Milk Fat and Health Consequences

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Dairy fats are a complex mixture of lipids, but the bulk is contained in the triglyceride form. The fatty acids are made up primarily of saturates and monounsaturates with polyunsaturates present in minor amounts (<3% total fatty acids). The saturated fats have received the most attention because they contribute to the total saturated fat intake of many people living in Western societies, and this in turn has been associated with elevated risk of cardiovascular disease such as plasma cholesterol levels. Unlike the fats from most animal sources, dairy saturated fats are composed of fatty acids ranging in carbon length from 4 to 20. Because not all saturated fatty acids are hypercholesterolemic in nature, there is debate about the negative effect of dairy fats on human health. Dairy fats contain trans fatty acids that are also thought to be hypercholesterolemic, but there is debate as to the relative effect of the ‘natural’ trans fatty acids in milk fats that arise from rumen microbiota and so-called industrial trans fatty acids that arise from industrial transesterification of polyunsaturated fats. In addition, conjugated linoleic acid is also found in bovine milk, and the effect of this fatty acid on human health remains debatable. Cholesterol and some plant sterols are present in milk fats and again, the effect of dietary cholesterol is controversial. While it is scientifically accepted that dietary cholesterol contributes little to plasma cholesterol levels, foods containing cholesterol are often grouped as unhealthy. However, cholesterol is present in human breast milk and because there is emerging evidence to suggest that dietary cholesterol could play a positive role in the growth and development of infants, some manufacturers are including cholesterol in their infant formulas. Interestingly, although dairy fat is low in polyunsaturated fatty acids (PUFAs), the balance of the essential fatty acids linoleic acid (18:2n-6) and alpha linolenic acid (18:3n-3) at 2:1 is considered desirable as it allows the endogenous conversion of these PUFAs to long-chain (LC) PUFAs. Thus, infants fed cow’s milk have higher LC-PUFA status than those fed formulas enriched with vegetable oils. In addition, dairy fats contain low levels of two important
omega-3 LC-PUFAs, eicosapentaenoic acid and docosapentaenoic acid, precursors of the very important docosahexaenoic acid that has proven health benefits in the diets of infants. Many of the LC-PUFAs are located in the phospholipid and glycoprophospholipid fractions which contribute about 1% of the total fats, but contain some interesting bioactive compounds. Finally, dairy fats contain a range of compounds that have putative health benefits including ceremides, cerebrosides and gangliosides. Unravelling the relative health benefits of all the lipid constituents of bovine milk will provide a challenge for researchers for many years to come.