Diet and colorectal cancer

Review of the evidence

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ABSTRACT

OBJECTIVE To investigate whether diet has a role in the development and progression of colorectal cancer (CRC).

QUALITY OF EVIDENCE MEDLINE was searched from January 1966 to December 2006 for articles on the relationship between diet and CRC using the key words *colorectal cancer* and *folic acid, calcium, vitamin D, red meat,* or *fibre.* Evidence that these factors are associated with CRC came from case-control and prospective cohort studies and some clinical trials.

MAIN MESSAGE Whether red meat is a culprit in causing CRC remains unanswered, although any effect it might have is likely moderate and related to processing or cooking. The effect of dietary fibre on risk of CRC has also been difficult to determine because fibre intake is generally low. Evidence that folic acid, calcium, and vitamin D reduce risk of CRC is stronger. In particular, recent research indicates that calcium and vitamin D might act together, rather than separately, to reduce the risk of colorectal adenomas. There might also be an interaction between low folate levels and high alcohol consumption and CRC.

CONCLUSION Before dispensing dietary advice, physicians should understand the potential benefits and harm of specific components of various foods. People might be able to reduce their risk of CRC by increasing their vitamin and mineral levels through eating more vegetables and fruit. Multivitamin and mineral supplements can complement a healthy diet.

RÉSUMÉ

OBJECTIF Déterminer si l'alimentation joue un rôle dans le développement et la progression du cancer colorectal (CCR).

QUALITÉ DES PREUVES On a recherché dans MEDLINE, entre janvier 1966 et décembre 2006, les articles sur la relation entre l'alimentation et le CCR à l'aide des rubriques *colorectal cancer and folic acid, calcium, vitamine D, red meat* ou *fibre.* Les preuves indiquant que ces facteurs influencent le CCR provenaient d'études cas-témoin et d'études de cohorte prospectives et de quelques essais cliniques.

PRINCIPAL MESSAGE La question de savoir si la viande rouge est un facteur dans le développement du CCR demeure sans réponse, quoique l'effet éventuel de ce facteur semble tout au plus modéré et lié au mode de cuisson. L'effet des fibres alimentaires sur le risque de CCR a aussi été difficile à évaluer parce que la consommation de fibres est généralement faible. Les preuves indiquant que l'acide folique, le calcium et la vitamine D réduisent le risque de CCR sont plus solides. Ainsi, les recherches récentes suggèrent que le calcium et la vitamine D agissent en synergie plutôt que séparément pour diminuer ce risque. Une interaction entre de bas niveaux de folates et une consommation élevée d'alcool pourrait aussi favoriser le CCR.

CONCLUSION Avant de prodiguer des conseils d'ordre alimentaire, le médecin devrait être au fait des effets bénéfiques et nocifs des composantes spécifiques de différents aliments. Il est possible qu'on puisse réduire le risque de CCR si on augmente les niveaux des vitamines et des minéraux en consommant plus de fruits et de légumes. Des suppléments de multivitamines et de minéraux peuvent constituer un complément utile à un régime sain.

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In Canada, colorectal cancer (CRC) is the second leading cause of death due to cancer among men and the third leading cause of death due to cancer among women. In 2004, about 11 900 men and 8800 women would have been diagnosed as new cases of CRC.[1] Diet has long been thought to have a role in the etiology of CRC, particularly when a poor diet is combined with excess calorie intake and weight gain, physical inactivity, and unhealthy practices, such as smoking and consuming a great deal of alcohol.[2-4]

Current knowledge about food consumption patterns indicates that a diet high in vegetables, fruit, and fibre is protective against certain types of cancer, but the evidence that fruit and vegetable consumption is specifically related to a reduced risk of CRC was recently challenged.[5] In an attempt to clarify the relationship between diet and CRC, researchers are examining individual dietary components, such as red meat, fibre, folic acid, calcium, and vitamin D. Some studies have focused on adenomas, precursors to CRC, or analysis of colon and rectal cancer, both separately and together.

