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C15: A New Essential Fat and a Small Lesson About Fat Chemistry

By Ann Gerhardt MD March 2025

As nutrition research advances over time, occasionally scientists discover new nutrients or facts that upend previously held truisms. It doesn't mean that anyone was intentionally trying to delude us: It just means that science often moves slowly, hypothesizing, studying and fact-checking before major announcements are made. Because we often rely on prior knowledge to build new paradigms, it's a big deal to identify something entirely new.

For almost a century, scientists had identified only two fatty acids (see below) the consumption of which were essential for health.

A **fatty acid is** a long chain of carbons with an acid tip that attaches to an alcohol. It is technically incorrect to call them fats, since they are only part of triglycerides, which are only part of fats and oils. Some fatty acids are saturated, and others are unsaturated or monounsaturated, depending on how their carbons are linked.

A **triglyceride** consists of three fatty acids (not necessarily the same type) attached to each other through a sugar alcohol backbone. This is the form of fat that is made in the liver and circulates in the blood.

Fats and oils are fatty mixtures which differ according to the sterols, types of fatty acids in triglycerides, and fat-soluble nutrients they contain.

"**Essential**" nutrients are ones not made in our bodies and without which our bodies can't function normally, so we need to acquire them from food or through the skin.

Human life depends on all the essential nutrients: Thirteen vitamins, multiple minerals, nine amino acids and the essential fatty acids, which we must ingest in food, since our bodies don't make them. The previously known essential fatty acids have chain lengths of 18-carbons, called linoleic and alpha-linolenic acids (both responsible for various immune and cellular functions, and found in vegetable oils). Two others, EPA (eicosapentaenoic acid, with 25 carbons) and DHA (docosahexaenoic acid, with 26 carbons), are found in fish oil, and are necessary for nerve cell function and infant brain development but also may predispose to bleeding. Scientists believe other, mostly saturated, fatty acids are rich sources of calories for energy, rather than having specific metabolic purposes.

In 2014, a Canadian group of scientists identified an unusual saturated fatty acid with an odd chain length. Fatty acids made in the body have an even number of carbons. The newly identified fatty acid has only 15 carbons, so it's called C15 (pentadecanoic acid), and was identified in the blood as being a marker of dairy fat intake. Subsequent scientists discovered that C15 is essential for maintaining integrity of cell walls throughout the body, especially as we age. The human liver makes extremely small quantities of it, which makes it essential to consume it in the diet. Food sources are full-fat cow, goat, or buffalo dairy foods like cheese and butter, seal and sunflower oils, lamb and to a lesser extent other fatty animal foods.

C15 fatty acids become part of complex cell wall components that help maintain the integrity of cells throughout the body, including those that comprise our vital organs. Since our tissues naturally lose integrity as we age, entrepreneurs, including a few scientists, jumped on the C15 fatty acid bandwagon to make claims for it improving heart, immune, metabolic and liver health, because those organs and systems are only as healthy as are their cells. No one has yet proved that C15 is the fountain of youth or that our cells would implode, dissolving into a puddle of scum if we didn't consume it.

I haven't found direct proof of C15 prolonging life, but no one was measuring or studying it prior to 2014, and studies documenting that something is associated with longevity don't happen that fast. Instead, in the case of C15, scientists study surrogate measures of health, assuming that, if it can produce chemical changes similar to those associated with life-prolonging drugs, like metformin for diabetics, aspirin for people with arterial disease and rapamycin for worms and flies, it too must be life-prolonging. Rapamycin works by blocking mTOR (mammalian target of rapamycin), which

regulates growth in cells. C15 does the same in test tube experiments, but we are not test tubes.

Over the years, I've seen multiple studies comparing dairy foods to single nutrients, such as vitamin D or calcium, which, in general, showed better results in those subjects consuming dairy foods. I'm now wondering if the C15 in those foods may have been at least partly responsible (along with the happiness factor of eating ice cream), or if there is some other yet unidentified substance in full-fat dairy foods that is healthy.

In summary, there is no good human data supporting prolonged life or better health with C15. I've decided to hedge my bets by reintroducing into my diet a little butter, goat cheese and sunflower seeds/oil but not seal oil, rather than take abusively expensive C15 supplements ($150 for 90 capsules. Think about it: $150 can buy a lot of cheese, milk and sunflower oil), because I have an ethical antithesis to scientist-entrepreneurs taking advantage of people with price-gouging nutritional products and I still trust that consuming a diet of a variety of whole foods, plus getting adequate sleep, doing regular exercise and having an outlook as calm as possible prolong healthful life in the absence of supplements. I look forward to learning much more about C15, hopefully from well-designed clinical studies.