

# IMM2041H – Techniques in Immunology

## OUTLINE:

**Lab Location:** MSB 2284

**Class Time:** Winter 2018

**Professor:** Dr. Jennifer Gommerman

**Lecturer:** Dr. Olga Rojas

**Office Hours:** The lecturer will have office hours

**Contact:** The lecturer

## DESCRIPTION:

The course aims to build knowledge in common analytical techniques used in immunology: chiefly, immunohistology and flow cytometry. It will teach how to stain tissue samples using immunofluorescence and immunohistochemistry, as well analyze single cell suspensions via flow cytometry. Additionally, methods in proper image/data quantification/analysis will be taught. The course will also cover the various applications of these techniques and will include lectures, tutorials and practicum sessions.

Using lectures, tutorials and practicum laboratory sessions the course will cover:

**Immunohistology** - historical uses of immunohistochemistry, how it complements other techniques, tissue preparation, fixation and processing and staining techniques. These practical topics will be combined with theory on the architecture of different immune tissues (spleen, lymph node, small intestine), as well as inflamed/diseased tissues (kidneys, spinal cord).

**Flow cytometry** - state-of-the-art innovations in cytometry; advanced modeling methods of acquired data; and applications in cell biology, biotechnology, immunology, cell signaling, fluorescent protein analysis, bead-based assays and cell sorting.

## SPECIFIC LECTURE TOPICS:

- Lecture 1 Introduction to Immunohistochemistry*
- Lecture 2 Techniques in Immunohistochemistry to assess lymphoid tissue architecture and diseased/inflamed CNS*
- Lecture 3 Multicolour Flow Cytometry Designing Experiments and Data Analysis*
- Lecture 4 Other applications for Flow Cytometry*
- Lecture 5 Mass Cytometry (CyTOF)*

## **SPECIFIC PRACTICUMS / LABORATORY SESSIONS:**

*Practicum 1 Cutting frozen tissue*

*Practicum 2 Staining of frozen sections*

*Practicum 3 Cutting paraffin embedded tissues*

*Practicum 4 Immunostaining paraffin embedded spinal cords to assess disease pathology*

*Practicum 5 Multicolour Flow Cytometry – cell cycle analysis*

*Practicum 6 Multicolour Flow Cytometry – cytometric bead arrays*

## **EVALUATION**

The final grade for the course will be the better of:

60% assignments + 40% final exam OR

60% final exam + 40% assignments

## **LAB REPORTS**

Lab reports must consist of

- An introduction explaining the concept that will be tested with references/citations where appropriate
- A faithful narrative of the methods applied with all relevant details.
- A results section describing the data that were produced
- A discussion section describing interpretation of results and any unexpected findings/technical problems.

Lab reports will be graded with the following rubric

Clarity and organization of report	25%
Quality of data	30%
Interpretation of data	30%
Grammar/Writing quality	15%

## **FINAL EXAM**

The final exam will test the student's theoretical and practical knowledge of the course in short answer and multiple choice format.