

Harvesting the health promise of conjugated linoleic acid

The CLA Network: What we've learned

A strong body of research establishing the health promise of natural ruminant fats is now in place, has gained global recognition, and has set the stage for broad future opportunities.

"From little things, big things grow."

When scientists investigating the properties of grilled hamburger first identified conjugated linoleic acid (CLA) in the early 80s, they likely had little inkling of the broad promise that would spawn from this unexpected discovery of an obscure food component. In fact, research into CLA was largely dormant for years after.

Today however, fueled in large part by major progress over the past decade, natural CLA is at the centre of a now substantial, multi-faceted and steadily growing body of research. The progress is fast approaching a 'tipping point' – it is set to make waves across the broad areas of nutrition, human health, agriculture and food industries, and potentially even food labeling requirements.

A leading player globally in this progress is the Canada-based CLA Network, which involves a number of researchers and institutions across the country and is linked to international expertise. Here's a snapshot of what CLA Network researchers have learned, particularly over the past three years of industry-supported research funding.

Understanding the natural power of CLA

One of the most important areas of CLA Network progress has been to understand the nature and role of CLA, including the fundamentals of how it is formed and the mechanisms that underlie its activity.

It is known that natural CLA is produced only by ruminant animals such as dairy and beef cattle and is found naturally in the milk and



meat products of these animals. While over 20 different isomers or "types" of natural CLA have been identified, it is two of these – CLA 9,11 and CLA 10,12 – that have shown the strongest health promise and have been the focus of CLA Network research. CLA 9,11 is the most prominent form found in beef and dairy products.

Work by the network and others has confirmed that natural CLA contains antioxidant, anti-tumor and other health-boosting properties, with strong promise to deliver health benefits considered beyond nutrition and into the realm of "functional foods." This includes the potential to help prevent or fight a number of chronic health conditions – including cardiovascular disease, metabolic syndrome, diabetes, cancer, obesity and kidney disease – as well as to improve bone density.

The research has included animal model and tissue culture studies, which have provided a basis for human clinical trials targeted over the next several years.



Vaccenic acid (VA) enters the picture

For most of the past decade, the majority of the work of CLA Network researchers has focused around CLA itself. However, in recent years, due in large part to discoveries made in the course of this research, their perspective has expanded to include a major concentration on a similar and related component: vaccenic acid (VA).

Like CLA, VA is a natural fatty acid produced by ruminant animals and found naturally in the milk and meat derived from these animals. It is also notable as a "pre-cursor" to CLA – after VA in food products is consumed, a portion is converted into CLA inside the human body upon interaction with a specific enzyme.

New research has indicated VA plays a significant role in the level of CLA available. This research has also produced breakthrough findings that vaccenic acid in its own right shows strong health enhancing potential comparable to, and perhaps even greater than, CLA.

Latest progress

The latest CLA Network research has focused primarily on further understanding the health implications of CLA and VA, including the mechanisms that underlie their activity. Here are some examples of the latest key findings:

Striking benefits for lowering cholesterol and triglycerides. In this 16 week trial, in animal models, feeding of VA showed no negative effect on blood lipid profiles and was associated with reductions in triglyceride levels (more than 50 percent) total cholesterol levels (approximately 30 percent) and LDL cholesterol levels (approximately 25 percent) This study is the first to demonstrate beneficial dyslipidemic properties solely due to vaccenic acid, as opposed to diets that often contain numerous bioactive lipids.

Signals of high absorption when consumed in food. With growing evidence VA may displace bad fats and reduce chronic disease risk, one of the key questions is how much is actually absorbed when consumed through food products such as meat and milk. The study, performed in animals, was among the first to tackle this question and the results indicated VA obtained naturally through a meal has a significant rate of absorption in the intestine - over 1 percent, which is considered nutritionally significant for this fatty acid and its health effects.

The study was conducted using specifically designed diets containing VA, one of which included a beef meal. Researchers noted that because VA in both beef and dairy is the same and the levels are comparable, similar absorption of VA would be expected from dairy foods.

Slashing the inflammation risk factor for heart disease. In a three week animal model trial, researchers succeeded in reducing inflammation from elevated to normal levels

by feeding dietary VA. The reduction in inflammation was substantial and clearly the result of feeding the dietary VA, the researchers noted. The findings are quite significant because inflammation is now recognized as an independent risk factor for heart disease.

New research underway. Several additional studies are both underway and planned as part of current CLA Network research funding, which is anchored by a 2008-2012 Program Grant from the Alberta Livestock and Meat Agency (ALMA) toward "Establishing the health benefits of ruminant trans fatty acids." Two examples include:

- **Female infertility associated with obesity.** A new study to investigate how CLA may help fight against poly cystic ovary syndrome (PCOS), which affects one in 10 women of childbearing age and is a leading cause of infertility. Women with PCOS and obesity are at higher risk for cardiovascular disease and diabetes.
- **Obesity and related conditions.** A new study to assess the ability of CLA and VA to fight obesity and related conditions such as type-2 diabetes and the metabolic syndrome.

More information on the web. While network research from 2008 to 2010 has focused heavily on human health components, past research also included strong advancements in areas including animal mechanisms, dairy production, beef production, product development and market research. Broader information on CLA Network research projects and results, including activity prior to 2008 is available at www.clanetwork.com.

New opportunities: Alberta Diet initiative

The CLA Network was set up to foster growth. Looking to the future, CLA Network research has now advanced to a stage where there are

new opportunities for connecting this ongoing body of work to broader picture initiatives that can help drive a next generation of progress.

For example, in Alberta, one such opportunity researchers involved with the CLA and vaccenic acid progress are strongly pursuing is the emerging Alberta Diet initiative. This multi-faceted effort includes a strong emphasis on research progress in chronic disease treatment and prevention through dietary approaches.

View longer progress report

This article is a short version of a longer report available at www.clanetwork.com. Access the long version of article for more information on:

- **Rehabilitating the image of animal fat** – CLA and VA are examples that some animal fats, including ruminant trans fats, are not harmful and may be very healthful
- **Good news for consumers, industry** – Harvesting new benefits for dairy and beef
- **Communications progress** – Generating interest and spreading knowledge
- **Strong industry support** – Including from Dairy Farmers of Canada, Alberta Milk, Beef Information Centre and Alberta Livestock and Meat Agency
- **New product potential** – CLA recently gained a positive early response from Health Canada, related to health claim and enhanced product opportunities
- **Milestones** – A listing of key CLA Network publications from 2008 to 2010
- **Perspectives on progress** – A collection of insightful comments from key CLA Network participants

Visit www.CLANetwork.com for more articles on activity and progress.

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