

Summer Student Research Program  
Project Description

**FACULTY SPONSOR'S NAME AND DEGREE:** Sylvia Christakos, Ph.D.

**PHONE:** (973) 972 - 4033

**DEPARTMENT AND INTERNAL MAILING ADDRESS:** Microbiology, Biochem,  
Molecular Genetics Medical Science Bldg. E 669 (office) E 622 lab

**E-MAIL:** [christak@njms.rutgers.edu](mailto:christak@njms.rutgers.edu)

**PROJECT TITLE (200 Characters max):** Nutrigenomics of Intestinal Vitamin D Action

**HYPOTHESIS:** With advancing age resistance to vitamin D action (to stimulate intestinal calcium absorption, to suppress colonic inflammation and to suppress carcinogenesis) develops. The hypothesis is that age related intestinal resistance to vitamin D action is due to interference of vitamin D receptor access to vitamin D target genes.

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

mRNA will be prepared from different regions of the intestine from young (4 months old) and old (22 months old) mice treated with vehicle control or 1,25(OH)<sub>2</sub>D<sub>3</sub>. Changes in gene expression will be assessed by RNAseq and analyzed by Kallisto in collaboration with the molecular resource facility at NJMS.

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

Li et al Analysis of 1,25-dihydroxyvitamin D genomic action reveals calcium regulating and calcium independent effects in mouse intestine and human organoids *Mol and Cellular Biology* 41, 2021

Aita et al Genomic analysis of 1,25-dihydroxyvitamin D action in mouse intestine reveals compartment and segment specific gene regulatory effects. *J. of Biol Chem* 298, 102213 , 2022

**IS THIS PROJECT SUPPORTED BY EXTRAMURAL FUNDS?**

Yes  or No

*(IF YES, PLEASE SUPPLY THE GRANTING AGENCY'S NAME)*

**NIH**

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

**THIS PROJECT IS CANCER-RELATED**

Please explain Cancer relevance: This project will serve as a foundation for developing strategies to improve intestinal vitamin D action especially in older populations at risk for developing diseases like osteoporosis as well as colon cancer

**THIS PROJECT IS HEART, LUNG & BLOOD- RELATED**

Please explain Heart, Lung, Blood relevance

**THIS PROJECT EMPLOYS RADIOISOTOPES**

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THIS PROJECT INVOLVES THE USE OF ANIMALS

PENDING

APPROVED

IACUC PROTOCOL #999901084

THIS PROJECT INVOLVES THE USE OF HUMAN SUBJECTS

PENDING

APPROVED

IRB PROTOCOL # M

THIS PROJECT IS SUITABLE FOR:

UNDERGRADUATE STUDENTS

ENTERING FRESHMAN

SOPHOMORES

ALL STUDENTS

THIS PROJECT IS WORK-STUDY:  Yes  or  No

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

This project is suitable for Medical students

WHAT WILL THE STUDENT LEARN FROM THIS EXPERIENCE?

Using state of the art genomic tools the students will begin to examine mechanisms related to how vitamin D mediates the control of key biological pathways in the intestine and how they are altered with age.