'396' Undergraduate Research Project Application Form

Version: 200603

Office for Undergraduate Research in Science
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INSTRUCTIONS FOR STUDENTS

- **All fields are required, unless indicated otherwise.**
- Download and print this form. Complete Section C and sign.
- See "How students can apply" instructions in Section B.
- Your supervisor or department will tell you if you are selected for this project. If so, you will receive a code to register for a '396' course on MINERVA.

SECTION A: SUPERVISOR INFORMATION

Name: Dr. Phil Gold
Dr. Arnold Kristof

Email: arnold.kristof@mcgill.ca

Phone: 514-934-1934 #35251

Website:

Supervisor's Department or Unit: Physiology

Course Number: PHGY396

SECTION B: PROJECT INFORMATION

Term: Fall 2006-2007

Project start & end dates: September 11th - December 8th 2006

Project title: The Molecular Regulation of STAT1 in Lung Epithelial Cells

Project description: By regulating the innate and adaptive immune responses, interferon-gamma (IFN) is required for the efficient clearance of viral and bacterial infections of the lung. As major participants in lung inflammation and repair, lung epithelial cells respond to IFN by synthesizing inflammatory mediators, and undergoing cellular apoptosis. We study the molecular regulation of 'signal transducer and activator of transcription-1' (STAT1), a transcription factor required for the induction of apoptosis genes in lung epithelial cells exposed to IFN. We recently identified a distinct protein complex containing STAT1 and two kinases: mammalian target of rapamycin (mTOR) and protein kinase Cδ (PKCδ). The mechanisms by which this complex assembles and regulates epithelial cell fate are potential therapeutic targets, but are unknown. We hypothesize that the phosphorylation status of STAT1 determines its physical interaction with mTOR and PKCδ. Using chromatographic techniques and immunoprecipitation, we partially purified and characterized the mTOR/STAT1 complex in epithelial cell cytosolic and nuclear fractions. By Western blot analysis of these preparations using site-specific antibodies, the student will investigate the phosphorylation (activity) status of protein in the mTOR/STAT1 complex from cells incubated without or with IFN. If time permits, the mTOR/STAT1 interaction will be assessed by immunoprecipitation of lysates from cells engineered to express STAT1 phosphorylation site mutants. We expect to gain a better understanding of the molecular events required for assembly, trafficking, and activity of specific STAT1-containing complexes.

Prerequisites: 1 term completed at McGill + CGPA ≥ 3.0; or permission of instructor.

Grading scheme: 50% final report, 50% lab work

Other:

Status: Mark with an x. This project is…
[ ] Open to applicants
[ ] Already taken; no more positions available this term
[x] Taken, but contact me for other possible projects this term

Ethics, safety, and training: Which of the following, if any, is involved? Mark with an x.
[ ] Animal subjects
[ ] Human subjects
[ ] Biohazardous substances
[ ] Radioactive materials
[x] Handling chemicals
[ ] Using lasers

For undergraduate students, ethics and safety compliance is the supervisor's responsibility.

How students can apply: Contact me by email. (This project is taken; contact me for other possible projects this term.)

SECTION C: STUDENT INFORMATION. (1) PRINT LEGIBLY AND SIGN. (2) SEE "HOW STUDENTS CAN APPLY" IN SECTION B.

Name:

McGill ID:

Email: @mail.mcgill.ca

Phone:

Program: (e.g., B.Sc. Maj. Chem. Minor Biology)

Level (circle one): U0 / U1 / U2 / U3

I have not applied for another 396 course in this term.

Student signature:

Date:

SECTION D: APPROVALS. (1) PRINT NAMES & SIGN. (2) NOTIFY OFFICE FOR UNDERGRADUATE RESEARCH IN SCIENCE. (3) GIVE STUDENT CODE TO REGISTER FOR COURSE ON MINERVA.

Supervisor:

Date:

Unit Chair, Director, or designate - I certify that this project conforms to departmental requirements for 396 courses.

Date: