Bankhead-Coley Cancer Research Program

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Cancer Center
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2010 Program
Postdoctoral Research Fellowship
(3-year project)

Project Title: Novel Approach for Enhancing the Efficacy of Breast Cancer Chemotherapy by Vascular Normalization Effect of R-Ras

Project Summary: Chemotherapy is the most common treatment for breast cancer. However, the immature and abnormal nature of tumor blood vessels significantly impairs delivery of chemotherapeutic agents to the target tumor cells. Normalization of the tumor vasculature could enhance drug delivery and therefore improve the efficacy of chemotherapy treatments. A breast cancer drug called Avastin prevents the growth of tumor vessels that supply the tumor with nutrients that facilitate tumor growth. Clinical studies have shown an improved benefit for breast cancer patients when Avastin was used in combination with standard chemotherapy. This project's goal is to determine how important tumor vascular normalization is for the efficacy of chemotherapy. The cellular signaling protein called R-Ras promotes vessel normalization. Therefore, the first goal is to examine the role of R-Ras in breast cancer chemotherapy using R-Ras-deficient mice bearing human breast cancer. The second goal is to use a new genetic mouse model to up-regulate R-Ras expression in tumor vascular endothelial cells. This model will determine the vascular normalization effect of R-Ras and its synergistic effects with conventional chemotherapy. The results may open a possibility for a new treatment regimen to improve the efficacy of breast cancer chemotherapies.