

**MDSC/BIOL 503**  
**Pharmacology of Organ Systems**

**Instructors:**

Dr. Quentin Pittman (Coordinator)	<a href="mailto:pittman@ucalgary.ca">pittman@ucalgary.ca</a> (403 978-7383)
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Dr. Drew Neyens	<a href="mailto:drewmackenzie.neyens@ucalgary.ca">drewmackenzie.neyens@ucalgary.ca</a>

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

Office hours are available by appointment.

Email communications with the course coordinator are welcome. Please email with MDSC / BIOL 503 in the subject line of the message. All efforts will be made to respond to emails received during working hours within 48 hours (excluding weekends and statutory holidays).

Please note that all course communications must occur through your @ucalgary email.
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**Time and Location:**

Monday 10<sup>th</sup> January – Monday April 11<sup>th</sup> (Term break: week of Feb 20<sup>th</sup>).

Classes take place Mondays and Wednesdays 5:00pm-6:20pm in HSC G500

**Classes are in person, subject to university policy concerning mandatory on-line instruction**

Teaching will be synchronous to encourage discussion and student engagement.

**Prerequisite/Co-Requisite:**

Open to students having successfully completed MDSC 501/BIOL 501; OR with consent of the course coordinator (Dr. Quentin Pittman [pittman@ucalgary.ca](mailto:pittman@ucalgary.ca))

**Course Description:**

Through analysis and discussion of research literature, this course explores topics in pharmacology including the nervous, cardiovascular, and gastrointestinal systems.

**Overarching Theme**

To build on the basic principles of pharmacology introduced in MDSC / BIOL 501, specific emphasis will be based on the analysis, interpretation and critique of select research topics in pharmacology. This advanced modular course will cover several areas of pharmacological research, from historical to modern investigation, concerning novel drug targets, mechanisms of action and / or therapeutic approaches. The course is designed for senior under-graduate or junior graduate students in the biomedical /biological / biochemical sciences. Course content will be delivered through a series of lectures and topics involving Journal Club-style presentations, debate and critical discussion of research papers in the field. Participants should be motivated, enthusiastic, questioning, critical and conversant senior undergraduates or junior graduate students who are prepared to discuss basic science and clinical research papers with different topic leads selected for their expertise.

## Global Objectives

- To facilitate development of critical and analytical skills in selected topics in pharmacology
- To create and develop an interactive, supportive, and inclusive learning environment

## Course Learning Outcomes

This course expects that an interactive environment for learning will be established to facilitate the ability to analyse, critically appraise and discuss scientific papers, as well as the popular over the counter 'natural' treatments and where appropriate integrating old and new concepts. This will be accomplished through active, class discussion based on lectures, journal club style presentations, debates, short written papers (e.g. news & views article, critical paper reviews) plus discussion and questions from the audience.

By the end of MDSC / BIOL 503 students will be able to:

1. develop communication skills by leading journal club style presentations, debate, and discussion of scientific / clinical research papers
2. appraise, critically analyze, and discuss basic and clinical research papers
3. assess appropriateness of scientific methods and models in selected research papers
4. engage concepts from lectures and readings to integrate old and new ideas in pharmacology to guide future avenues of study
5. advance skills in the presentation (written and oral) of complex material for a broad audience
6. Critically evaluate natural product claims

## Learning Resources

Access to D2L and library resources will be required.

## Recommended Textbooks/Readings

There is no assigned textbook for this course. All readings / links to readings will be posted on D2L. Access to library resources will be required.

## A Note regarding readings

A list of required readings will be outlined on D2L and links and documents will be made available, where possible. Required readings have been chosen carefully to inform you and enhance the lecture material. **Students are REQUIRED to complete assigned readings BEFORE each class.** Instructors will proceed in class on the assumption that students have read completely the assigned readings. 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:

Description	% grade	Due Date	LOs
New and Views (500 words max)	20%	Jan 26 <sup>th</sup> before class	2, 5
Debate- proponent/respondent	20%	Variable – assigned times To be held in class	All
Term paper	20%	End of term	All
Written analysis of claims for a natural pharmaceutical product	20%	Due 7 days after assigned presentation	All
Written Review of an unpublished research paper	20%	Mar 28 before class	All

Rubrics for each component will be provided on D2L.

