

Summer Student Research Program

Project Description

FACULTY SPONSOR'S NAME AND DEGREE: *Pranela Rameshwar, PhD*

PHONE: (973) 972 - 0625

DEPARTMENT AND INTERNAL MAILING ADDRESS: *Medicine, E-579*

E-MAIL:*rameshwa@umdnj.edu*

PROJECT TITLE (200 Characters max):

Role of Notch signaling in pluripotency of mesenchymal stem cells

HYPOTHESIS:

Oct 4 regulates Notch1 to maintain pluripotency of mesenchymal stem cells

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

Notch 1 has been detected in mesenchymal stem cells (MSCs). Despite its expression, the role in maintaining pluripotency is unclear. However, Notch has been reported to prevent differentiation of MSCs to osteoblasts. This study hypothesizes that the transcription factor, OCT4 positively regulates Notch 1, which in turn interacts with other cells.

Due to the short time in the lab, the student can only address part of the hypothesis. To this end, the student will be asked to perform western blots for OCT4 and Notch1 in with extracts from human MSCs. He or she will knockdown OCT4 and determine if Notch 1 expression is decreased with concomitant differentiation of the stem cells. The latter will be determined by lack of the MSCs to differentiate along various lineages.

All reagents are available in the lab. The PI will supervise the student.

SPONSOR'S MOST RECENT PUBLICATIONS RELEVANT TO THIS RESEARCH:

Greco SJ, Liu K, Rameshwar P. (2007) Functional similarities among genes regulated by OCT4 in human mesenchymal and embryonic stem cells. *Stem Cells* 25:3143-54.

IS THIS PROJECT SUPPORTED BY EXTRAMURAL FUNDS?

Yes or No

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

FM Kirby Foundation

THIS PROJECT IS: Clinical Laboratory Behavioral
Other

THIS PROJECT IS CANCER-RELATED

Please explain Cancer relevance

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**

THIS PROJECT INVOLVES THE USE OF HUMAN SUBJECTS
PENDING **APPROVED** **IRB PROTOCOL #0120030071**

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

WHAT WILL THE STUDENT LEARN FROM THIS EXPERIENCE?

The student will learn to design experiments; interpret data; troubleshoot techniques; read journal articles