Summer Student Research Program
Project Description

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PROJECT TITLE (200 Characters max):

Effect of retinoic acid therapy on established post-surgical lymphedema

HYPOTHESIS:

G*iven the known pro-lymphangiogenic effects of retinoic acid in vitro and in vivo, we hypothesize that retinoic acid therapy will stimulate lymphatic regeneration and improve lymphedema in established murine models*

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

While it is known that administration of retinoic acid therapy at the time of lymphadenectomy and lymphatic injury stimulates lymphangiogenesis and mitigates the development of post-surgical lymphedema, it is not known if retinoic acids have any clinical effect on established lymphedema. To address this, we will induce lymphedema in mouse tails using established methods. When lymphedema is clinically established at post-operative days 35-42, tails will be grouped by clinical stage and initial tail volume and then randomized to 9-cis retinoic acid or vehicle control. Clinical assessment and tail volume will be collected every other day for 3 weeks. At the conclusion of the study, tail skin biopsies will be obtained for histological and molecular analyses.

SPONSOR'S MOST RECENT PUBLICATIONS RELEVANT TO THIS RESEARCH:

Sung C, Jiao W, Park SY, Cooper M, Bouz A, Choi D, Jung E, Kim G, Hong YK, Wong AK. Lymphatic endothelial cell RXRα is critical for 9-cis-retinoic acid-mediated lymphangiogenesis and prevention of secondary lymphedema. FASEB J. 2023 Jan;37(1):e22674. doi: 10.1096/fj.202200146RR. PMID: 36520015.

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

THIS PROJECT IS CANCER-RELATED ☐
Secondary lymphedema is a side effect of surgical lymph node removal that is part of the treatment of certain solid tumors that significantly impacts cancer survivors.

THIS PROJECT IS HEART, LUNG & BLOOD- RELATED ☐
Lymphedema results from the disruption of lymphatic peripheral circulation. Lymphatic vasculature is a component of the heart lung and blood system

THIS PROJECT INVOLVE RADIOISOTOPES? No ☐

THIS PROJECT INVOLVES THE USE OF ANIMALS ☐
PENDING ☐ **APPROVED** ☐ **IACUC PROTOCOL #**

THIS PROJECT INVOLVES THE USE OF HUMAN SUBJECTS? No ☐
PENDING ☐ **APPROVED** ☐ **IRB PROTOCOL # M**

THIS PROJECT IS SUITABLE FOR:

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MEDICAL STUDENTS ☐

THIS PROJECT IS WORK-STUDY: **Yes** ☐ **or** **No** ☐

THIS PROJECT WILL BE POSTED DURING ACADEMIC YEAR FOR INTERESTED VOLUNTEERS: **Yes** ☐ **or** **No** ☐

WHAT WILL THE STUDENT LEARN FROM THIS EXPERIENCE?

Mouse modeling of disease, surgical technique, histologic analysis, immunohistochemistry, RNA and protein expression analysis