

Course Code: MMG1309H

Course Title: Virus-Host Interactions

Course Location: to be determined

Course Time and Date: Thursdays 2-4 PM, March 3 – April 7 inclusive

Course Instructor(s): Martha Brown

Instructor Contact Information (email): martha.brown@utoronto.ca

Additional Lecturers (list name, email, Department): none

Course Overview:

This course will consider new developments in understanding the ways in which viruses and viral proteins interact with host cells to generate thousands of progeny virus particles from a single infected cell. This version of the course is for students who already have a background in virology (eg an undergrad or grad course). The first class will comprise an interactive review of virus replication with particular attention to release of progeny virions and entry into the next host cell. Subsequent classes will consist of student presentations of selected papers from the literature, along with class discussion. Papers for presentation will be distributed a week in advance of the presentation. Assessment is based on presentation of one or more papers (depending on class size), participation in class discussion and a written assignment.

This version of the course will focus on an aspect of virology that currently is attracting a lot of interest, specifically, the release of non-enveloped viruses. In contrast to what the textbooks say, it's not just that viruses get out when the host cells disintegrate but there is now substantial evidence that several non-enveloped viruses are released in vesicles before the cell disintegrates. Specific topics likely to be covered include the following: release of poliovirus, rotavirus and norovirus in vesicles from different sources, the role of autophagy in virus release, how progeny virions can benefit from autophagy but are diverted away from the degradative autophagy pathway, transmission of viruses in vesicles not only in cell culture but between animal (and probably human) hosts, proviral and antiviral effects of vesicles produced by infected cells for communication with other target cells.

Course Objectives:

- To explore the recent literature that draws attention to vesicles for transport of newly-made virions between cells within one host and even between hosts
- To explore how release of virions in vesicles affects entry of those virions into the next host cell
- To consider the role of vesicles for communication between infected cells and their uninfected neighbours.

Marking Scheme:

- Presentation 30 %
- Participation/discussion 20%
- Take-home exam 50%
(questions distributed in last class; papers due two weeks later)

If you anticipate missing a class you must let the instructor know in advance. You will still be responsible for the material covered in that class.

The basic outline for what will be covered in the six weeks is below:

Week 1: Overview of poliovirus replication and early studies in release (March 3)

Week 2: Release of poliovirus and other picornaviruses (March 10)

Week 3: How picornaviruses avoid degradative autophagy (March 17)

Week 4: Release of rota- and noroviruses; transmission of virus between hosts (March 24)

Week 5: Vesicles for cell-cell communication (March 31)

Week 6: Proviral and antiviral effects of vesicles produced by infected cells (April 7)