



Exercise Improves Blood Flow, Oxygen; Makes Chemotherapy Successful

Exercise is the key to make chemotherapy treatment more successful. Generally cancers grow resistant to treatment by generating a web of blood vessels that are so jumbled they fail to provide adequate oxygen to the tumor. Chemotherapy drugs and radiation are designed to seek out well-oxygenated tissue; and with oxygen starvation the tumor gains a sort of cloaking device that protects it from the toxic effects of the therapies. A study led by Duke Cancer Institute (DCI) has revealed that exercise may significantly improve blood flow to tumor sites, thus improving oxygen flow and making treatment with chemotherapy more successful.



The research team studied the impact of exercise in models of breast cancer in mice. They randomly assigned a group of mice who exercised, and another group who were sedentary. These mice were then exposed to chemotherapy.

Scientists found that exercise stimulated significant improvements in the number and function of blood vessels around the breast tumors, improving oxygen flow to the cancer site. Among the mice that exercised, tumor growth was significantly slower than growth in the sedentary mice, and tumor cell death was 1.5 times higher. The density of small blood vessels was approximately 60% higher in exercised mice compared to the controls, and oxygen transport improved, leading to less oxygen starvation of the cancer tissue. The vasculature in the breast tumors also looked and behaved more normally.

"We set about to see whether exercise would affect the tumor perfusion, and could not have guessed that it would be as effective as it was. We were truly amazed by these findings. I have spent the better part of the last 30 years trying to figure out how to eliminate hypoxia in tumors, and have looked at a lot of different approaches- drugs, hyperthermia and metabolic manipulations. None has worked very well, and in some

cases, made things worse. So these findings with exercise are quite encouraging," said co-senior author Mark W. Dewhirst, DVM, Ph.D, the Gustavo S. Montana Professor of Radiation Oncology and vice director for Basic Science at DCI.

The study is published in the 'Journal of the National Cancer Institute'.