

## **Exercising into Cancer Prevention by the American Institute for Cancer Research**

*Research shows that physical activity does more for cancer prevention than helping control weight. Now researchers are learning how.*

Epidemiological studies over the past several decades show that physical activity plays a major role in cancer prevention. In recent years, scientists have begun to better understand how exercise may help prevent cancer, reduce recurrence and improve quality of life for cancer survivors—all independent of weight control.

### **Mechanisms for Preventing Cancer**

Investigating the mechanisms related to exercise and cancer prevention is revealing several promising areas of study, including the immune system and energy balance.

One strong link to exercise that repeatedly appears is the hormone insulin. In a recent study published in the *European Journal of Cancer Prevention*, James Barnard, Ph.D., Professor of Physiological Science at the University of California, Los Angeles, looked at the impact of serum (a component of blood) on prostate cancer cells grown in culture. The cancer cells were exposed to serum from sedentary men or serum from men who exercised consistently (five days a week) for 10 years.

The cells exposed to serum from exercisers showed signs of reduced cell growth and apoptosis, as compared to cells exposed to serum from sedentary men. According to Dr. Barnard, one of the key factors may be the insulin level, which is decreased after exercise.

Insulin may lead to prostate cancer cell growth by increasing levels of insulin-like growth factor-1 (IGF-1). Research shows that physical activity does more for cancer prevention than helping control weight. Now researchers are learning how. In previous studies, Dr. Barnard found that when regular activity reduced IGF-1, it led to decreased tumor growth and increased apoptosis.

### **Clues to Measure Exercise**

In an effort to understand how exercise may affect colon cancer, Kristin Campbell, Ph.D., Post Doctoral Fellow in Cancer Prevention at the Fred Hutchinson Cancer Research Center, measured the effects of exercise on a known risk factor. The study randomly assigned 202 sedentary participants to moderate- to-vigorous intensity exercise for 60 minutes daily, six days a week. After a year, Dr. Campbell tested areas of the colon that are especially susceptible to cancer for Bax proteins, which promote apoptosis. Males who had exercised showed a significantly greater expression of Bax, leading to less cell proliferation. The researchers also tested for a protein that inhibits apoptosis, called Bcl-2. In certain areas, the ratio of Bcl-2 to Bax decreased as aerobic fitness increased.

Surprisingly, the women did not show the same results. According to Dr. Campbell, epidemiological evidence is stronger for a protective link between physical activity and

colon cancer in men. And one possible reason may lie in the different protein expressed among the men and women in the study.

“More research needs to be done to understand the nuances of these proteins, but our results suggest that [the proteins] may be important biomarkers for the role exercise plays in reducing colon cancer risk, and that exercise may impact these proteins differently in men and women,” says Dr. Campbell.

### **Cancer Survivors and Exercise**

In another study on prostate cancer, Dr. Barnard and his colleagues found that exercise affects the levels of prostate specific antigen (PSA). High levels of PSA may indicate cancer. When early-stage prostate cancer patients maintained comprehensive lifestyle changes for at least a year, including exercise and a low fat diet, the patients showed significant decreases in their levels of PSA and a lower likelihood of needing treatment. “We found that the combination of a low fat diet and exercise delayed the need for more aggressive treatment in these men,” says Dr. Barnard.

The effect of exercise also can extend to quality of life for cancer survivors. Although there is a drop in physical activity following a cancer diagnosis, activity helped survivors with coping and rehabilitation. Physical activity during treatment also has been shown to improve quality of life and physical function, and decrease fatigue.

### **A Part of Prevention**

Although more studies are needed to unravel how exercise helps, researchers agree: whatever the mechanisms – exercise clearly plays a role in cancer prevention.

Dr. Barnard strongly suggests that people include exercise as a vital part of their lives given the strong epidemiological and scientific evidence. “Most of the health problems seen in the United States and other industrialized countries are the result of three factors: lack of physical exercise, a diet high in sugar and fat and exposure to hazardous chemicals, which includes smoking.”

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