

Molecular Genetics Graduate Topic Course

Course Title: Viral Pathogenesis

Course Location:

Course Time and Date: Friday 10 am to noon March 17 to April 28 2023

Course Instructor(s): Alan Cochrane, James Rini

Instructor Contact Information (email): alan.cochrane@utoronto.ca, james.rini@utoronto.ca

Additional Lecturers (list name, email, Department):

Course Overview:

Given recent studies documenting the wide range of viruses, both bacterial and mammalian, found in the human microbiome, the question arises as to why some viral infections induce pathologies while others do not. This course will examine the mechanisms underpinning the pathogenesis of a number of viruses, with emphasis on the role played by viral factors and the host response to infection.

Course Objectives:

- Provide an introduction into the concept of the virome and the mechanisms by which viruses can positively or negatively influence the health of the host.
- Examine specific mechanisms for virus induced cell killing.
- Explore mechanisms by which viruses adapt to the host to reduce pathology/manipulate the host immune response.
- Examine the role of the immune response upon viral infection and the positive/negative effects on the host.
- Examine strategies to harness viral pathogenesis for the treatment of cancer and other diseases.

Marking Scheme:

- 30% - presentation of background to the week's papers including a description of the virus (lifecycle and importance as pathogen, key questions in the field and those being addressed by the paper). (10-15 min, assigned one week in advance).
- 30% - presentation of figures from selected papers (presenters to be chosen at random).
- 40% - 2 written assignments (2 pages in length) describing experiments that would extend/confirm the work described in the papers presented. (0.5 page summary of paper findings, 1.5 pages future directions, not including references, single spaced, 2 cm margins, 12 point font) to be assigned in week 3 and week 6.

If you anticipate missing a class you must let the instructors know in advance, given the weight on participation and the fact that there are only six classes. Providing that you had a legitimate reason for missing the class, your grade will reflect your participation in the other classes.

The basic outline for what will be covered in the six weeks is below. Assigned reading will be sent out one week in advance.

Week 1: Introduction to viral pathogenesis

Week 2: Mechanisms of direct/indirect cell killing by viruses

Week 3: Virus evolution and adaptation to the host (attenuation)

Week 4: Role of the immune response in pathogenesis

Week 5: Virus manipulation of host immune responses (innate/adaptive)

Week 6: Use of viral pathogenesis as a therapeutic (i.e. oncolytic viruses).