Dual roles of mesenchymal stem cells in T-cell responses to breast cancer cell subsets.

**HYPOTHESIS:**
Mesenchymal stem cells (MSCs) mediate regulatory T-cell (Tregs) responses in the presence of Oct4(+) breast cancer cells (T47D), and T helper 17 (Th17) responses in the presence of Oct4(-) breast cancer cells. Th17 propagate breast cancer growth whereas Tregs inhibit the growth of the breast cancer cells.

**PROJECT DESCRIPTION (Include design, methodology, data collection, techniques, data analysis to be employed and evaluation and interpretation methodology)**
Peripheral blood mononuclear cells will be cultures in gamma irradiated Oct4(+) or Oct4(-) breast cancer cells, in the presence or absence of MSCs. At day 5, culture media will be analyzed for the following cytokines: TGFβ1, IL-21, IL-17 and IL-1α. The cells will be studies by flow cytometry for Tregs or Th17 type. The role of Tregs and Th17 in the function of the breast cancer cells will be studied by studying cell proliferation in parallels where Tregs or Th17 cells are depleted.

**SPONSOR'S MOST RECENT PUBLICATIONS RELEVANT TO THIS RESEARCH:**

- Patel SA, Meyer J, Greco SJ, Corcoran KE, Bryan M, **Rameshwar P.** Mesenchymal stem cells protect breast cancer cells through regulatory T cells: Role of mesenchymal stem cell-derived TGF-β. (revised manuscript resubmitted to J Immunol).
Summer Student Research Program
Project Description

IS THIS PROJECT SUPPORTED BY EXTRAMURAL FUNDS?
Yes ☑ or No ☐
(IF YES, PLEASE SUPPLY THE GRANTING AGENCY'S NAME)

DOD and NJCC

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

THIS PROJECT EMPLOYS RADIOISOTOPES ☐

THIS PROJECT INVOLVES THE USE OF ANIMALS ☐

PENDING ☐  APPROVED ☑  IACUC PROTOCOL #

THIS PROJECT INVOLVES THE USE OF HUMAN SUBJECTS ☒

PENDING ☐  APPROVED ☑  IRB PROTOCOL #0119980163

WHAT WILL THE STUDENT LEARN FROM THIS EXPERIENCE?

- The student will learn to culture mesenchymal stem cells, learn basic immunology and to appreciate the differences between the various T-cell subsets. The student will be able to appreciate how basic science is translated to cancer treatment.

- In addition, the student will learn to analyze data, write and make presentations.