

Moderate exercise may make cancer treatments more effective, kinesiology finds

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Brad Behnke, associate professor of exercise physiology at Kansas State University, and collaborators have shown that moderate exercise on a regular basis may enhance tumor oxygenation and improve treatments in cancer patients. Credit: Kansas State University

Kansas State University kinesiology research offers encouraging

information for cancer patients: A brisk walk or a slow jog on a regular basis may be the key to improved cancer treatments.

Brad Behnke, associate professor of [exercise physiology](#), and collaborators have shown that [moderate exercise](#) on a regular basis enhances [tumor](#) oxygenation, which may improve treatments in cancer patients. Now Behnke is using a \$750,000 American Cancer Society grant to study moderate exercise as a way to make radiation treatments more effective, especially for difficult-to-treat tumors.

"If we can increase the efficacy of radiation treatment, then the patient's prognosis is enhanced," Behnke said. "An intervention like exercise has almost universally positive [side effects](#) versus other treatments that can have deleterious side effects. Exercise is a type of therapy that benefits multiple systems in the body, and may permanently alter the environment within the tumor."

The National Cancer Institute at the National Institutes of Health recommends exercise for cancer patients and cancer survivors, but little research shows what happens within the tumors during such exercise. That prompted Behnke to combine his expertise in integrative physiology with cancer research. He also has received support from the university's Johnson Cancer Research Center.

"I became interested in finding out what happens within the tumor during and after exercise as a means to enhance treatment outcomes," Behnke said.

For the latest research, Behnke is using prostate cancer tumor models to find ways to enhance oxygen delivery to tumors. When a tumor is hypoxic, or has low oxygen, it is often very aggressive, Behnke said. Because oxygen is a "radiosensitizer," it helps destroy cancer cells. As a result, low-oxygen tumors often are resistant to traditional cancer

therapies, such as radiation therapy, and interventions, such as concentrated oxygen breathing, are used to get more oxygen to the tumor before treatment.

"If we manipulate all the systems in the body—the lungs, the heart and the blood vessels—with exercise, we can take advantage of the dysfunctional vasculature in the tumor and enhance blood flow to the tumor," Behnke said. "The tumor becomes the path of least resistance for the elevated cardiac output of exercise, which results in a substantial increase in tumor oxygenation during and after exercise."

But the key is moderate exercise, said Behnke. Too little exercise may have no effect, but too much exercise may have a negative effect and may shut down blood flow to the tumor region or impair the immune system.

Moderate exercise is an activity that uses 30 to 60 percent of someone's aerobic capacity, Behnke said. The activity is nonstrenuous and is something that most people can perform, such as a brisk walk or a slow jog.

Research also has shown that moderate exercise can help [cancer patients](#) counteract some of the side effects of treatment—such as low blood count, fatigue, cachexia and lost muscle mass—which has led to many researchers labeling this as "aerobic exercise therapy" for patients with cancer, Behnke said.

"There really aren't any negative side effects of moderate-intensity exercise," Behnke said. "Exercise is often prescribed to improve the side effects of [cancer](#) and treatment, but what [exercise](#) is doing within the tumor itself is likely beneficial as well."

More information: Behnke and collaborators have published their

exercise and cancer research in the *Journal of the National Cancer Institute*: www.ncbi.nlm.nih.gov/pmc/articles/PMC3982888/

Provided by Kansas State University

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