

## Advanced Topics in Immunology CMMB/MDSC 567

### Instructors:

Course Coordinator

Derek McKay ([dmckay@ucalgary.ca](mailto:dmckay@ucalgary.ca))

Course Instructors

Kamala Patel ([kpatel@ucalgary.ca](mailto:kpatel@ucalgary.ca))

Matheus Batista Heitor Carneiro ([matheus.batistaheito@ucalgary.ca](mailto:matheus.batistaheito@ucalgary.ca) )

Shan Liao ([liao@ucalgary.ca](mailto:liao@ucalgary.ca))

Pierre-Yves von der Weid ([vonderwe@ucalgary.ca](mailto:vonderwe@ucalgary.ca) )

Robert Newton ([rnewton@ucalgary.ca](mailto:rnewton@ucalgary.ca) )

### Office Hours/Policy on Answering Student Emails

Queries addressed *ad hoc* as they arise (no specified office hours). Please note that all course communications must occur through your @ucalgary.ca email, and we will aim respond to emails within 48 hours.

### Time and Location:

Winter Semester

Tuesdays and Thursdays

3:30-4:45

HSC G743

Course lectures will be delivered in-person classes with the caveat that this may change and have to revert to online delivery should provincial or University guidelines mandate this. Should this be the situation, students will be given as much advance notice as possible about the arrangements for course delivery and evaluation.

### Prerequisite/Co-Requisite:

Introductory Immunology (CMMB 527 or MDSC 321)

### Course Description:

This is an advanced course catering to students with an interest in immunology, and those with research interests. The material presented builds on the foundation of basic immunological principles that students will have obtained in CMMB 527/MDSC 321 or an equivalent course. The course is modular and can change/rotate annually. This year instruction is provided by five experts in immunology under the main topics of:

- (1) innate immunity and immune cell trafficking;
- (2) structure and function of the lymphatic system;
- (3) Inflammation and therapeutics in the airways;

#### (4) immunoparasitology

### **Overarching Theme**

To blend didactic and interactive teaching approaches to delivery up-to-date knowledge (i.e. from the primary research literature) on advanced in immunology.

### **Global Objectives**

This course is designed for motivated students who can work well independently and in groups, with the central goal of illuminating current immunological concepts as they relate to homeostasis, infection and disease. Students are introduced to one or more teaching styles (lectures, small group discussions and problem-based learning) and, similarly, a variety of evaluation tools are employed (in class tests, in class participation, form presentations, critique of the scientific literature, composition of a critical essay). The student will gain a much fuller understanding of the complexity of immunology – signals, cell-cell communication, coordinated responses, immunopathological mechanism, interaction of the immune system with other systems in the body – and how this advances our knowledge of the organism and health and disease.

### **Course Learning Outcomes**

By the end of this course, students will be able to:

- Better critique the scientific literature
- Apply problem-based learning to a biomedical question and as a learning tool
- Understand the complexity of immune cells recruitment and trafficking
- Appreciate the active role that lymphatic vessels play in the control of homeostasis and disease
- Understand steroid intracellular signaling and gene regulation as they relate to airway inflammation
- Appreciate the complexity of host-parasite interactions and the impact on host immunity

### **Transferable Skill Development:**

Transferable skills are core skills for your success in building your future career.

The work that you will do in this course will help you build the following transferable skills:

- **Collaboration:** Work respectfully with others from different backgrounds, cultures, and countries.
- **Verbal Communication:** Learn and share information by presenting, listening, and interacting with others.
- **Creativity and Innovation:** Find different and better ways to do things, being curious, thinking imaginatively.
- **Critical Thinking:** Actively and skillfully conceptualize, apply, analyze, synthesize, and/or evaluate information (data, facts, observable phenomena, and research findings) to make a reasoned judgement or draw a reasonable conclusion.

- **Information Literacy:** Find, understand, and use information presented through words, symbols, and images
- **Problem solving:** Identify an issue, find and implement a solution, and assess whether the situation has improved.
- **Written Communication:** Share ideas and information by using words, images, and symbols.

### **Learning Resources**

None

### **Recommended Textbooks/Readings**

None

### **A Note regarding readings**

Individual lecturers may opt to provide essential reading in advance of class. If so, students will be notified that said material will be uploaded to D2L within a reasonable time to read the material prior to class.

