

A single exercise session may slow cancer cell growth, new study shows

Exercise may not only help prevent cancer but also could fight it at a cellular level.

Today at 5:00 a.m. EDT

6 min Summary



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By [Gretchen Reynolds](#)

Exercising muscles pumps out substances that can suppress the growth of breast cancer cells, according to an important new study of exercise and cancer.

The study, published last month, involved 32 women who'd survived breast cancer. After a single session of interval training or weightlifting, their blood contained higher levels of certain molecules, and those factors helped put the brakes on laboratory-grown breast cancer cells.

“Our work shows that exercise can directly influence cancer biology, suppressing tumor growth through powerful molecular signals,” said Robert Newton, the deputy director of the Exercise Medicine Research Institute at Edith Cowan University in Perth, Australia, and senior author of the new study.

His group's experiment adds to mounting evidence that exercise upends the risks of not only developing but also surviving cancer. Past research indicates that exercise helps some cancer survivors avoid recurrence of their disease. The new study offers an explanation of how, showing that exercise changes the inner workings of our muscles and cells, although more study is still needed.



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The study also offers clues about the specific types of exercise that may be most effective against malignancies and underscores just how potent a single session of exercise can be for health.

Exercise keeps cancer from returning

“We know from large, observational studies that breast cancer survivors who report higher levels of physical activity have lower rates of recurrence and better survival,” said Jessica Scott, the director of the Exercise-Oncology Program at Memorial Sloan Kettering Cancer Center in New York City. She researches and works with cancer patients to implement exercise programs, but wasn't involved in the new study.

The same is true for many other types of cancer. In a widely discussed study published in June in the New England Journal of Medicine, a large group of colon cancer survivors began a supervised exercise program that included frequent, fast-paced walking and other, more intense workouts. A second group didn't exercise. Three years later, the exercisers were 37 percent less likely to have experienced a cancer

recurrence than those who didn't work out, an outcome better than that seen with many preventive drugs, according to the study's authors.

But how can exercise protect against cancer coming back? Scientists know contracting muscles release a slew of hormones and biochemicals, known as myokines, into our bloodstreams and have long suspected these myokines fight cancer. In some past studies with mice and healthy people, blood drawn after exercise and added to live cancer cells killed or suppressed the cancer's growth.



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Which exercise works best?

But those studies rarely included patients who'd survived cancer, which matters, Newton said. "Survivors of breast cancer often have very different physiology" than people with no history of the disease, he said, because of the cancer itself, as well as treatments like chemotherapy and radiation.

It hasn't been altogether clear, in other words, whether cancer survivors benefit from exercise in the same ways as healthy people.

So, for the new study, Newton and his colleagues recruited women who'd finished treatment for breast cancer. None currently exercised but were medically cleared to start working out.

The researchers drew blood from everyone, then invited half of the women to try high-intensity interval training, in which they ran, rode or rowed (their choice) at a hard pace on gym machines for 30 seconds,

rested for 30 seconds, and repeated that sequence a total of seven times. With warm up and cooldown, the session lasted about 45 minutes and each woman's overall effort felt to her like at least a 7 or 8 on a scale from 1 to 10, Newton said.

The other women lifted weights for 45 minutes, also at a high intensity, so their effort, too, felt like at least a 7 on a 10-point scale.

Immediately after the sessions ended and again 30 minutes later, the researchers drew blood. Then they added plasma from that blood, as well as the blood drawn before the exercise (which served as a non-exercise comparison), to human breast cancer cells that were living and growing in high-tech petri dishes in the lab.

Interval training suppressed cancer cells

Things happened quickly from there. Drenched in plasma from either the interval trainers or the lifters, many cancer cells quit growing. Quite a few died. (The blood drawn before exercise had no effects.)

The cancer-fighting impacts were greatest with the blood drawn after interval training. Why? Additional testing showed this blood contained the highest concentrations of certain, beneficial myokines, especially IL-6, a protein that affects immune responses and inflammation. The more IL-6 in a woman's blood, the more that blood slowed or ended cancer growth. And interval training prompted the greatest increases in IL-6.

What these results mean, Newton said, is that "exercise doesn't just improve fitness and well-being" in people who've had cancer. "It also orchestrates a complex biological response that includes direct anticancer signals from muscles."

The benefits of intense exercise

The study's implications are broad. "I do think these findings may help explain the results of our study in colon cancer," said Kerry Courneya, a professor of physical activity and cancer at the University of Alberta in Edmonton, who led the colon cancer study. He was not involved in the new experiment.

Questions remain, of course. Can any type of exercise fight cancer? Newton and other researchers have doubts. The exercise in this study was strenuous, by design. "Earlier studies suggested that the stronger

the exercise stimulus, the greater the release of anticancer myokines,” Newton said.

Strolls or similarly gentle exertions might not be taxing enough. “It’s possible that light or moderate exercise may have some biological effects,” Courneya said, “but they would likely be muted compared to the higher-intensity exercise tested in this study.”

Even the weight training in this study was less potent than the intense intervals. But Newton believes weight training remains key to cancer fighting. “People with cancer who increase their muscle mass through resistance training also experience greater rises in circulating myokines,” he said. More muscle means more myokines.

But cancer and its treatments can be grueling. Will survivors be able to do hard workouts? Newton thinks so. The volunteers in his study “tolerated the exercise very well,” he said.

Memorial Sloan Kettering’s Scott agrees. “Our group, and others, have shown that tailored, progressive exercise training programs that include high-intensity interval training are both safe and beneficial” for breast cancer survivors.

Talk with your oncologist before starting to exercise if you’re a cancer survivor and look for local exercise programs at hospitals or community centers designed specifically for people dealing with cancer and its aftermath.

The good news is that working out can be an easy, inexpensive and accessible way to improve your health and also cut the risks of the cancer returning. “The key message” of the new study, Newton said, “is that exercise is not just a nice add-on to conventional therapies like chemotherapy or radiation. It’s increasingly being recognized as a first-line treatment in its own right for people with cancer.”

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