Bankhead-Coley Cancer Research Program

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Pathology
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2009 Program
Technology Transfer/Commercialization Project
(1-year project)

Project Title: A Dedicated Flow Cytometer for Monitoring of Stem Cells

Project Summary: Stem cells serve as a renewable source of differentiated cells, which perform essential functions in the human body. Recent studies have revealed that besides normal stem cells, tumors of breast, prostate, and nervous system also have tumor stem cells that are a perpetual source for tumor growth. To identify and study normal and tumor stem cells, antibodies to a stem cell marker are labeled with a fluorescent dye, and laser flow cytometry is used to detect the presence of cells with a particular stem cell marker expression. Flow cytometers are expensive to purchase and maintain and are often located in a central core laboratory in most academic institutions. In this project, we seek to develop a dedicated, low-cost flow cytometer, using specific UV/Violet and blue solid-state lasers needed for analysis of normal and tumor stem cells. As the cost of solid-state lasers and other electronics hardware has significantly come down, we believe we can build a dedicated flow cytometer for stem cell work for less than $30,000. This unit will have automatic features for alignment, calibration, sample preparation and loading, data acquisition and analysis, and will reduce the cost of tumor stem cell research. The prototype flow cytometer will be tested at the University of Miami Medical School, and data collected will be compared with a commercial flow cytometer for its validity and reliability.