### Assignments:

The purpose of the course assignments is to demonstrate that the students have developed oral and written presentation skills. Through the completion of these assignments, the students will demonstrate their appreciation of the literature and critical skills and ability to integrate and synthesize knowledge. The lay summaries will provide an opportunity to write for a general audience, whilst the written critique articles and paper reviews will provide a more in-depth critical appraisal. The term papers will provide the students with the opportunity to consider contemporary issues in pharmacology. Finally, the oral presentations will help the students develop presentation skills (making clear slides, giving a cohesive talk in defined time).

**Lay Summary:** All students will write a 1-page lay summary (500 words maximum) (on the paper presented by course coordinator on January 27<sup>th</sup>). Due before class Jan 27<sup>th</sup>

**Debater Presentation:** Each student will present in a debate focused on an alternative/complimentary medicine. One student will be a proponent and the other a respondent/critic. Topics/dates will be assigned in discussion with the course coordinator during the first two weeks of class.

**Written critique of claims for a natural pharmaceutical product:** Each student will present a written analysis of the claims (for and against) for the product of their debate.

**Paper Review:** Each student will provide a written review of an unpublished research paper (available on D2L)

**Term paper:** A limited choice of hot topics in today's world of drugs/treatments will be provided and a paper will be written analyzing the topic.

**Participation:** All students will be engaged and participate in classroom discussions, including ad hoc questions as they arise. Please be advised that the instructor will call on individuals to provide answers/commentary etc.

Any presentation slides and papers to be submitted on D2L dropbox.

There is no final exam for this course.

### 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.

### Grading Scheme:

Letter Grade	Description	Percentage
A+	Outstanding performance	96-100
A	Excellent performance	90-95
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/Late Components of Term Work:

Students are permitted one 24 h penalty-free extension to a deadline for written material over the entire course. The course coordinator should be informed 24 h in advance of your intent to take advantage of this option. **At the Course Coordinator's discretion, subsequent late assignments will incur a 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. **Exceptions to this policy may be granted on a case-by-case basis.**

**Extensions will NOT be granted** on any assessed components. The only exceptions to this are those in keeping with the University Calendar (debilitating illness, religious conviction, or severe domestic affliction) that are received in writing and with supporting documentation. Traffic jams and late or full buses are common events in Calgary and are NOT acceptable reasons for late arrivals to class, meetings and examinations. 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**

Attendance is encouraged at all timetabled sessions. Please let the course coordinator know in advance if you are unable to attend due to illness or other extenuating circumstance. Please note that topics will be discussed in class to a degree of detail not necessarily available on a power point presentation.

## **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 necessary for the online portions of the course and is acceptable for in person classes 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 read 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>

## **MEDIA RECORDING**

### **Media recording for self-assessment of teaching practices**

The instructor may use media recordings as a tool for self-assessment of their teaching practices. Although the recording device will be fixed on the instructor, it is possible that student participation in the course may be inadvertently captured. These recordings will be used for instructor self-assessment only and will not be used for any other purpose.

## **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	<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 [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**

The following is a list of topics for class, associated readings, and assignment due dates. Please note that unforeseen circumstances may cause changes to the schedule with respect to the timing of topics and readings. Students will be notified of all changes in a timely manner by way of email and D2L announcements.

All course class activities are synchronous, on the dates below from 5:00 – 6:20pm. Note that Jan 10-26 classes are online, with the remainder in person.

Please see next page for schedule and overview of course topics.

**Class Schedule (tentative)** The following is a list of topics for class. Please note that unforeseen circumstances may cause changes to the schedule with respect to the timing of topics and readings. Students will be notified of all changes in a timely manner by way of email and D2L announcements. Except for Jan10-26, all other course class activities are in person, on the dates below from 5:00 – 6:20pm in room G500 HSc.