Quality of evidence

MEDLINE was searched from January 1966 to December 2006 for articles on the relationship between diet and CRC using the key words *colorectal cancer* and *folic acid, calcium, vitamin D, red meat,* or *fibre.* These key words were chosen because they highlight controversies or are important focuses of current CRC and micronutrient research. More than 700 articles were identified, including many experimental studies. Evidence from case-control and prospective cohort studies (level II evidence) and clinical trials (level I evidence) is discussed below.

Levels of evidence

Level I: Evidence derived from properly conducted randomized, double-blind controlled clinical trials
Level II: Evidence originating from well-designed controlled clinical trials or well-designed multicentre, prospective cohort, or case-control epidemiologic studies
Level III: Evidence obtained from respected authorities with clinical experience, descriptive studies, or reports of expert committees, such as reports from consensus conferences

Red meat

Consumption of red meat might be related directly to the incidence of CRC or indirectly because a diet high in meat tends to be low in vegetables, fruit, and fibre. Whether red meat itself or the method by which it is prepared influences risk of CRC has also been investigated.

Bidoli et al[6] found that high intake of refined starches, eggs, cheese, and red meat increased risk of CRC. Risk of colon or rectal cancer was about twice as great among those who consumed these foods more frequently. On the other hand, more frequent consumption of tomatoes was associated with a 50% and 60% reduction in risk of colon cancer and rectal cancer, respectively.[6] A study of CRC among people residing in northern Italy[7] revealed that 17% of CRC cases were attributable to consumption of red meat.

The carcinogenic effect of heterocyclic amines, produced during cooking of red meat, has been suggested as the link between red meat and CRC. Probst-Hensch and colleagues[8] found a more than twofold difference in the occurrence of distal colorectal adenomas among subjects who ate fried, darkly browned red meat more than once a week and subjects who ate red meat less often and ate it with a lightly browned surface. Sinha et al[9] also found that well-done, grilled red meat was the main contributor to increased risk of cancer.

The relationship between consumption of meat and risk of CRC has been the focus of 2 meta-analyses. Sandhu et al[10] determined that an increase of 100 g in daily consumption of all meat or red meat was associated with a 12% to 17% increase in risk of CRC. The authors noted, however, that the association might be confounded by other factors because only a few of the studies attempted to examine the independent effect of consumption of meat on risk of CRC. The second meta-analysis[11] found that total meat consumption was not significantly associated with risk of CRC, but that consumption of red meat and processed meat was associated with about a 33% greater risk of CRC. This finding is supported by evidence from Argentina,[12] where diets are rich in beef (almost 300 g daily for men). The number of deaths due to CRC among men in Argentina is comparable to that in Canada, but higher than that in other countries in Latin America.[13]

Whether consumption of red meat influences risk of CRC remains unclear (**Table 1**[6-12,14]). A recent prospective cohort study by the National Cancer Institute[14] showed no association between consumption of red meat, processed meat, or well-done meat and risk of CRC; however, the authors did not rule out the possibility of a modest association. Le Marchand[15] noted that, in genetically predisposed people, consuming very well-cooked meat or meat cooked in direct contact with flames raises the risk of CRC.

Fibre

Dietary fibre varies considerably in its physical properties and chemical composition, but can be classified according to its water solubility. This affects its action

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Table 1. Summary of evidence on associations between consumption of red meat and risk of CRC: *Studies are level II evidence.*

