

**BIOL 515/MDSC 515 (Winter 2022)**  
**Cellular Mechanisms of Disease**

**Instructors:**

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**Visiting Lecturers:**

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Dr. Martin Hyrcza <a href="mailto:Martin.Hyrcza@albertaprecisionlabs.ca">Martin.Hyrcza@albertaprecisionlabs.ca</a>		Dr. Jessica Boyd <a href="mailto:Jessica.Boyd@albertaprecisionlabs.ca">Jessica.Boyd@albertaprecisionlabs.ca</a>

**Office Hours/Policy on Answering Student Emails**

Office hours will be held on an as-needed basis, either in person (in Dr. Mahé's office: Foothills Medical Clinic, McCaig Tower, 7<sup>th</sup> Floor, Room 7523) or by ZOOM; these should be prearranged via Dr. Mahe's admin assistant (see below). Dr. Mahé will endeavor to respond to emails within 24 hours of receipt. It is important to recognize, however, that Dr. Mahé is a practising physician; as such, occasional reply delays owing to clinical priorities may occur. Students are encouraged to cc Dr. Mahé's administrative assistant on all emails (see below).

**Assistants:**

Ms. Liz McGovern (administrative assistant to Dr. Mahé)  
[Elizabeth.mcgovern@albertapubliclabs.ca](mailto:Elizabeth.mcgovern@albertapubliclabs.ca)  
Office: 403-944-1566

**Time and Location:**

The course is scheduled for MW 15:30 - 16:45 in HSC G500.

If it is necessary to deliver the course remotely (owing to the ongoing COVID-19 pandemic), lectures may be presented through the ZOOM function of D2L. As required, lectures will be delivered either live, or through pre-recorded video, at the same time as the scheduled in-person lectures. Dr. Mahé (and potentially the visiting speaker) will be available (briefly) before and after the online presentation to field questions.

**Prerequisite/Co-Requisite:**

Biochemistry 341 or 393; and Biology 331 or Medical Science 351.

**Course Description:**

The cellular and molecular mechanisms underlying basic human disease processes and how these can be influenced by lifestyle and environmental factors. The ways in which this knowledge can be used in the laboratory diagnosis of disease.

**Overarching Theme**

The course format consists of 25 didactic lectures provided by specialist physicians and clinical scientists, expert in the subject matter. The course is designed to cover the various mechanisms of disease and provide pathophysiological explanations for how diseases manifest, their environmental and genetic causes, the clinical consequences, and with some discussion about treatments if applicable. The course is designed to draw together numerous concepts in cell biology and physiology to help learners better understand the consequences of pathology in humans.

**Global Objectives**

To understand the basic general pathology of human diseases at organ, tissue, cell, and molecular levels, with a focus on the cellular basis of disease.

**Course Learning Outcomes**

By the end of this course, students will be able to understand the general principles of pathology of inflammation, neoplasia, immunology and related disorders, genetic disorders, infectious diseases, hematologic disorders and transplantation, gastrointestinal disease, cutaneous disorders, women's and men's health topics, neurological and musculoskeletal disorders, disorders of neonates, infancy and childhood, and others. The course opens with sessions relating to evidence and scientific discourse, as well as refresher topics related to basic cellular biology and metabolism.

**Learning Resources****Required Textbooks**

None required

**Recommended Textbooks/Readings**

STRONGLY RECOMMENDED (available through the University of Calgary Bookstore):

Robbins And Cotran Pathologic Basis Of Disease 10E, Kumar, et al. Elsevier. ISBN: 9780323531139

***Electronic versions (or comparable editions) of this textbook are available through the University of Calgary Library.***

Recommended readings for course sections may be added to the lecture video files and will be posted as links on D2L. Students are encouraged to review the D2L content section to preview recommended

readings BEFORE each lecture.

Students should be aware that many of the readings they will be assigned may be of an unfamiliar nature and style. Students should allot sufficient time to allow for several reads of the assigned material.

### **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 2021-2022 Calendar.

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

- **Weekly exercises: 60% (5% for each of 12 exercises)**
- **Writing Assignments:**
  - **Critical Appraisal Exercise: 10%**
  - **Scientific Study Proposal Exercise: 10%**
- **Registrar-scheduled final exam: 20%**

The final exam is CUMULATIVE in scope and is entirely multiple-choice.

### **Weekly Exercises:**

The weekly exercises will be held through the D2L quiz feature. D2L will allow students to do the exercises at any point during the timeframe allotment, but once started, each student will have a limit of 30 minutes to complete the exercise. These will consist of 2 to 4 questions.