Date	Topics	Instructor	Assignments & Due Dates
Jan 10, M	General introduction to the course Presentation tips	Pittman	
Jan 12, W	News and Views – format and examples	Pittman	News and Views- Assignment of papers
Jan 17, M	Scientific Integrity	Pittman	
Jan 19, W	Drug Discovery	Pittman	
Jan 24, M	Unique drug targets- case in point- the CNS	Pittman	
Jan 26, W	Junk pharmacology, complementary medicine, the good the bad and the ugly-	Pittman	<b>News and Views due at beginning of class (5PM)</b>
Jan 31 M	Orientation- sample debate	Pittman	<b>Debate selections available</b>
<b>Topic and student presentation schedule - Dates below</b>			
<b>Feb 2 W</b>	<b>TOPIC 1 Pain</b>	<b>Dr Kwok</b>	<b>Topic Overview</b>
Feb 7, M	Debate 1	Kwok/Pittman	Student & class
Feb 9, W	Debate 2	Kwok/Pittman	Student & class
<b>Feb 14 M</b>	<b>TOPIC 2 Gastrointestinal</b>	<b>Dr Flannigan</b>	<b>Topic Overview</b>
Feb 16 W	Debate 3	Flannigan/Pittman	Student & class
Feb 21-23	<i>No Class – Reading Week</i>		
Feb 28, M	Debate 4	Flannigan/Pittman	Student & class
<b>Mar 2 W</b>	<b>TOPIC 3 Learning and Memory</b>	<b>Dr. Batabyal</b>	<b>Topic Overview</b>
Mar 7, M	Debate 5	Batabyal/Pittman	Student & class
Mar 9, W	Debate 6	Batabyal/Pittman	Student & class
<b>Mar 14, M</b>	<b>How to review a paper -</b>	<b>Dr Pittman</b>	<b>Topic Overview Assignment of papers for review</b>
<b>Mar 16 W</b>	<b>Topic 4 The brain as a target organ-peptide therapy for socialization/anxiety</b>	<b>Dr Pittman</b>	<b>Topic Overview</b>
Mar 21, M	Debate 7	Pittman	Student & class
Mar 23, W	Debate 8	Pittman	Student & class
<b>Mar 28, M</b>	<b>TOPIC 5 – Obesity</b>	<b>Dr Neyens</b>	<b>Topic Overview Critical review due beginning of class</b>
Mar 30, W	Debate 9	Neyens/Pittman	Student & class
Apr 4, M	Debate 10	Neyens/Pittman	Student & class
Apr 6, W	Debate 11	Dr Pittman	Student & class
Apr 11, M	Class wrap up / alternate debate date	Pittman	<b>Term paper due</b>

**Note: Depending upon enrollment, student participation assignments may have to be slightly re-scheduled**

**Topic 1 (Kwok)**

**Pain – new analgesic targets**

Pain medicine is of paramount importance for global health and wellness management. In this journal club we explore the science behind identifying new analgesic targets. Discussion will centre around understanding the mechanisms of pain and comorbidities (stress and sleep disruption), repurposing approved drugs as pain therapies, and using multidisciplinary approaches for novel drug development.

**Topic 2 (Flannigan)**

**Therapy Focused on Our Gut Microbes: Fecal Microbiota Transplantation**

Our understanding of the microbiota and its influence in a number of different diseases has rapidly expanded in recent years and with this new knowledge has come a number of therapeutic strategies targeting the microbiota. One such therapeutic strategy gaining momentum is Fecal Microbiota Transplantation (FMT). We will explore the evidence for this therapy in a number of different diseases and determine if this new approach holds any promise.

**Topic 3 (Batabyal)**

**Pharmacological modulation of learning and memory**

There is a never ending search for mechanisms and drugs to either enhance memory or to abolish it when it is detrimental to health ( eg PTSD). This topic will review some of the underlying mechanisms for learning and memory and discuss some of the pharmacological approaches to modulation of memory.

**Topic 4 (Pittman)**

**Peptide Therapy**

Review the data on involvement of neurohypophysial peptides ( oxytocin and vasopressin) in the social brain and discuss the clinical literature on their use/efficacy in the treatment of affiliation disorders.

**Topic 5 (Neyens)**

**Anu**

Obesity is a serious medical problem and its treatment is a major focus of drug company research. With an overview of the physiology and pharmacology of food intake and metabolism, this topic will explore possible successful avenues for modifying food intake and metabolism.