Bankhead-Coley Cancer Research Program

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Applied Physiology
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2010 Program
New Investigator Research
(3-year project)

Project Title: Is Exercise Bad for the Tumor Microenvironment?

Project Summary: With any increase in energetic demand (e.g., walking up stairs, gardening, exercise) blood flow and oxygen delivery are directed toward compliant tissues, analogous to electricity following the path of least resistance. Exercise is commonly prescribed to cancer patients to combat muscle weakness and fatigue; however, little is known regarding the effect of exercise on tumor blood flow and oxidative capacity. This project is testing the global hypothesis that exercise augments tumor blood flow and oxidative capacity, and thus induces structural and functional alterations within the tumor. Specific Aims will investigate mechanisms of prostate tumor blood flow at rest, during acute and chronic exercise, as well as how exercise alters tumor oxygenation and mitochondrial function. These studies utilize an integrative approach, examining effects from the cell to the whole organism. Knowledge about the relationship of tumor growth and exercise is extremely important because: 1) It is likely that exercise may enhance the blood flow and density of blood vessels in tumors. 2) Exercise in combination with various tumor-targeting agents may represent a powerful therapeutic paradigm to combat tumor growth and metastasis. Therefore, the long-term goal is to utilize the research findings from this project to translational and, ultimately, therapeutic investigations within cancer patients.