

## **Dietary Fatty Acids and Colorectal Cancer: A Case-Control Study**

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### FROM ABSTRACT

Fatty acid effects on colorectal cancer risk were examined in a national prospective case-control study in Scotland (1999–2006), including 1,455 incident cases and 1,455 matched controls.

Significant dose-dependent reductions in risk were associated with increased consumption of omega-3 polyunsaturated fatty acids: [the highest consumption was 37% reduced risk vs. the lowest intake].

The observed different effects of different types of fatty acids underline the importance of type of fat in the etiology and prevention of colorectal cancer.

### THESE AUTHORS ALSO NOTE:

Colorectal cancer is the third most common cancer in both men and women in Scotland.

“50–80 percent of cases of colorectal cancer are considered due to environmental factors, such as dietary habits.”

“Fats (triglycerides) consist of fatty acids that are saturated or unsaturated (monounsaturated fatty acids (MUFAs) and polyunsaturated fatty acids (PUFAs)).”

“PUFAs are further divided into omega-3 (3) and omega-6 (6) PUFAs.”

“Diets high in animal fat (rich in saturated fatty acids) are associated with increased risk of colorectal cancer in contrast to diets high in fish and fish products (rich in 3 PUFAs), which are associated with reduced risk.”

Both MUFAs and trans-fatty acids promote human colon cancerous growth.

“The objective of the present case-control study was to examine associations between colorectal cancer and dietary intake of total fatty acids; seven subgroups (saturated fatty acids, MUFAs, PUFAs, 6 PUFAs, 3 PUFAs, trans-fatty acids, and trans-MUFAs); and nine individual fatty acid compounds (palmitic and stearic acids (saturated fatty acids); oleic acid (9 PUFAs); linoleic acid, alpha-linolenic acid, and

arachidonic acids (6 PUFAs); and alpha-linolenic acid, eicosapentaenoic acid, and docosahexaenoic acid (3 PUFAs)).”

This study of colorectal cancer included 1,455 cases and 1,455 matched controls.

## RESULTS

“Evaluation of the fatty acid composition of the diet of our study population showed that the most abundant fatty acids were oleic, palmitic, and linoleic.”

“Intake of total fatty acids and trans-MUFAs as well as of the individual fatty acids palmitic, stearic, and oleic showed a strong and dose-dependent effect on colorectal cancer risk, with approximately a 30–50% increase in risk for those with high intakes versus low intakes.”

“Intake of 3 PUFAs and of eicosapentaenoic and docosahexaenoic fatty acids was inversely and dose-dependently associated with colorectal cancer, with approximately a 40% reduction in risk for those with high intakes versus low intakes.”

“In general, 3 PUFAs, eicosapentaenoic acid, docosahexaenoic acid, and 3/6 appear to have a strong inverse and dose-dependent effect on colorectal cancer risk.”

“Patients with colorectal cancer consumed lower amounts of omega-3 PUFAs and individual eicosapentaenoic acid and docosahexaenoic acid.”

The more omega-3 fatty acids consumed the lower the risk of colorectal cancer.

“Omega-3 PUFAs are rapidly incorporated into cell membranes and effect several anti-carcinogenic biologic responses.”

“Omega-3 and omega-6 PUFAs are converted into eicosanoids by using the same enzymatic systems. Eicosanoids derived from omega-3s have anti-carcinogenic properties, whereas the omega-6 ones have pro-carcinogenic effects.”

“In conclusion, this large case-control study investigated an a priori hypothesis that different fatty acids have different effects on colorectal cancer.” “Moderately strong inverse and dose-dependent associations were found in multivariate logistic regression models between colorectal cancer risk and intake of omega-3 PUFAs and its main compounds, eicosapentaenoic acid and docosahexaenoic acid. The effects remained constant and significant after further energy adjustment and stratification. In addition, after the results of four published case-control studies were combined, the protective effect of the 3 PUFAs remained constant and significant.”

## KEY POINTS FROM DAN MURPHY

- 1) Colorectal cancer is the third most common cancer in both men and women.
- 2) "50–80 percent of cases of colorectal cancer are considered due to environmental factors, such as dietary habits."
- 3) "Diets high in animal fat (rich in saturated fatty acids) are associated with increased risk of colorectal cancer in contrast to diets high in fish and fish products (rich in 3 PUFAs), which are associated with reduced risk."
- 4) Significant dose-dependent reductions in risk of colorectal cancer is associated with increased consumption of omega-3 polyunsaturated fatty acids:
- 5) "Intake of 3 PUFAs and of eicosapentaenoic and docosahexaenoic fatty acids was inversely and dose-dependently associated with colorectal cancer, with approximately a 40% reduction in risk for those with high intakes versus low intakes."
- 6) "In general, 3 PUFAs, eicosapentaenoic acid, docosahexaenoic acid, and omega-3/omega-6 appear to have a strong inverse and dose-dependent effect on colorectal cancer risk."
- 7) "Omega-3 PUFAs are rapidly incorporated into cell membranes and effect several anti-carcinogenic biologic responses."
- 8) "Omega-3 and omega-6 PUFAs are converted into eicosanoids by using the same enzymatic systems. Eicosanoids derived from omega-3s have anti-carcinogenic properties, whereas the omega-6 ones have pro-carcinogenic effects."