

## Has Dairy Fat Been Given a Bad Rap?

- **The most recent edition of the Dietary Guidelines for Americans recommends avoiding foods that provide saturated fats, including full-fat dairy products.**
- **Numerous studies demonstrate that dairy consumption does not increase the risk of cardiovascular disease, and many even demonstrate a benefit of dairy to heart health.**
- **Dairy products contain different types of saturated fats compared with other fatty foods and also have a unique set of nutrients that positively influence lipid metabolism, blood pressure, and insulin resistance.**
- **Nutritional recommendations should focus on the health benefits or risks associated with entire foods rather than a particular nutrient.**

Every five years, a panel of U.S. experts on nutrition convene to scour the scientific literature and determine what constitutes a healthy diet. Their conclusions, presented in the *Dietary Guidelines for Americans* (DGA), are “science-based nutrition guidance” designed to “improve the nation’s health” [1]. Right now, the nation’s biggest health problem is cardiovascular disease (CVD), so it should come as no surprise that the most recent edition of the DGA [1] focuses on reducing the risk of CVD by limiting the intake of saturated fats from meat, oils, and dairy. There is just one problem with this “science-based nutrition guidance”—mounting scientific evidence over the last several years suggests that not all saturated fats negatively influence heart health. Namely, saturated fats from dairy have different metabolic effects than those derived from other food sources [2]. Rather than finding an association between dairy foods and CVD, the literature suggests a potential protective effect of dairy on heart disease, stroke, and even insulin resistance [2-8]. By recommending only low- or fat-free dairy foods, are the guidelines guiding us in the wrong direction?

### They give fat a bad name



The scientific literature on the health benefits or risks of different nutrients is vast, making it impossible for the average American to keep up to date. Luckily, the U.S. Government provides a nutritional “cheat sheet”—[the DGA— that summarizes the towers of scientific research papers into a handful of guidelines for optimal health](#). One of the most important messages of this year’s DGA is limiting or avoiding food items that are associated with chronic diseases such as type 2 diabetes, high blood pressure, and CVD. The main culprits are refined sugars, sodium, and the well-known nutritional villain, saturated fat.

Saturated fats have been the bad guys of the nutrition world since the first DGA was released in 1980. Their reputation comes from observations that diets high in saturated fat increase low-density lipoproteins (LDL), also known as “bad” cholesterol.

Lipoproteins are in charge of moving fat throughout the body and LDL are “bad” because they move these fats into the walls of the arteries, resulting in plaques and subsequently, heart disease.

The basic dogma has always been that saturated fats in diets raise LDL, which in turn increases the risk for CVD. But this dogma has recently been questioned because numerous prospective studies have failed to find any association between saturated fat consumption and subsequent development of CVD [2-5,7,9,10].

One of the key sticking points of those that question the dogma is the emphasis on LDL levels to assess CVD risk. Many

have argued that looking at only one biological measurement is too reductive [2,4,5,7,9,10]. For starters, they point out that there is a “good” cholesterol, high-density lipoprotein (HDL), responsible for removing lipids from the arteries. Individuals with high LDL levels but with correspondingly high levels of HDL would have a different CVD risk than those with high LDL but low HDL. Indeed, low HDL levels are more indicative of CVD risk than are high LDL levels [2-4].

Furthermore, there are actually two types of LDL molecules, large and small. The small LDL molecules are more likely to lead to clogged arteries and inflammation than the large LDL molecules. Considering just one measurement of total LDL, therefore, obscures the variation in the type of LDL molecules that are present and their potential effects on heart health.

The relationship between saturated fats and cholesterol is much more complicated than it is often depicted. It turns out that while some types of saturated fats in the diet do increase LDL, other types increase the large (and less worrisome) LDL molecules to a greater degree than small LDL, whereas other saturated fats increase HDL [2-5,7]. Moreover, saturated fats have several other physiological influences in the body unrelated to blood lipids and cholesterol, many of which may be positive for overall health [2,5]. Thus, statements from the DGA to limit all saturated fats result in making villains out of nutrients (and the foods that contain them) that may actually be nutritional good guys.

### Dairy fats: Guilty by association

A prime example of this nutritional stereotyping is the DGA's recommendation to avoid full-fat dairy products, including milk, cheese, and yogurt, in favor of their low- or fat-free counterparts. The message this sends to consumers is clear: as a source of saturated fat, full-fat dairy products are inherently unhealthy. Or are they? This question has received much scientific scrutiny, and the current consensus is that there is no clear evidence that dairy foods increase the risk for CVD [2-5,7]. Indeed, research results often point in the opposite direction, suggesting improved heart health and other health benefits from full fat dairy foods.

