

Issue 75

In a nutshell

Many nutrient connections with prostate cancer have been raised, including a link with higher calcium intake.

It is too early to be sure which links will turn out to be valid. It is certainly not appropriate for physicians to counsel male patients to avoid calcium-rich foods without taking into account the impact of this on health overall (e.g. on osteoporosis).

Calcium, fat and prostate cancer

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NUTRITION RESEARCH REVIEW

Study one: Calcium has higher risk in case-control

Subjects: 526 men with prostate cancer and 536 controls.

Method: Case-control study in which dietary intake was compared in the two groups.

Results: After controlling for age, family history of prostate cancer, smoking, and total energy and phosphorous intake, those with the higher intakes of calcium had significantly greater risk of having prostate cancer, compared with those with the lower intakes (see table 1).

Higher consumption of dairy products was also associated with a greater risk of having prostate cancer.

Ref: *Cancer Causes Control* 1998;9:559-66

Study two: Calcium has extra risk prospectively

Subjects: 47,781 men from the Health Professionals Follow-Up Study, apparently free of prostate cancer at the start of the study.

Method: Prospective study involving dietary

assessment and 8 year follow-up.

Results: Higher intake of calcium was associated with higher risk of both prostate cancer overall and metastatic prostate cancer (see Table 2).

The higher risk was independent of whether calcium came from food sources or from supplements

Higher levels of fruit intake and fructose were associated with lower risk of prostate cancer.

Once calcium and fructose intake were adjusted for, there was no significant association between fat intake and prostate cancer risk.

Ref: *Cancer Res* 1998;58:442-7

Study three: vitamin D

Subjects: 3,737 Japanese-American men living in Hawaii.

Method: Nested case-control in which stored blood samples taken at the outset in 136 men who developed prostate cancer over 26 years of follow-up were compared with the stored blood samples of 136 controls.

Table 1: Relative risk of prostate cancer in relation to calcium intake * (Study 1)

	Prostate ca	Metastatic cancer
RR	1.91	2.64
(95% CI)	(1.23-2.97)	(1.24-5.61)
p value	p < 0.05	p < 0.05

* calcium intake >1,182 vs <825 mg/d

Table 2: Relative risk of prostate cancer in relation to calcium intake ** (Study 2)

	Prostate ca	Metastatic cancer
RR	2.97	4.57
(95% CI)	(1.61-5.50)	(1.88-11.1)
p value	p < 0.002	p < 0.001

** calcium intake >2,000 vs <500 mg/d

Blood was analysed for two forms of vitamin D (25-hydroxy and 1,25-dihydroxy), calcium, phosphorus and parathyroid hormone.

Results: There were no significant differences in blood levels between cases and controls.

Ref: *Cancer Causes Control* 1998;4:425-32

Study four: macronutrients

Subjects: 932 men with newly diagnosed prostate cancer and 1,201 controls. Each group was approximately equally divided into men of black and men of white racial origin.

Method: Case-control study comparing dietary intake (based on interview) between groups.

Results: There was a significant association between greater consumption of foods high in animal fat and increased risk of advanced prostate cancer in both black and white males, with greater effect being seen in black men (in black males the relative risk for highest vs lowest intakes was 3.1, in white males = 2.4, $p < 0.02$ for trend).

However, the association between fat and prostate cancer overall was not significant in white males, only in black.

There was no significant association between prostate cancer and intake of calcium, vitamin A, or specific lycopene-rich foods

Ref: *Cancer Epidemiol Biomarkers Prev* 1999;8:25-34

Comments

If this article had been written 5 or more years ago, it is likely that the predominant dietary influence on prostate cancer would have been regarded as fat intake.

This was based on epidemiological evidence, and is not surprising given the fact that the impact of dietary fat on hormone-dependent cancers such as breast and prostate has been subject to a huge amount of study.

However, as the second and fourth studies above show, finer dissection of the relationship, between fat and prostate cancer has tended to weaken the associations found - in these two studies it was controlling for calcium/fructose and racial origins respectively.

In the last few years, on the other hand, the emphasis has definitely shifted towards looking at vitamins and minerals as being relevant. In our previous three issues in this series, we have focused on antioxidants such as selenium, vitamins A and E. In this issue, the role of calcium and vitamin D are under examination.

Vitamin D and calcium are obviously closely associated physiologically (higher calcium lowers vitamin D levels), and it is possible that if higher levels of calcium are a risk factor for prostate cancer this may work through its impact on vitamin D alone. Even fructose intake can potentially affect vitamin D levels through effects on phosphorus.

There is quite good evidence from laboratory studies

that vitamin D metabolites have antiproliferative effects on prostate tumour cells. Indeed, in the last few months there has been some phase-one trial data published on the clinical use of 1,25 dihydro vitamin D (calcitriol) in the treatment of advanced malignancies ¹.

Furthermore, there has been previous epidemiological evidence suggesting higher dairy intake is a risk factor for prostate cancer.

However, before anyone gets too excited about the adverse effects of either calcium or dairy intake, it would be useful to stop for a minute and look at the overall picture. The evidence linking dairy and calcium intakes remains essentially epidemiological, and this is certainly not conclusive.

For example, it is hard to be sure that epidemiological studies completely separate the effects of food group intake (such as dairy foods) from those of macronutrient intake (such as fat or protein). Statistical adjustments can only accomplish so much, and a similar relationship to prostate cancer has been found with meat intake as it has with dairy.

Study three above looking at blood levels of vitamin D failed to show any significant relationship to prostate cancer, although to be fair it was a small study and contradicts the significant relationship demonstrated in earlier American research using very similar methodology ².

References:

1 *Clin Cancer Res* 1999;5:1339-45

2. *Cancer Epidemiol Biomarkers Prev* 1993;5:467-72

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