Mechanisms Regulating Gene Expression and Cell Signaling

Start: Thursday January 12, 2017, 1:30 - 4:30 pm  
Last: Thursday February 16, 2017, 1:30 - 4:30 pm.

Building: International and Graduate Affairs Building (IGAB); Room 1N05

This course will review the basics of gene expression and cell signaling focusing on understanding the mechanisms of regulating gene expression, the diversity of cell surface receptors that dictate cellular responses, mechanisms differentially regulating proliferation vs differentiation, the diversity of post-translational modifications and how they alter protein localization and/or function within cells and differential mechanisms of regulating and/or inducing cell death. The signaling perspectives will primarily focus on neuronal development and cancer.

Outline

Session 1. Receptors and the Basics of Cell Signaling
1. Review a diversity of receptor structures
2. Understand the mechanism of kinase activation
3. Review the diversity of protein binding domains and the specificity of their interactions

Session 2. Mechanisms Regulating Proliferation vs Differentiation
1. Examine/Understand the Differential Signaling Mechanisms that the Trk receptor, originally identified as a tumor causing gene outside the nervous system, actually supports nerve growth factor dependent mitotic arrest and differentiation inside the nervous system.

Session 3. Methylation, Acetylation, Epigenetics, miRNAs and Cell Signaling
1. Review the Basics of Gene Expression
2. What is Epigenetics; how is this regulated and how does this impact on gene expression
3. Review the basics of how methylation and acetylation alters both changes in gene expression, protein function and cell signaling
4. What are miRNAs and how do they regulate changes in gene expression and/or cell signaling.

1. Review the Basics of Cell Survival
2. Review Cell Death Mechanisms: Apoptosis, Autophagy and Macropinocytosis

Sessions 5 and 6. Student presentations

Evaluation

40% Group presentation. Comprised of 15% from group peers and 25% from SM to the group. 
Groups will be established by the instructor. Topics will be at the discretion of the group, chosen from a list of topics provided by the instructor.

40% 2 page write-up summarizing the findings from the group presentation, done individually. This report should be submitted by email as a PDF to smeakin@uwo.ca no later than 4pm Monday February 20th. A penalty of 4 grade points (from the 40) will be deducted per day for late assignments.

20% participation. Class attendance will not alone be satisfactory to gain full participation marks; however, failure to attend a class will result in an automatic deduction of 6 grade points per missed class.
Statement on Academic Offences

The statement: “Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf

All required papers may be subject to submission for textual similarity review to the commercial plagiarism-detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (http://www.turnitin.com).

Plagiarism: Students must write their essays and assignments in their own words. Whenever students take an idea or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar).

As part of a successful graduate student experience at Western, we encourage students to make their health and wellness a priority. Western provides several on campus health-related services to help you achieve optimum health and engage in healthy living while pursuing your graduate degree. For example, to support physical activity, all students, as part of their registration, receive membership in Western’s Campus Recreation Centre. Numerous cultural events are offered throughout the year. Please check out the Faculty of Music web page http://www.music.uwo.ca/, and our own McIntosh Gallery http://www.mcintoshgallery.ca/. Information regarding health-and wellness-related services available to students may be found at http://www.health.uwo.ca/

Students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in, such as their faculty supervisor, their program director (graduate chair), or other relevant administrators in their unit. Campus mental health resources may be found at http://www.health.uwo.ca/mental_health/resources.html

To help you learn more about mental health, Western has developed an interactive mental health learning module, found here: http://www.health.uwo.ca/mental_health/module.html. This module is 30 minutes in length and provides participants with a basic understanding of mental health issues and of available campus and community resources. Topics include stress, anxiety, depression, suicide and eating disorders. After successful completion of the module, participants receive a certificate confirming their participation.

Helpful Resources @ Western for Graduate Students

Writing Support Centre http://www.sdc.uwo.ca/writing/  SDC’s Learning Skills Services, Rm 4100
WSS, www.sdc.uwo.ca/learning

LS counsellors are ready to help you improve your learning skills. We offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling. The Student Success Centre: http://success.uwo.ca/