STUDY	DETAILS OF STUDY	RESULTS
Bidoli et al,[6] 1992	Case-control study: 123 patients with colon cancer and 125 patients with rectal cancer were compared with 699 controls	Red meat unfavourably affected risk of rectal cancer in particular
La Vecchia et al,[7] 1996	% risk in population attributable to intake of red meat estimated from data collected by Bidoli et al[6]	Frequency of intake of red meat explained 17% of all CRC cases; low intake of β-carotene and vitamin C explained 43% of all CRC cases
Probst-Hensch et al,[8] 1997	Case-control study: 488 matched pairs	Intake of HCAs increased risk of CRC (OR 2.2, 95% CI 1.1-4.3) when extremes of estimated HCA intake were compared
Sinha et al,[9] 1999	Case-control study: 146 cases of colorectal adenoma were compared with 228 controls	29% increased risk per 70 g/wk of well-done or very well-done red meat (OR 1.29, 95% CI 1.08–1.54) vs 10% increased risk with rare or medium red meat (OR 1.10, 95% CI 0.96–1.26)
Sandhu et al,[10] 2001	Meta-analysis	Daily increase of 100 g of all meat or red meat was associated with a 12% to 17% increased risk of CRC; 49% increased risk with a daily increase of 25 g of processed meat
Norat et al,[11] 2002	Meta-analysis	Total meat consumption was not associated with increased risk of CRC; RR 1.35 (95% CI 1.21–1.51) for red meat; RR 1.31 (95% CI 1.13–1.51) for processed meat
Navarro et al,[12] 2003	Case-control study: 287 patients with colorectal adenocarcinomas were compared with 566 controls	Total meat, red meat, and other types of meat were not related to increased risk of CRC; increased risk of CRC found for those consuming large amounts of cold cuts, sausages, and bovine organ meats
Flood et al,[14] 2003	National Cancer Institute prospective cohort study of 45 496 women	No evidence of an association between consumption of total meat, red meat, processed meat, or well-done meat and risk of CRC

CRC—colorectal cancer, CI—confidence interval, HCA—heterocyclic amine, OR—odds ratio, RR—relative risk.

in the body and might be relevant to the issue of risk of CRC. Bran fibre is insoluble; fruit and vegetable fibre tends to be more soluble.

Terry et al[16] examined fruit, vegetable, and fibre intake and risk of CRC among Swedish women known for their low consumption of fruit and vegetables and their high consumption of cereals. High consumption of fruit was associated with a 32% reduction in risk of CRC, while high intake of cereal fibre did not lower risk of CRC.

Asano and McLeod[17] conducted a meta-analysis of 5 randomized controlled trials with subjects who had had adenomatous polyps removed, but who had no history of CRC. Dietary fibre interventions included wheat bran fibre, ispaghula husk, or high-fibre whole food alone or in combination. There was no difference between intervention and control groups with respect to the incidence or recurrence of adenomatous polyps over a 2- to 4-year period.

Whether dietary fibre has a direct or indirect effect on CRC is currently unknown (**Table 2**[16-21]). Some researchers have suggested that a diet high in fat and meat and low in dietary fibre might affect the integrity of colonic cells.[22] Others have suggested that certain plant cell-wall constituents, suberin and lignin, adsorb heterocyclic amines and thus protect against CRC.[23] Potato skins contain suberin. Wheat bran contains lignin.

Levi et al[18] found a significant inverse relationship between total fibre intake and risk of CRC (odds ratio 0.57, 95% confidence interval 0.47-0.68) and between certain types of fibre and CRC among 286 patients with CRC (149 with colon cancer and 137 with rectal cancer) compared with 550 controls. Vegetable fibre appeared to be more protective than either fruit or grain fibre.

In a large prospective cohort study in Europe,[19] high intake of dietary fibre was inversely related to large-bowel cancer, but no food source of fibre was found to be more protective than any other. The researchers suggested that doubling dietary fibre intake among people with low average intake of dietary fibre could reduce the risk of CRC by 40%.

