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Substitutions between dairy product subgroups and risk of type 2 diabetes: the Danish Diet, Cancer and Health cohort

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Abstract

The aim of this study was to investigate the associations for specified substitutions between different subgroups of dairy products and the risk of type 2 diabetes. We used data from the Danish Diet, Cancer and Health cohort including 54 277 men and women aged 50–64 years at baseline. Information regarding intake of dairy products was obtained from a validated FFQ, and cases of type 2 diabetes were identified through the Danish National Diabetes Register. Cox proportional hazards regressions were used to estimate associations. During a median follow-up of 15·3 years, 7137 cases were identified. Low-fat yogurt products in place of whole-fat yogurt products were associated with a higher rate of type 2 diabetes (hazard ratio (HR) 1·17; 95 % CI 1·06, 1·29) per serving/d substituted. Whole-fat yogurt products in place of low-fat milk, whole-fat milk or buttermilk were associated with a lower rate of type 2 diabetes (HR 0·89; 95 % CI 0·83, 0·96; HR 0·89; 95 % CI 0·82, 0·96; HR 0·89; 95 % CI 0·81, 0·97; per serving/d substituted, respectively). The pattern of associations was similar when intake was expressed as kJ/d (kcal/d). These findings suggest that intake of whole-fat yogurt products in place of low-fat yogurt products, low-fat milk, whole-fat milk and buttermilk are associated with a lower rate of type 2 diabetes.

Key words: Cheese: Dairy products: Milk: Substitution studies: Yogurt

Type 2 diabetes is a major public health problem with increasing incidence rates[1]. Genetic predisposition has an indisputable role in the aetiology of type 2 diabetes and constitutes a non-modifiable risk factor for the individual. Dietary intake, on the other hand, can be modified and is a key element in the prevention of type 2 diabetes[2]. Indeed, large randomised controlled trials have shown that lifestyle interventions, including dietary modification, can prevent the onset of type 2 diabetes[3,4]. With a projected continuing increase in the incidence of type 2 diabetes in the coming years[5], further solutions to combat this epidemic are warranted.

Low-fat dairy products are part of most dietary recommendations to adult populations[6]. However, the role of dairy products in the prevention of type 2 diabetes is currently being debated and some argue that there is no evidence to support that whole-fat dairy products increase the risk of type 2 diabetes and other metabolic diseases[7]. Further, a recent cohort study, using data from the Malmö Diet and Cancer cohort, found that whole-fat dairy products, not low-fat dairy products, were inversely associated with risk of type 2 diabetes[8].

Dietary modifications usually imply changing the dietary composition rather than the total energy intake. Thus, the vast majority of cohort studies that investigated the association between dairy products and type 2 diabetes adjusted for total energy intake. It follows that a higher intake of one food item implies a concomitantly lower intake of other foods. Specifying the substitution is important because the substituted foods may be neutral, harmful or beneficial in relation to type 2 diabetes. However, few cohort studies have specified the substitution. One of the cohort studies that did specify the food substitution found that replacing snacks with yogurt was associated with a lower risk of type 2 diabetes[9]. In another cohort study, using data from the PREvención con DIeta MEDiterránea study, no association with type 2 diabetes was found when biscuits and chocolate were replaced with low-fat milk, whereas an inverse association with type 2 diabetes was found when biscuits and chocolate were replaced with yogurt[10]. Substitution of one type of dairy product for another may be more relevant, than, for example, substituting dairy products for snack foods. In this study, we investigated the associations for specified

Abbreviation: HR, hazard ratio.

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