Opinion Article

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Udder Confusion: Are Dairy Foods Good for Us?

The science of health is always shape-shifting and evolving in a way that might appear fickle to any outside viewer. That observation certainly applies to the science of food.

How could such a simple and ageless question—"What should we eat?"—have such a complicated and elusive answer?

For years, avoiding saturated fats has been a critical part of the answer to that question. The recommendation was built on Ancel Keys' "diet-heart hypothesis"[1] and also on the inferred logic that "since LDL cholesterol caused coronary disease, and saturated fats raised LDLs, therefore, saturated fat caused coronary disease."

Increasingly sophisticated nutritional research is proving that many of those conclusions were either Sesame Street simple or just flat-out wrong. But public health messages take a long time to build and even longer to tear down; so, for example, the USDA's *MyPlate*—the replacement for their heavily lobbied and crumbling Food Pyramid—still recommends keeping saturated fat intake below 22 grams (wonderfully precise and wholly impractical advice).[2]

These low-sat-fat recommendations put dairy foods and their naturally endowed saturated fats nearly on a dietary "no-fly" list. Low-fat milk, yogurt, and so on could be tolerated, but only as a good source of calcium (available in many other common foods) and vitamin D (only there via supplementation, not via lactation).

Now, new research from the Prospective Urban Rural Epidemiology (PURE) study throws everything into udder confusion.[3]

The PURE study looked at the dietary habits of over 136,000 adults from 21 lower and middle-income countries on five continents. Researchers monitored intake of milk, yoghurt (yes, "yoghurt"—the study was published in *The Lancet*), and cheese, divided into low fat and high fat options. Butter consumption was also assessed, but it was generally so low that the researchers couldn't make any conclusions. They then looked to see if there was any association between dairy intake and overall mortality (death from any cause, be it choking on a cheese curd or a broccoli floret) and the risk of having a cardiovascular event such as a heart attack, stroke, or heart failure.

Researchers found that during the nine years of the study, those who had more than 2 dairy servings a day, compared to those who had none, had a 16% reduction in any one of those bad things—death, heart attack, and so on—happen to them. In fact, for each disease category, higher dairy intake was associated with a benefit (except for the risk of having a heart attack, which remained the same). The benefit associated with increased dairy intake was the strongest in stroke, which was reduced by 34%.

While you're texting on your cell phone to have your favorite deep-dish pizza delivered, you should also consider that the protective effect of dairy foods seemed to be strongest for whole fat versions of milk and yogurt (sorry, cheese), and was also strongest in regions with lower mean dairy intakes.

Though the study was PURE, it was not perfect. But what observational study—and in particular *any* dietary study—ever is? So, is this just the fickle winds of science blowing, or is there truly something about a milk mustache that improves our health?

The first question to ask should be, "When we 'Got Milk?' what do we got?" As a 2018 review in *Circulation Research* points out, milk—like most foods—is complicated.[4]

Yes, it's mostly water, but it also contains lactose, calcium, and protein—32 to 34 grams per liter of it, with 80% of that being casein (a major factor in the production of cheese curds), and 20% of it being whey. And it has milk fats, of course: *Yes,* some of these fats are LDL-raisers, but those comprise less than 40% of the total fatty acids in milk. The other 60% includes monounsaturated, polyunsaturated fatty acids, and medium-chain saturated fats and more, all of which seem to have different and *healthy* metabolic actions.

These milk fats are packaged in what are called "milk fat globule membranes" (MFGM), a sandwich of triglycerides, bioactive proteins, and phospho- and sphingo-lipids. Interestingly, the process of homogenization destroys MFGM, which is why butter has very little of it, and why an eight-week study mandating 15% of caloric intake should come from either butter or whipping cream showed detrimental lipid changes in the butter group but not in the whipping cream group. Now that's a yummy conclusion.

But we do more to milk than just homogenize it. We feed it to microorganisms that ferment it into yogurt or kefir or cheese. These "probiotic" microorganisms seem to have healthy effects on our native gut microbiota, possibly through enhancing intestinal epithelial integrity, thereby reducing the absorption of pro-inflammatory compounds (the so-called "leaky gut" hypothesis). Some of the bacteria that produce cheese also produce vitamin K2, which studies suggest is a more biologically active form of vitamin K than the K1 version famously found in leafy greens.

If the pro-dairy results of the PURE study seem contrary to the low-sat-fat public health dietary message, they are in sync with emerging nutritional research showing that saturated fats are a highly heterogeneous group. As a 2016 Authoritative Review in *Circulation* points out, "This biological and metabolic diversity does not support the grouping together of all saturated fatty acids based on only one chemistry characteristic: the absence of double bonds."[5]

One important characteristic seems to be whether a saturated fatty acid (SFA) is even-chain or odd-chain. In vitro, even-chain SFAs seem to be the most harmful, and they are commonly synthesized by the liver in response to increased dietary intake of carbohydrates and alcohol. That piece of biochemistry exposes the ultimate irony of America's Low-Fat Craze, which made us cuckoo for Cocoa Puffs and other highly refined carbohydrates—deluding ourselves into thinking that one cannot get fat from eating a box of low-fat cookies (which illustrates a basic tenet of nutritional research: eating is substitutional. When people are advised to avoid certain food groups, they end up eating more from other groups).

Conversely, odd-chain SFAs, which come primarily from the diet, seem to be beneficial. A large 2014 European study (EPIC-InterAct) found that the odd-chain SFAs 15:0 and 17:0 were both an accurate reflection of dairy intake and inversely associated with the incidence of type 2 diabetes.[6]

Who knows where the results of the PURE study will lead the public health message on dairy foods. Almost certainly, increasingly complex nutritional research will change the way we currently think about food—that is, with cartoonish simplicity (it's either fuel to burn, or building blocks for building). When the truth is, our food talks to us. It communicates and interacts with our bodies in myriad and intimate ways, influencing and participating in complex metabolic pathways that can lead to health or disease. The list looks something like this:

> It is now evident that dietary habits influence diverse cardiometabolic risk factors, including not only obesity and low-density lipoprotein (LDL) cholesterol, but also blood pressure (BP), glucose-insulin homeostasis, lipoprotein concentrations and function, oxidative stress, inflammation, endothelial health, hepatic function, adipocyte metabolism, cardiac function, metabolic expenditure, pathways of weight regulation, visceral adiposity, and the microbiome.[5]
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> – D. Mozafarrian, MD, *Circulation*

So, please pass the whipping cream. I'm trying to ward off a stroke.

■ REFERENCES

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