PROJECT TITLE (200 Characters max):
Evaluation of Global Gene Expression between Breast Cancer Stem Cells and Progenitors

HYPOTHESIS:
In silico evaluation of global genes from functional breast cancer stem cells and progenitors to identify at least three novel markers to predict treatment response

PROJECT DESCRIPTION (Include design, methodology, data collection, techniques, data analysis to be employed and evaluation and interpretation methodology)

We have isolated subsets of breast cancer cells, based on the stem cell gene Octamer 4 (Oct4). The Oct4 hi cancer cells were phenotypically and functionally stem cells. A hierarchy of breast cancer cells was developed based on the phenotype and functions. The significance of the data was tested with patient samples before and after treatment. The data clearly indicate that the stem cell fraction could predict treatment response. More importantly, in patients with negative lymph node the cancer stem cells were detected in the circulation. The phenotype of the Oct4 hi cells were different that the published markers (CD44/CD24).

Based on the above findings, we hypothesize that breast cancer stem cells are chemoresistant and can serve as an indication of chemoresistance in the blood.

To address the hypothesis, we have performed global gene studies between the Oct4 hi and Oct4 lo breast cancer cells and the results showed distinct genes. The results indicate at least 20 candidate genes that can define the different subtypes. The medical student, together with a doctoral student will perform further in silico studies with the data and validate the genes with cell lines and primary cells. Drs Bryan and Pliner will provide the blood. These studies are approved by the Institutional Review Board.

SPONSOR’S MOST RECENT PUBLICATIONS (last 3 years):

MANUSCRIPTS
Summer Student Research Program
Project Description


**REVIEWS:**


Summer Student Research Program
Project Description


SPONSOR’S PUBLICATIONS RELEVANT TO THIS RESEARCH:


IS THIS PROJECT SUPPORTED BY EXTRAMURAL FUNDS?
Yes ☒ or No ☐
(IF YES, PLEASE SUPPLY THE GRANTING AGENCY’S NAME)
Department of Defense

THIS PROJECT IS: ☐ Clinical ☒ Laboratory ☐ Behavioral ☐ Other

THIS PROJECT EMPLOYS RADIOISOTOPEs ☐

THIS PROJECT INVOLVES THE USE OF ANIMALS Yes ☐ or No ☒
(IF YES, PLEASE INDICATETHE STATUS)
PENDING ☒ APPROVED ☐ IACUC PROTOCOL #

THIS PROJECT INVOLVES THE USE OF HUMAN SUBJECTS Yes ☒ or No ☐
(IF YES, PLEASE INDICATETHE STATUS)
PENDING ☒ APPROVED ☒ IRB PROTOCOL # 0120100094

WHAT WILL THE STUDENT LEARN FROM THIS EXPERIENCE?
The student will learn to use database, perform real time RT-PCR, western blots and flow cytometry. More importantly, the student will learn how to analyze data to understand why the studies are
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SUGGESTED READINGS FOR THIS PROJECT:
The PI will provide the students with the website and password for the students to review slides and audio on stem cell biology. After this, the student will be provided with original articles to read and will be reviewed at lab meetings.