### **Learning Technology Requirements**

Brightspace (by D2L) is located on the University of Calgary server and will be used extensively for communication with students. **It is the student's responsibility to ensure that they receive all posted communications and documents and that they receive emails sent by instructors or fellow students through D2L.**

Only your @ucalgary.ca email address may be linked to D2L. Please ensure that you are regularly checking your @ucalgary.ca account.

### **Evaluation**

The University policy on grading and related matters is described in section F of the 2022-2023 Calendar.

In determining the overall grade in the course, the following weights will be used:

- Dr. McKay: 25% (2-4 page insightful report (17%): in class test (8%))  
 Drs. Liao & Von der Weid: 25% (in class test (12%), written critique (8%), in class participation (5%))  
 Dr. Patel: 25% (written critiques (15%), class participation (10%))  
 Dr. Newton: 25% (Essay (20%), in class participation (5%))

Each instructor will provide individual instruction on the assessment criteria for their module at the being of the first class of their module.

***There will not be a Registrar-scheduled final examination.***

## A Note regarding Writing Assignments:

Writing skills are important to academic study in all disciplines. In keeping with the University of Calgary's emphasis on the importance of academic writing in student assignments (section E.2 of 2022-23 Calendar), writing is emphasized, and the grading thereof in determining a student's mark in this course. The Bachelor of Health Sciences values excellence in writing. Competence in writing entails skills in crafting logical, clear, coherent, non-redundant sentences, paragraphs, and broader arguments, as well as skills with the mechanics of writing (grammar, spelling, punctuation). Sources used in research papers must be properly documented. The University of Calgary offers instructional services through the Students' Success Centre's Writing Support Services (<http://www.ucalgary.ca/writingsupport/>) for students seeking feedback on assignments or seeking to improve their general writing skills. Students are **strongly encouraged** to take advantage of these programs.

## Grading Scheme:

| Letter Grade | Description                          | Percentage |
|--------------|--------------------------------------|------------|
| A+           | Outstanding performance              | 96-100     |
| A            | Excellent performance                | 90-95.99   |
| A-           | Approaching excellent performance    | 85-89      |
| B+           | Exceeding good performance           | 80-84      |
| B            | Good performance                     | 75-79      |
| B-           | Approaching good performance         | 70-74      |
| C+           | Exceeding satisfactory performance   | 65-69      |
| C            | Satisfactory performance             | 60-64      |
| C-           | Approaching satisfactory performance | 57-59      |
| D+           | Marginal pass                        | 54-56      |
| D            | Minimal pass                         | 50-53      |
| F            | Did not meet course requirements     | 0-49       |

## Missed Components of Term Work:

At each instructor's discretion, late assignments will not be accepted and will automatically receive a mark of zero, or students will lose 5% per day late past the deadline for all assignments. In this case, assignments will NOT be accepted more than 72 hours after the posted deadline and students failing to submit any assignment within this time frame will receive a mark of zero. Only very exceptional circumstances will be considered for assignments submitted after the 72h deadline

It is the agreement of all Faculty involved in MDSC 567 that extensions will NOT normally be granted on any assignment. The only exceptions to this, are those in keeping with the University Calendar (illness, religious conviction, or severe domestic affliction) that are received in writing and with supporting documentation. Please be advised that students should notify the instructor before the assignment deadline to discuss. Please note that while absences are permitted for religious reasons, students are responsible for providing advance notice and adhering to other

guidelines on this matter, as outlined in the University Calendar (<https://www.ucalgary.ca/pubs/calendar/current/e-4.html>).

### **Course Evaluations and Student Feedback**

Student feedback will be sought at the end of the course through the Universal Student Rating of Instruction (USRI) and a qualitative student evaluation. Students are welcome to discuss the process and content of the course at any time with the instructor. Students may also address any concerns they may have with Dr. Ebba Kurz, Associate Dean (Undergraduate Health and Science Education) in the Cumming School of Medicine ([kurz@ucalgary.ca](mailto:kurz@ucalgary.ca)).

### **Attendance**

Full attendance is expected and any absence should be communicated to Dr. McKay (the course coordinator) and the individual lecturer of the missed session.

