

Project 5:

Dissecting the Cell Surface Proteome of Prostate Cancer

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**No human subjects or human subject materials involved
in this project.**

No Vertebrate animals will be used in this project.

DESCRIPTION: State the application's broad, long-term objectives and specific aims, making reference to the health relatedness of the project. Describe concisely the research design and methods for achieving these goals. Avoid summaries of past accomplishments and the use of the first person. This abstract is meant to serve as a succinct and accurate description of the proposed work when separated from the application. If the application is funded, this description, as is, will become public information. Therefore, do not include proprietary/confidential information. **DO NOT EXCEED THE SPACE PROVIDED.**

Prostate cancer is a major contributor to cancer related mortality in American men of all ages, causing the death of approximately 30,000 men each year. Prostate cancer frequently metastasizes to the bone and lymph nodes, resulting in mortality. No effective treatment for metastatic prostate cancer is available. The long-term objective of this project is to understand the role of cell surface proteins in prostate cancer metastasis. Cell surface proteins play vital roles in multiple steps of prostate cancer metastasis, such as detachment of tumor cells from the extracellular matrix, resistance of tumor cells to the detachment-induced apoptosis, adhesion of tumor cells to endothelial cells and angiogenesis to support tumor growth. The hypothesis of this project is that there are cell surface proteins either uniquely or differentially expressed in both epithelial and endothelial cells that are important for individual processes of prostate cancer metastasis. At present, no proteomic approaches are readily available to characterize the cell surface proteome. Specific Aim 1 is to develop innovative approaches to specially characterize cell surface proteomes using a combination of new methods targeting and labeling cell surface proteins and cutting-edge mass spectrometry technologies. A comprehensive understanding of the cell surface proteomes will be achieved by specific cell surface protein targeting and high accuracy protein identification and quantification. Specific Aim 2 is to use these proteomic approaches to identify uniquely or differentially expressed cell surface proteins in cancerous prostate epithelial cells by comparing them to normal prostate epithelial cells. Several considerations will be taken to select a limited number of proteins that will be the focus of functional studies. The selected cancer-associated proteins will be either suppressed or overexpressed using siRNA or transfection techniques respectively to determine their role in cell adhesion/detachment and apoptosis. Specific Aim 3 is to identify unique cell surface proteins in endothelial cells from bone marrow where prostate cancer metastasis frequently occurs. Several those unique endothelial cell surface proteins will be selected. Using the siRNA technique to suppress the expression of the selected proteins, we will focus on determining their functional roles in carcinoma-endothelial cell interaction and angiogenesis. The studies proposed herein will determine an array of cell surface proteins potentially involved in prostate cancer metastasis and open new avenues for therapeutic intervention of [the](#) advanced metastatic disease.

PERFORMANCE SITE(S) (*organization, city, state*)

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KEY PERSONNEL. See instructions. *Use continuation pages as needed* to provide the required information in the format shown below. Start with Principal Investigator. List all other key personnel in alphabetical order, last name first.

Name	Organization	Role on Project
Zhu, Haining	University of Kentucky	Principal Investigator
Lu, Xiaoning	University of Kentucky	Postdoctoral Fellow
Liu, Li	University of Kentucky	Technician

Disclosure Permission Statement. Applicable to SBIR/STTR Only. See instructions. Yes No