stage the most likely questions on CLA to expect from the general public are those regarding weight loss. Particularly in the United States, CLA supplements are widely available and typically marketed as a weight loss wonder drug. While other potential health benefits are less well known, these too are gaining recognition and marketers are taking further advantage by advertising links to these benefits.

Despite the growing promise of CLA, it's important to remember that at this stage there is insufficient evidence to conclusively support major health claims.

The good news is studies to date have found no major negative implications for consumption of the natural CLA already found in beef and dairy products. Also, these products are known to contain the specific CLA isomers – CLA 9,11 and CLA 10,12 – which have been linked to health benefits.

The message is more cautionary for the area of synthetic CLA, which includes nearly all CLA health supplements marketed today. First, many of these products do not contain the isomers linked to health benefits and are therefore of questionable value. Also, there is some preliminary evidence the synthetic form may be detrimental among subgroups of people at risk of diabetes or heart disease.

Learn more

In Canada, a major effort to understand and harvest the health promise of CLA is the CLA Network. The CLA Network is a collaborative team from academia, industry and government, including representatives from many areas of expertise such as research, food industry, health and communications. **For more information on the CLA Network, visit www.CLAnetwork.com or email: CLAnetwork@gov.ab.ca.**

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