Exercise questions are designed to be challenging and require short written responses. The general topic areas of the exercises will relate to those speaker topics presented during the previous week, and these are not meant to be cumulative. However, students may need to apply critical thinking skills and careful thought in generating their responses, potentially using external (e.g., online or other) resources. This approach is meant to assess at how well students are able to apply knowledge obtained from the weekly speaker topics to potentially challenging scenarios. Since each exercise is relatively low-stakes, students should see these as opportunities to further explore the topics of the week.

### **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 2021-22 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.

General Guidelines FOR EACH ASSIGNMENT:

1. **Writing assignments must be submitted through the D2L dropbox. Assignments sent directly to the instructor/coordinator, admin assistant or any of the speakers will be ignored.**
2. Evaluation rubrics for each writing assignment will be posted to D2L in advance, along with any other materials required for the specific assignment.
3. Length must NOT EXCEED 2 pages single-spaced (no less than 1.0 spacing) at size no smaller than 11pt Times New Roman font with 0.5-inch margins.
4. Cover pages ARE REQUIRED and do not count toward the page limit.
5. An appropriate title is REQUIRED.
6. Student name/number MUST BE INCLUDED at the top right of each page of text.
7. Graphs/Figures/Charts: These are optional and may be used to enhance the written content of the work. Graphs/Figures/Charts should not be used to replace, or as a substitute to, written content; students are expected to fully explain complex topics without the need for Graphs/Figures/Charts. Graphs/Figures/Charts DO NOT COUNT toward the page limit.
8. Sources/references: Primary sources such as journal articles are preferred, ideally those that are peer-reviewed. Secondary sources such as textbooks, review papers, internet sources, newspaper or magazines articles and others are less desirable. The bibliography DOES NOT COUNT toward the page limit.
9. All sources must be properly cited according to the APA manual of style, as outlined by the Effective Writing Program at The U of C: <https://www.ucalgary.ca/ssc/resources/writing-support/436>
10. Documents should be uploaded to D2L in pdf format.

*Critical Appraisal Exercise:*

This exercise aims to address students' abilities to critically appraise a piece of scientific literature. For this exercise, a series of several journal articles will be provided to students (through D2L). **Students must select one of the articles provided**, read, and evaluate the contents of the article, and provide a structured assessment of the article's thesis, its manner of exposition and its validity. Students will be provided with a marking rubric.

*Scientific Study Proposal Exercise:*

This exercise aims to address students' abilities to pose a scientifically valid and assessable question, to design an appropriate experimental protocol to address the question, and to demonstrate an understanding of what would be construed as appropriate evidence to answer the question. Given the content of the course, this exercise should be focused on clinically relevant questions; this includes basic science areas that have clinical motivation or applicability. Students will be provided with a marking rubric.

**Grading Scheme:**

Letter Grade	Description	Percentage
A+	Outstanding performance	96-100
A	Excellent performance	90-95

<b>A-</b>	Approaching excellent performance	85-89
<b>B+</b>	Exceeding good performance	80-84
<b>B</b>	Good performance	75-79
<b>B-</b>	Approaching good performance	70-74
<b>C+</b>	Exceeding satisfactory performance	65-69
<b>C</b>	Satisfactory performance	60-64
<b>C-</b>	Approaching satisfactory performance	57-59
<b>D+</b>	Marginal pass	54-56
<b>D</b>	Minimal pass	50-53
<b>F</b>	Did not meet course requirements	0-49

### **Missed Components of Term Work:**

Late submission of assignments is strongly discouraged. Students will lose 5% of the assignment total value for every day of delay in submission (one day of delay will be considered to have passed one minute after the deadline for submission to D2L). Students who miss taking a quiz or who do not take the final exam will receive a mark of zero for that item.

Exceptions relating to course work requirements and standards outlined herein can only be made in rare circumstances, as for example through a prescribed student accommodation plan (see below). This plan must be adhered to and should be provided to the instructor (and home programme) in advance. Other exceptions may be made in accordance with the University Calendar and Policies (e.g., illness, religious conviction, or domestic affliction) that are received in writing. It is considered proper comportment that the instructor be notified in advance of any anticipated exceptions or delays.

### **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**

Regular attendance (including for online lecture delivery, if required due to COVID-19 restrictions) is highly encouraged, although an attendance portion of the final grade in the course does not apply.

### **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 encouraged 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 (In-Class) Lectures**

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

In the event that lecture delivery need to move to on-line (owing, for example, to COVID-19 restrictions), lectures will be recorded and posted to D2L. Any such recordings are to be used for student study and review, and are not to be shared, reproduced or transmitted.