Fibre intake is generally low. The adequate intake for women 50 years old and older has been established at 21 g daily.[24] In 1 study of older women,[20] no association between fibre intake and CRC was observed, but in that study, the 10th percentile of dietary fibre intake was 5.4 g, and the 90th percentile was only 18.2 g. High

intake of dietary fibre, however, was associated with a 27% lower risk of adenomas among subjects in 1 cancer screening trial.[21]

Folic acid

The observation that folic acid supplementation was associated with a substantial decrease in colon cancer among ulcerative colitis patients led researchers to examine the role of folic acid in prevention of CRC[25] (**Table 3**[26-33]). Two case-control studies in Majorca and Italy found a protective effect of folic acid on risk of CRC[26,27]. Bird and colleagues[28] investigated folate and risk of adenomatous polyps; the strongest relationship was found between red-cell folate concentration and colorectal polyp development in men.

As is the case with breast cancer, an interaction between folate and alcohol might have a role in CRC. Kato et al[29] found that women with low serum folate

Table 2. Summary of evidence on associations between consumption of dietary fibre and risk of CRC: *Studies are level II evidence.*

STUDY	DETAILS OF STUDY	RESULTS
Terry et al,[16] 2001	Prospective cohort study of 61 463 women	Very low consumption of fruit and vegetables raises risk of CRC
Asano and McLeod,[17] 2002	Meta-analysis (5 randomized controlled trials)	Increase in dietary fibre intake does not reduce incidence or recurrence of adenomatous polyps
Levi et al,[18] 2001	Case-control study: 286 cases of CRC compared with 550 controls	Vegetable fibre appears to be more protective against CRC than either fruit or grain fibre
Bingham et al,[19] 2003	Prospective cohort study of 19 978 patients	Intake of fibre was inversely related to incidence of large-bowel cancer
Mai et al,[20] 2003	Prospective cohort study	No association between fibre intake and CRC
Peters et al,[21] 2003	Cancer screening trial	High dietary fibre lowers risk of adenomas

CRC—colorectal cancer

Table 3. Summary of evidence on associations between intake of folic acid and risk of CRC: *Studies are level II evidence.*

STUDY	DETAILS OF STUDY	RESULTS
Benito et al,[26] 1991	Case-control study: 286 cases of CRC compared with 295 population controls and 203 hospitalized controls	Both legume fibre and folic acid had a protective effect
Ferraroni et al,[27] 1994	Case-control study: 828 colon cancer cases and 498 rectal cancer cases compared with 2024 hospitalized controls	RR 0.52; inverse association found for both colon and rectal cancer across sex and age
Bird et al,[28] 1995	Case-control study: 332 cases compared with 350 controls	Significant association between adenomatous polyps and red-cell folate levels (OR 0.76, 95% CI 0.53–1.08 for highest level vs lowest level); plasma folate levels and folate intake had similar but weaker associations with occurrence of polyps
Kato et al,[29] 1999	Nested case-control study: 105 cases of CRC compared with 523 controls	OR 1.99 (95% CI 0.92–4.29) for patients with low serum folate levels and high alcohol consumption
Giovannucci et al,[30] 1993	Nurses' Health Study, Health Professionals Study (prospective cohorts)	Increased risk of CRC with > 2 alcoholic drinks per day (RR 1.84, 95% CI 1.19–2.86 in women; RR 1.64, 95% CI 0.92–2.93 in men)
Giovannucci et al,[31] 1998	Prospective cohort study of 88 756 subjects	After 15 years of multivitamin use, women with folic acid intake > 400 µg/d had a significantly reduced risk of CRC (RR 0.25, 95% CI 0.13–0.51)
Jacobs et al,[32] 2003	Cancer Prevention Study II Nutrition Cohort study of 145 260 men and women	Regular (≥ 4 times/wk) use of multivitamins 10 y before enrolment was associated with reduced risk of CRC (rate ratio 0.71, 95% CI 0.57–0.89)
Platz et al,[33] 2000	Health Professionals Follow-Up Study of 47 927 men	71% of CRC cases in the population were attributable to 6 risk factors: obesity, physical activity, red meat consumption, alcohol use, smoking, and low folic acid levels

CRC—colorectal cancer, CI—confidence interval, OR—odds ratio, RR—relative risk.

levels and high alcohol intake had a tendency toward greater risk of CRC. Giovannucci and colleagues[30] determined that high intake of dietary folate was inversely associated with risk of colorectal adenomas. Also, women who drank more than 2 alcoholic drinks per day had an elevated risk of adenomas.