Research results on the link between dairy and CVD risk come almost exclusively from prospective studies. The study design is quite simple—researchers identify their study cohort and follow them for an extensive period of time (often several decades) to see which study participants develop particular traits (such as a stroke, heart attack, or hypertension). Dietary data are collected along the way, and at the end of the study they can compare what individuals consumed to their health outcomes. Although these studies do not prove a cause and effect, they usually have very large study cohorts, allowing the researchers to demonstrate patterns that are strongly suggestive of a link between diet and health outcome.

For example, de Oliveira Otto et al. [2] followed 5200 study participants (ages 45–84 years old) from 2000 to 2010 to assess the relationship between their intake of saturated fat from dairy and red meat with outcomes related to CVD (e.g., hypertension, heart attack). Participants with a higher intake of dairy saturated fat had a lower risk of CVD, whereas red meat saturated fat was associated with a higher CVD risk. Dairy's benefits are demonstrated even more clearly by their finding that substituting just 2% of energy from meat saturated fat with energy from dairy saturated fat lowered the risk of CVD by 25% [2]. Two percent of energy is not a major lifestyle change (perhaps just a hundred calories), and yet the impact on heart health is profound.

De Oliveira Otto and colleagues believe that the food-based effects of saturated fat are related to several unique attributes of dairy fat [2]. First, they point out differences in the types of fatty acids present. Saturated fats are chains of carbons, and chain length may influence their metabolic properties. Compared to red meat, dairy has a higher proportion of short-chain fatty acids (fewer than 10 carbons in length) and medium-chain saturated fats (10 and 12 carbons), both of which are believed to raise HDL levels more so than fatty acids with 14 or 16 carbons [2]. Additionally, dairy has a higher proportion of odd-chain saturated fats, which have demonstrated effects on both heart health and decreased risk of type 2 diabetes [2,5].

Numerous studies also suggest that the heart health benefits of dairy may have little to do with the fatty acids present, and more to do with the other nutrients that make up dairy foods, including calcium, potassium, phosphorus, and even [naturally-occurring trans fats](#) [2-7,11]. Take calcium, for example. This essential mineral is well known for its [positive influence on blood pressure](#), but it may also relate to the way that dairy fats are digested [4]. Calcium can bind many of the saturated fats present in dairy to create calcium soaps that are not soluble and are therefore not removed from the digestive tract into the blood stream [4]. In doing so, it is as if these fats were never consumed in the first place.

In fact, the way that all milk fats are “packaged” may have a large influence on their digestion and ultimate effects on health [4,6]. Fat in milk is present as a milk fat globule; in between the fat and the digestive tract are three layers of membranes made up of phospholipids and proteins, each of which affect the way in which the milk is digested. They also have their own positive health effects, including lowering small particle LDL [6].

Milk fats unique travel accommodations through the digestive tract further distinguishes them from saturated fats from other food sources. Taken together with the types of saturated fatty acids present and the nutritional benefits from the numerous essential nutrients that make up dairy, there seems insufficient evidence to place it on the nutritional naughty list. Based on DGA recommendations, dairy fat may simply be guilty by association.

## Foods not nutrients

In a 2011 paper, Astrup and colleagues [3] asked, “Should advice on saturated fatty acid intake be based on food rather than on types of fatty acids?” The scientific evidence replies with a resounding “yes.” And this is because foods actually are the sum of their parts.

Nutrition science calls this way of thinking “the food matrix” [2,3,6,11]. Although it sounds like something out of a sci-fi movie, the food matrix approach simply means considering the complexity of food rather than simply looking at one particular nutrient. On paper, five grams of saturated fat in a cup of whole fat milk may seem like an unhealthy nutritional choice. But that cup of milk is more than just those grams of saturated fat. Milk contains a unique combination of essential nutrients and high quality proteins, all of which have demonstrated health benefits, including [bone growth](#), [bone quality](#), [lean body mass maintenance](#), and [insulin resistance](#). And on closer inspection, those five grams of saturated fat might not be so terrible either; a higher proportion of shorter chain fatty acids, fat-binding calcium, and fat presented in the milk fat globule means milk fat is not metabolized in the same way as saturated fat from other dietary sources such as red meat or palm oil [2].

The American public has embraced a false dichotomy due to marketing that categorizes all saturated fats as the bad fats and unsaturated fats as the good fats. Thus, it may not be an easy task to convince consumers that some foods with saturated fats may have been given a bad rap. But informing consumers about which foods are healthy or which should be limited instead of simply lumping together all food sources of saturated fats may help break the stigma attached to full-fat dairy.

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