### **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 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 violence policy guides us in how we respond to incidents of sexual violence, including supports available to those who have experienced or witnessed sexual violence, or those who are alleged to have committed sexual 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/policies/files/policies/sexual-violence-policy.pdf>

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

Student Success Centre	<a href="http://www.ucalgary.ca/ssc/">http://www.ucalgary.ca/ssc/</a>
Student Wellness Centre	<a href="http://www.ucalgary.ca/wellnesscentre/">http://www.ucalgary.ca/wellnesscentre/</a>
Distress Centre	<a href="http://www.distresscentre.com/">http://www.distresscentre.com/</a>
Library Resources	<a href="http://library.ucalgary.ca">http://library.ucalgary.ca</a>

### **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 [suwpaca@ucalgary.ca](mailto:suwpaca@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

Date	Time	Topic	Speaker	Assignments, Critical Thinking Exercises & Exams	Marks/Weight
January 10, 2022	1530-1645	Introduction & Scientific Evidence Topics 1	Mahe		
January 12, 2022	1530-1645	Scientific Evidence Topics 2	Mahe	<i>Critical Appraisal Assignment Instructions</i>	
January 17, 2022	1530-1645	Cell Biology 1: Structure & Function	Wang	<i>D2L Critical Thinking Exercise 1: EBM Topics</i>	5
January 19, 2022	1530-1645	Cell Biology 2: Cell Cycle & Metabolism	Prokopyshin		
January 24, 2022	1530-1645	Genetics 1: Basic Molecular Biology & Methods	Box	<i>D2L Critical Thinking Exercise 2: Cell Biology</i>	5
January 26, 2022	1530-1645	Genetics 2: Structural Genomics & Methods	Argiropoulos		
January 31, 2022	1530-1645	Inflammation	Sidhu	<i>D2L Critical Thinking Exercise 3: Genetics</i>	5
February 2, 2022	1530-1645	Autoimmune Diseases	Shameli		
February 7, 2022	1530-1645	Microorganisms & Infection	Berenger	<i>D2L Critical Thinking Exercise 4: Inflammation &amp; Autoimmune Disease</i>	5
February 9, 2022	1530-1645	Antimicrobial science	Drost		
February 14, 2022	1530-1645	Cardiovascular disease	Bromley	<i>D2L Critical Thinking Exercise 5: Microorganisms &amp; Infection</i>	5
February 16, 2022	1530-1645	Respiratory disease	Kelly	<i>Critical Appraisal Assignment Due &amp; Study Proposal Assignment Instructions</i>	10
February 28, 2022	1530-1645	Gastrointestinal topics	Koro	<i>D2L Critical Thinking Exercise 6: Cardiac &amp; Respiratory</i>	5
March 2, 2022	1530-1645	Cutaneous Disease & Related Topics	Brenn		
March 7, 2022	1530-1645	Women's Health Topics	Cota	<i>D2L Critical Thinking Exercise 9: GI and Skin Topics</i>	5

March 9, 2022	1530-1645	Men's Health Topics	Siadat		
March 14, 2022	1530-1645	Blood & Bleeding	Mansoor	<i>D2L Critical Thinking Exercise 8: Women &amp; Men Health Topics</i>	5
March 16, 2022	1530-1645	Hematological Disease	Mahe		
March 21, 2022	1530-1645	Infancy, Childhood and Young Adulthood 1 - non-neoplastic disease	Brundler	<i>D2L Critical Thinking Exercise 7: Hematology</i>	5
March 23, 2022	1530-1645	Infancy, Childhood and Young Adulthood 2 - Neoplasia	Nohr		
March 28, 2022	1530-1645	Musculoskeletal Topics	Matyas	<i>D2L Critical Thinking Exercise 10: Infancy, Childhood and Young Adulthood</i>	5
March 30, 2022	1530-1645	CNS Topics	Ng		
April 4, 2022	1530-1645	Role of Autopsy & Forensics	Bromley	<i>D2L Critical Thinking Exercise 11: MSK &amp; CNS</i>	5
April 6, 2022	1530-1645	Toxicology & Drugs of Abuse	Boyd		
April 11, 2022	1530-1645	Head & Neck Topics	Hycza	<i>D2L Critical Thinking Exercise 12: Toxicology &amp; Autopsy/Forensics &amp; Study Proposal Assignment Due</i>	10+5
TBA				REGISTRAR SCHEDULED FINAL EXAM	20