### **Conduct During Lectures**

The classroom should be respected as a safe place to share ideas without judgement - a community in which we can all learn from one another. Students are expected to frame their comments and questions to lecturers in respectful and appropriate language, always maintaining sensitivity towards the topic. Students, employees, and academic staff are also expected to demonstrate behaviour in class that promotes and maintains a positive and productive learning environment.

As members of the University community, students, employees and academic staff are expected to demonstrate conduct that is consistent with the University of Calgary Calendar, the Code of Conduct and Non-Academic Misconduct policy and procedures, which can be found at <https://www.ucalgary.ca/legal-services/university-policies-procedures>.

**Students are expected to take notes during class and should not rely solely on material supplied by the instructors.**

### **Use of Internet and Electronic Communication Devices in Class**

The Bachelor of Health Sciences program aims to create a supportive and respectful learning environment for all students. The use of laptop and mobile devices is acceptable when used in a manner appropriate to the course and classroom activities. However, research studies have found that inappropriate/off-topic use of electronic devices in the classroom negatively affects the learning of others during class time.

Students are responsible for being aware of the University's Internet and email use policy, which can be found at <https://www.ucalgary.ca/policies/files/policies/electronic-communications-policy.pdf>.

## **UNIVERSITY OF CALGARY POLICIES AND SUPPORTS**

## Copyright

All students are required to reach the University of Calgary policy on Acceptable Use of Material Protected by Copyright (<https://www.ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright-policy.pdf>) and requirements of the Copyright Act (<https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html>) to ensure they are aware of the consequences of unauthorized sharing of course materials (including instructor notes, electronic versions of textbooks, etc.). Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy <https://www.ucalgary.ca/pubs/calendar/current/k.html>.

## Instructor Intellectual Property

Course materials created by instructors (including course outlines, presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the instructor. These materials may **NOT** be reproduced, redistributed or copied without the explicit consent of the professor. **The posting of course materials to third-party websites such as note-sharing sites without permission is prohibited.** Sharing of extracts of these course materials with other students enrolled in the course **at the same time** may be allowed under fair dealing.

## Academic Accommodations

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The Student Accommodations policy is available at <https://ucalgary.ca/student-services/access/prospective-students/academic-accommodations>. Students needing an accommodation based on disability or medical concerns should contact Student Accessibility Services (SAS) in accordance with the Procedure for Accommodations for Students with Disabilities (<https://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities.pdf>). SAS will process the request and issue letters of accommodations to instructors. For additional information on support services and accommodations for students with disabilities, visit [www.ucalgary.ca/access/](http://www.ucalgary.ca/access/).

Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to Dr. Ebba Kurz, Associate Dean (Undergraduate Health and Science Education) ([kurz@ucalgary.ca](mailto:kurz@ucalgary.ca)).

## Academic Misconduct

The University of Calgary is committed to the highest standards of academic integrity and honesty. The University of Calgary has created rules to govern all its members regarding the creation of knowledge and the demonstration of knowledge having been learned.

Academic Misconduct refers to student behaviour that compromises proper assessment of a student's academic activities and includes (but is not limited to): cheating, fabrication, falsification, plagiarism, unauthorized assistance, failure to comply with an instructor's expectations regarding conduct required of students completing academic assessments in their courses, and failure to comply with exam regulations applied by the Registrar. **It also includes**

**using of third-party websites/services to access past/current course material, essay/assignment writing services, or real-time assistance in completing assessments, seeking answers to assessment questions and similar, whether paid, bartered or unpaid.**

For information of the Student Academic Misconduct Policy and Procedures, please visit;  
<https://ucalgary.ca/policies/files/policies/student-academic-misconduct-policy.pdf>  
<https://ucalgary.ca/policies/files/policies/student-academic-misconduct-procedure.pdf>

Additional information is available on the Academic Integrity website at:  
<https://ucalgary.ca/student-services/student-success/learning/academic-integrity>.

### **Recording of Lectures**

Audio or video recording of lectures (or similar) is **prohibited** except where explicit permission has been received from the instructor or it is an approved accommodation.