In the Nurses' Health Study, Giovannucci et al[31] found a considerably lower risk of colon cancer among women reporting use of multivitamins containing 400 µg of folate for 15 or more years. In practical terms, long-term folate supplementation reduced the number of new cases of colon cancer from 68 to 15 per 10 000 women aged 55 to 69. At least 1 other study[32] has confirmed that having taken multivitamins containing folic acid in the past is associated with a reduced risk of CRC.

Platz et al[33] suggested that modifying 6 risk factors (obesity, physical inactivity, alcohol consumption, smoking, red meat consumption, and low folic acid intake) could substantially reduce the incidence of colon cancer. Other studies[34-39] have confirmed that modifiable risk factors, such as intake of dietary folate, alcohol consumption, and smoking, are important in cancer control.

Calcium and vitamin D

Calcium and vitamin D are thought to reduce risk of CRC through mechanisms that decrease cell proliferation or promote cell differentiation.[40] In general, cohort studies have found that milk and dairy products have a protective effect on CRC, but case-control studies do not support this relationship.[41] Nevertheless, scientists are intrigued that the risk of dying from CRC is highest in geographic areas that get less sunlight.[42] In contrast, the diet of people living in the Faroe Islands in the north Atlantic is high in fat and low in vegetables, but also high in fish, calcium, and vitamin D. Incidence rates of both colon and rectal cancer there were among the lowest in northwestern Europe and North America.[43]

Case-control studies have had inconsistent results (**Table 4**[43-62]). In 2 studies of women,[44,45] calcium intake was associated with reduced risk of CRC, but in a study involving both men and women,[46] no significant association was observed for either calcium or vitamin D. In a Swedish study,[47] increasing levels of vitamin D were inversely related to risk of rectal cancer or colon cancer, but the effect of calcium could not be documented. In 2 other case-control studies, calcium was found to be

Table 4. Summary of evidence on intake of vitamin D and calcium and risk of CRC

STUDY	DETAILS OF STUDY	RESULTS	LEVEL OF EVIDENCE
Dalberg et al,[43] 1999	Retrospective study of 242 cases of CRC	People living in the Faroe Islands have one of the lowest incidence rates of CRC in northwestern Europe and North America despite a diet low in vegetables and high in fat	II
Marcus and Newcomb,[44] 1998	Case-control study: 348 cases of colon cancer and 164 cases of rectal cancer were compared with 678 controls	Calcium intake tended to lower risk of both cancers when fifth to first quintiles were compared (OR 0.6, 95% CI 0.4–1.0 for rectal cancer; OR 0.6, 95% CI 0.3–1.1 for colon cancer); intake of vitamin D showed a similar, but nonsignificant, trend	II
Franceschi and Favero,[45] 1999	Case-control study: 1953 cases of CRC were compared with 5155 controls	Intake of calcium was inversely associated with risk of CRC	II
Levi et al,[46] 2000	Case-control study: 223 men and women with CRC were compared with 491 controls	No significant associations between intake of calcium or vitamin D and risk of CRC	II
Pritchard et al,[47] 1996	Case-control study: 352 colon cancer cases and 217 rectal cancer cases were compared with 512 controls	Highest vs lowest quartile of vitamin D intake was inversely associated with risk of CRC (stronger association with rectal cancer than with colon cancer); calcium intake was not associated with risk of CRC at either cancer site	II
De Stefani et al,[48] 1997	Case-control study: 282 patients with adenocarcinomas were compared with 564 controls	Comparison of highest to lowest quartile of calcium intake showed reduced risk of CRC (OR 0.41, 95% CI 0.24–0.69); effect of calcium was greatest at low levels of fat intake	II
Boutron et al,[49] 1996	Case-control study: 154 patients with small (< 10 mm) adenomas, 208 with large adenomas, and 171 with CRC were compared with 426 polyp-free controls and 309 other controls	No consistent results	II

