Exercise may lead to faster prostate tumor growth

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Prostate tumors grew more quickly in mice who exercised than in those who did not, leading to speculation that exercise may increase blood flow to tumors, according to a new study by researchers in the Duke Comprehensive Cancer Center (DCCC) and the Duke Prostate Center.

“Our study showed that exercise led to significantly greater tumor growth than a more sedentary lifestyle did, in this mouse model,” said Lee Jones, Ph.D., a researcher in the DCCC and senior investigator on this study. “Our thought is that we may, in the future, be able to use this finding to design better drug delivery models to more effectively treat prostate cancer patients, and those with other types of cancer as well.”

The findings were presented in a poster session at the American Association for Cancer Research annual meeting on April 13 in San Diego, Calif. The study was funded by the United States Department of Defense, the Prostate Cancer Foundation and the American Urological Association Foundation, Rising Star in Urology Award, given to Stephen Freedland, one of the study’s investigators.

The researchers implanted prostate tumors subcutaneously in the flanks of 50 mice and then put half of the mice in cages with exercise wheels and half in cages with no wheels. All mice were fed the same diet. On average, the exercising mice ran more than half a mile each day.

“We found that among the mice that had the opportunity to voluntarily exercise, tumors grew approximately twice as fast as they did among the

mice that did not have the opportunity to exercise," Jones said.

Researchers and clinicians know that a challenge in delivering chemotherapy and radiation to tumors can be their poor blood flow, so these findings may hint at a way in which to improve blood flow to tumors, perhaps then allowing for better distribution of medicine, he said.

"We're wondering, can we combine exercise with treatments such as chemotherapy, hormone therapy or radiation, to maximize the results we achieve in prostate cancer patients," Jones said. "That question will be the subject of subsequent studies."

The researchers are currently conducting a validation study, in mice, in which tumors are injected directly into the prostate, thereby better simulating human prostate cancer, Jones said.

"Down the line, we will test this hypothesis in humans undergoing medical treatment for prostate cancer," he said.

The researchers want to caution men against interpreting these findings as an endorsement for not exercising for fear of getting or exacerbating cancer.

"These mice were not receiving treatment and we were allowing aggressive tumors to grow unchecked for the sake of the experiment," said study investigator Freedland, a urologist at Duke. "Patients would not find themselves in the same situation."

Concerns should also be overridden by the well-established benefits of exercise, including its positive effects on cardiovascular health, Type II diabetes, obesity, and many other chronic conditions, he said.

“This study gives us insight into which cellular pathways are affected by exercise, and starts to give us clues about how to harness the beneficial effects,” said Michael Potter, a medical student at Duke and lead investigator on the study. “Ultimately, we hope that this knowledge will help us use exercise to both deliver medicines more effectively and protect the body from the harmful side effects of treatment, as we already know it can.”

This is one of the first studies to look at the physiological effects of exercise on the tumor itself, rather than examining the quality-of-life or symptom-control effects of exercise in cancer patients, Jones said.

“The findings were a bit surprising, but provide a very important and exciting foundation upon which to build,” he said.

Source: Duke University