
Research and Public Health Implications of the Intricate Relationship Between Calcium and Vitamin D in the Prevention of Colorectal Neoplasia

The recent study by Grau et al. (1) demonstrated that calcium's protection against colorectal adenoma recurrence is confined to patients with adequate vitamin D status and that vitamin D's effect is confined to those receiving calcium. These results are consistent with those of a recent study (2) indicating that calcium supplementation and low-fat dairy foods are independently associated with a statistically significant reduction in the growth of abnormal cells that lead to colorectal polyps. Both studies add to the growing body of evidence that calcium and vitamin D reduce the risk of colon cancer. Given the widespread insufficiency of both nutrients, it is perhaps not surprising that it takes relative adequacy of both to produce the benefits of either.

However, the accompanying editorial by Jacobs et al. (3) cautioned against using dairy foods as the source of the needed calcium and vitamin D. This statement is misleading and incorrect. There are many good reasons for public health efforts to be directed, instead, at increasing dairy consumption, not only for its potential role in reducing colon cancer risk but also for its protective role in at least eight other disorders (4).

The cautions expressed by Jacobs et al. are based on early data from the Health Professionals Follow-up Study (5), which reported an association between high intakes of dietary calcium and prostate cancer risk. The study was observational in character and hence could not establish causality. Therefore, it should not be used for nutritional policy recommendations, particularly when other observational studies report no association. Moreover, as new cases have accumulated in the Health Professionals Study itself, the association of calcium and prostate cancer incidence has disappeared (6), and in the only randomized controlled trial data available on the relationship between calcium and prostate cancer, calcium, rather than increasing prostate cancer risk, actually cut it in half (7). I would urge caution before

excluding a major food group with many demonstrated benefits. I also call attention to the fact that the intake of milk has been declining at the same time as prostate cancer incidence has been rising.

Jacobs et al. cite the problem of lactose intolerance as further justification for discouraging increased consumption of dairy products. This conclusion appears to be based on an overestimate of the prevalence and severity of lactose intolerance (as contrasted with lactase nonpersistence). Unfortunately, misunderstanding of lactose intolerance is common and often leads to unnecessary reduction of dairy consumption, eliminating a major source of calcium and other essential nutrients. In reality, most lactase-nonpersistent individuals can consume one cup or more of milk with each meal without experiencing symptoms. Also, regular lactose intake improves tolerance.

Dairy foods, in addition to containing calcium and vitamin D, are excellent sources of many nutrients and contain compounds such as conjugated linoleic acid, butyric acid, and sphingolipids, all of which exhibit anticancer properties. These are yet more reasons not to exclude them out of hand.

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NOTES

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RESPONSE

We thank Dr. Heaney for his interest in our editorial. However, there are several points in his commentary that we believe are misleading with regard to the epidemiologic data related to dairy products, calcium, and prostate cancer.

First, data from the Health Professionals Follow-up Study showing that higher daily intake is associated with an increased risk of prostate cancer are now supported by more than a dozen studies, as discussed by Rodriguez et al. in a recent publication from the Cancer Prevention Study II Nutrition Cohort (1), which also showed a statistically significantly increased risk for prostate cancer associated with higher calcium intake (1). Dr. Heaney states that, in the work of Michaud et al. (2), the effect of calcium on prostate cancer has disappeared as new cases have accumulated. We strongly disagree with the interpretation of these data. First, Michaud et al. (2) did not address the association between calcium itself and prostate cancer but rather the effect of animal products; calcium appeared only as a covariate in the multivariable models. Although the association of dairy products themselves with the risk of prostate cancer was no longer statistically significant, this result occurred after controlling for calcium and fat in the regression model. This finding, therefore, actually supports a potential detrimental role for calcium in prostate cancer risk. Indeed, the authors of this work themselves conclude that these findings may explain the previously observed positive association between dairy products and prostate cancer (2).

Further, Dr. Heaney references the analyses by Wallace et al. (3) to indicate

that calcium supplementation may offer protection from prostate cancer. Although a suggestion of reduced risk of prostate cancer with calcium supplementation was indeed observed in this study, caution should be used when drawing conclusions from these data (3). The results were not statistically significant ($P = .09$), and the original trial was designed to test the effect of calcium supplementation on colorectal adenoma recurrence, not prostate cancer. In addition, because the duration of this study was relatively short, most of the prostate cancers were probably early-stage cancers. This is relevant because studies have indicated that higher calcium consumption may be more strongly associated with later-stage cancers (1,4). It is possible that calcium has differential effects on prostate cancer depending on the stage of the disease. Therefore, after weighing the evidence, we believe that our conclusion of exerting caution when developing public health recommendations for increased consumption of calcium or dairy products is justified.

We do agree with Dr. Heaney that several health benefits are associated with dairy foods. Despite his assertion that we are “excluding a major food group” and did so “out of hand,” in no way did we suggest the elimination of dairy products from the diet. We merely noted that there are alternatives to dairy for obtaining calcium and that increasing intake of dairy may not be the best recommendation, given the potential adverse effects on prostate cancer. For this reason, we also discussed whether increasing calcium intake at all would be an important public health message. We believe that further research is necessary to more clearly define the appropriate dose and type of calcium for optimal health.

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