### **Freedom of Information and Protection of Privacy Act**

Student information will be collected in accordance with typical (or usual) classroom practice. Students' assignments will be accessible only by the authorized course faculty. Private information related to the individual student is treated with the utmost regard by the faculty at the University of Calgary

### **Appeals**

If there is a concern with the course, academic matter or a grade, first communicate with the instructor. If these concerns cannot be resolved, students can proceed with an academic appeal, as per Section I of the University Calendar. Students must follow the official reappraisal/appeal process and may contact the Student Ombuds' Office (<http://www.ucalgary.ca/ombuds>) for assistance with this and with any other academic concerns, including academic and non-academic misconduct. Students should be aware that concerns about graded term work may only be initiated **within 10 business days** of first being notified of the grade. <https://www.ucalgary.ca/pubs/calendar/current/i-2.html>

### **Sexual and Gender-Based Violence Policy**

The University recognizes that all members of the University Community should be able to learn, work, teach and live in an environment where they are free from harassment, discrimination, and violence. The University of Calgary's sexual and gender-based violence policy guides us in how we respond to incidents of sexual and gender-based violence, including supports available to those who have experienced or witnessed sexual or gender-based violence, or those who are alleged to have committed sexual or gender-based violence. It provides clear response procedures and timelines, defines complex concepts, and addresses incidents that occur off-campus in certain circumstances. Please see the policy available at <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Sexual-and-Gender-Based-Violence-Policy.pdf>.

### **Resources for Support of Student Learning, Success, Safety and Wellness**

Student Success Centre <http://www.ucalgary.ca/ssc/>

Student Wellness Centre <http://www.ucalgary.ca/wellnesscentre/>  
Student Advocacy and Wellness Hub (CSM students only)  
<https://cumming.ucalgary.ca/student-advocacy-wellness-hub/home>  
Distress Centre <http://www.distresscentre.com/>  
Library Resources <http://library.ucalgary.ca>

### **Wellness and Mental Health Resources**

The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the excellent mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (<https://www.ucalgary.ca/wellnesscentre/services/mental-health-services>) and the Campus Mental Health Strategy (<http://www.ucalgary.ca/mentalhealth/>).

### **Student Ombuds' Office**

The Student Ombuds' Office supports and provides a safe, neutral space for students. For more information, please visit [www.ucalgary.ca/ombuds/](http://www.ucalgary.ca/ombuds/) or email [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca)

### **BHSc Student Faculty Liaison Committee (SFLC)**

The BHSc SFLC, with elected representatives from all majors, serves to raise issues of interest to BHSc students to the program administration, including items pertaining to curriculum, scheduling and events. A list of current representatives can be found on the BHSc website.

### **Student Union (SU) Information**

The SU Vice-President Academic can be reached at (403) 220-3911 or [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca); the SU representatives for the Cumming School of Medicine can be reached at [medrep1@su.ucalgary.ca](mailto:medrep1@su.ucalgary.ca) or [medrep2@su.ucalgary.ca](mailto:medrep2@su.ucalgary.ca).

### **Student Success Centre**

The Student Success Centre provides services and programs to ensure students can make the most of their time at the University of Calgary. Our advisors, learning support staff, and writing support staff assist students in enhancing their skills and achieving their academic goals. They provide tailored learning support and advising programs, as well as one-on-one services, free of charge to all undergraduate and graduate students. For more information visit: <https://www.ucalgary.ca/student-services/student-success>

### **Emergency Evacuation/Assembly Points**

As part of the University of Calgary Emergency Evacuation plan, students, faculty, and staff should locate the closest Assembly Point in case of Fire Alarm. Safety signage is posted throughout the campus showing the locations and the possible route to these locations. All students, faculty, and staff are expected to promptly make their way to the nearest Assembly Point if the Fire Alarm is activated. No one is to return into campus facilities until an all clear is



given to the warden in charge of the Assembly Area. For more information, see <https://www.ucalgary.ca/emergencyplan/building-evacuation/assembly-points>

### **Safewalk**

Campus security will escort individuals, day or night, anywhere on campus (including McMahon Stadium, Health Sciences Centre, Student Family Housing, the Alberta Children's Hospital and the University LRT station). Call 403-220-5333 or visit <http://www.ucalgary.ca/security/safewalk>. Use any campus phone, emergency phone or the yellow phone located at most parking lot pay booths. Please ensure your personal safety by taking advantage of this service.