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STUDY	DETAILS OF STUDY	RESULTS	LEVEL OF EVIDENCE
McCullough et al,[50] 2003	Prospective cohort study of 68 866 men and 66 883 women found CRC in 421 men and 262 women	Total calcium intake was associated with marginally lower risk of CRC in men and women (RR 0.87, 95% CI 0.67–1.12); strongest association with calcium from supplements (RR 0.69, 95% CI 0.49–0.96 for ≥ 500 mg/d vs none); total vitamin D intake associated with reduced risk of CRC only in men (RR 0.71, 95% CI 0.51–0.98)	II
Terry et al,[51] 2002	Prospective cohort study of 61 463 women found 572 cases of CRC	Women with high calcium intake (median 914 mg/d) had a lower risk of CRC compared with women with low intake (486 mg/d) (rate ratio 0.72, 95% CI 0.56–0.93); vitamin D was not associated with risk	II
Pietinen et al,[52] 1999	Alpha-Tocopherol, Beta-Carotene Cancer Prevention Study of 27 111 male Finnish smokers found 185 cases of CRC	Calcium had a modest effect on risk of CRC (RR 0.6, 95% CI 0.4–0.9)	II
Martinez et al,[53] 1996	Nurses Health Study of 89 448 nurses found 501 cases of CRC	Inverse association suggested between total vitamin D intake and CRC; highest vs lowest intake comparison was significant among subjects who reported high or low intake consistently across all 3 questionnaires (RR 0.70, 95% CI 0.16–0.70)	II
Kampman et al,[54] 1994	Netherlands Cohort Study of 120 852 men and women found 326 cases of CRC	No substantially decreased risk of CRC	II
Jarvinen et al,[55] 2001	Prospective cohort study of 9959 men and women	No significant results for calcium or vitamin D	II
Kato et al,[56] 1997	New York University Women's Health Study of 14 727 found 100 cases of CRC	In an association explained mainly by calcium content, increased intake of fish and shellfish was associated with a lower risk of CRC (RR 0.49, 95% CI 0.27–0.89); similar results obtained for intake of dairy products	II
Van Gorkom et al,[57] 2002	111 patients with sporadic adenomas were treated with 2 placebos, 1 g calcium plus placebo, or resistant starch plus placebo	No effect on increased epithelial cell proliferation (intermediate risk marker for CRC)	II
Cascinu et al,[58] 2000	34 CRC post-surgery patients were given 2 g of calcium and vitamins A, C, and E or placebo	No effect on colorectal cell proliferation	II
Cats et al,[59] 1995	15 patients at increased risk of hereditary nonpolyposis CRC were treated with 1.5 g calcium as calcium carbonate for 12 wk; 15 others were given placebo	No significant reduction in epithelial cell proliferation	II
Hofstad et al,[60] 1998	116 polyp-bearing patients received a mixed supplement containing 1.6 g of calcium as calcium carbonate for 3 y	No overall effect on polyp growth	II
Baron et al,[61] 1999	930 subjects with colorectal adenomas were given 1200 mg of elemental calcium (3 g of calcium carbonate)	Moderate reduction in adenoma recurrence with calcium supplementation (RR 0.85, 95% CI 0.74–0.98)	I
Grau et al,[62] 2003	803 subjects	When vitamin D intake was above the median, calcium supplementation lowered risk of adenoma recurrence (RR 0.71, 95% CI 0.57–0.89); vitamin D had a significant effect on adenoma recurrence only when combined with calcium supplementation	I

CRC—colorectal cancer, CI—confidence interval, OR—odds ratio, RR—relative risk.

protective[48] and not protective.[49] In the first study, however, the patients all had confirmed adenocarcinomas, while in the second study, the patients were at different stages along the adenoma-carcinoma path.