### **Class Schedule**

As detailed in the accompanying excel sheet.

| WINTER 2023   |         |              |   |                                       |
|---|---------|--------------|---|---------------------------------------|
| <b>MDSC (CMMB) 567: Advanced Topics In Immunology [Tuesday and Thursday 15:30-16:45] [Room: HSC - G743]</b> |         |              |   |                                       |
| Date  | Session | Presentation | Lecturer  | Evaluation (due dates to be provided) |
| 10th Jan  | Tues    | 1            | Course introduction and overview  | D. McKay                              |
| <b>INNATE IMMUNITY and CELL RECRUITMENT</b>   |         |              |   |                                       |
| 12th Jan  | Thurs   | 2            | Hallmark features of inflammation   | K. Patel                              |
| 17th Jan  | Tues    | 3            | Recruitment of leukocytes   | K. Patel                              |
| 19th Jan  | Thurs   | 4            | Cytokines and chemokines  | K. Patel                              |
| 24th Jan  | Tues    | 5            | Lipid mediators of inflammation   | K. Patel                              |
| 26th Jan  | Thurs   | 6            | Systemic inflammation and COVID-19  | K. Patel                              |
| 31st Jan  | Tues    | 7            | Discussion and debate (topic to be determined)  | K. Patel                              |
| <b>LYMPH NODE STRUCTURE, MUCOSA ASSOCIATED IMMUNE CELLS AND LYMPHATICS</b>                                  |         |              |   |                                       |
| 2nd Feb   | Thurs   | 8            | introduction to the lymphatic system  | S. Liao/P-Y von der Weid              |
| 7th Feb   | Tues    | 9            | lymphatic vessel and lymph node development   | S. Liao/P-Y von der Weid              |
| 9th Feb   | Thurs   | 10           | lymphatic and immune regulation   | S. Liao/P-Y von der Weid              |
| 14th Feb  | Tues    | 11           | paper discussion/debate   | S. Liao/P-Y von der Weid              |
| 16th Feb  | Thurs   | 12           | paper discussion/debate   | S. Liao/P-Y von der Weid              |
| 22nd Feb  | Tues    |              | Winter term break - no class  |                                       |
| 24th Feb  | Thurs   |              | Winter term break - no class  |                                       |
| 28th Feb  | Tues    | 13           | in-class test   | S. Liao/P-Y von der Weid              |
| <b>AIRWAYS INFLAMMATION</b>   |         |              |   |                                       |
| 2nd Mar   | Thurs   | 14           | Introduction to the lungs and airways and immunology in asthma  | R. Newton                             |
| 7th Mar   | Tues    | 15           | Molecular immunology and asthma therapeutics  | R. Newton                             |
| 9th Mar   | Thurs   | 16           | Start mechanisms of glucocorticoid action   | R. Newton                             |
| 14th Mar  | Tues    | 17           | Mechanisms of glucocorticoid action + student presentations   | R. Newton                             |
| 16th Mar  | Thurs   | 18           | Student presentations: journal club and discussion  | R. Newton                             |
| 21st Mar  | Tues    | 19           | Student presentations: journal club and discussion  | R. Newton                             |
| <b>IMMUNOPARASITOLOGY</b>   |         |              |   |                                       |
| 23rd Mar  | Thurs   | 20           | Parasitic burden - immune response to helminth worm parasites   | D. McKay                              |
| 28th Mar  | Tues    | 21           | Host-helminth interaction in the mammalian intestinal tract   | D. McKay                              |
| 30st Mar  | Thurs   | 22           | Immune response to infection with protozoan parasites   | T. Allain                             |
| 4th April   | Tues    | 23           | Giardia: a model organism to study the immunoparasitology of enteric protozoan parasites  | T. Allain                             |
| 6th April   | Thurs   | 24           | The worms fight back (promoting immunosuppression) (in class test)  | D. McKay                              |
| 11th April  | Tues    | 25           | Understanding host-parasite interactions to combat auto-inflammatory disease<br>Assignment due - 5PM April 11th (last day of class) | D. McKay                              |

**Written critiques (15%)**  
**Participation (10%)**  
*\* For these six sessions, slides and lecture notes will be posted to 2DL*

**In class test (12%); participation during discussion (5%); written critiques (8%)**

**presentation and participation (5%); essay 20%**

**5 page critique on topic to be determined (17%); assignment is a self-directed essay not based on in-class material; short answer test (8%)**