Observations made in cohort studies have been conflicting. Three studies[50-52] demonstrated that calcium had at least a modest effect on CRC risk reduction. Two studies[53,54] showed no association between calcium and CRC risk. One study[55] showed that high consumption of milk might reduce risk of colon cancer, but not because of its calcium or vitamin D content. Only the study by McCullough and colleagues[50] showed an association between vitamin D and reduced risk of CRC, and then only in men.

In the New York University Women's Health Study, an inverse association was found between fish and shellfish consumption and CRC and between consumption of dairy products and risk of CRC.[56]

Epithelial cell proliferation was not altered by administration of calcium in 3 studies,[57-59] but subjects in these trials were at high risk of cancer, had adenomas, or had had surgical treatment for CRC. For any specific micronutrient, the protective effect might be identified only after long-term high intake, either through diet or supplements or both. A 3-year intervention with calcium and antioxidants had no overall effect on polyp growth, but the authors suggested that calcium and antioxidants might have a protective effect against formation of new adenomas.[60]

Recent research indicates that calcium and vitamin D might act together, rather than separately, to reduce risk of colorectal adenomas.[62] In a previous study,[61] 1200 mg of elemental calcium was associated with a moderate but significant reduction in risk of recurrent colorectal adenomas ($P=.03$). Grau et al[62] found later that calcium supplementation was not associated with adenoma recurrence when vitamin D levels were at or below the median (29.1 ng/mL), and that vitamin D levels were associated with reduced risk only among those receiving calcium supplements.

Conclusion

Evidence that diet has an effect on the incidence of CRC is only moderate and might be affected by the multifactorial nature of CRC. Making appropriate choices across food groups, particularly with respect to fruit, vegetables, and fibre, is the key to healthy eating.

Patients could be advised to eat more vegetables and fruit for their folic acid and fibre content. Some patients at risk of CRC might benefit from a 400-µg folic acid supplement because of its higher bioavailability.

Patients could be advised to eat fish more often because it might provide some protection against CRC. Calcium and vitamin D might act together to reduce CRC risk; milk and canned salmon with bones provide both calcium and vitamin D. Dairy products such as yogurt and cheese provide calcium only; canned light tuna provides vitamin D. Supplementation with calcium and vitamin D might benefit some patients.

EDITOR'S KEY POINTS

- Much has been said in the news over the years about the effects of red meat, fibre, and other food on the development or prevention of colorectal cancer (CRC), but what is the evidence?
- Most studies on the effect of diet on CRC are case-control or epidemiologic studies, although there are some randomized controlled trials on the effects of specific nutrients.
- Evidence linking red meat and fibre with development or prevention of CRC is conflicting. Evidence linking intake of vitamin D, calcium, and folate with reduction in risk of CRC is slightly stronger.

POINTS DE RÉPÈRE DU RÉDACTEUR

- Ces dernières années, il a été beaucoup question dans les nouvelles de l'effet de la viande rouge, des fibres et d'autres aliments sur le développement ou la prévention du cancer colorectal (CCR), mais qu'avons-nous comme preuves?
- La plupart des données concernant l'effet de l'alimentation sur le CCR proviennent d'études épidémiologiques ou de cas-témoin, quoiqu'il existe quelques essais randomisés portant sur des aliments spécifiques.
- Les données reliant la viande rouge et les fibres au développement ou à la prévention du CCR sont contradictoires. Les preuves que la vitamine D, le calcium et les folates réduisent le risque de CCR sont légèrement plus solides.

Competing interests

Dr Ryan-Harshman *received a grant from Wyeth Consumer Healthcare Inc to co-author this article, and* **Dr Aldoori** *is an employee of Wyeth Consumer Healthcare Inc.*

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