Biochemistry 4Q03: Biochemical Pharmacology Sep-Dec 2020

Contact Information

Instructor
Dr. Radhey S. Gupta,
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Ext. 22639
Office: HSC-4H2
Office Hours: virtually (by appointment only)

Teaching Assistants
Information in this regard will be provided later.

Course Website
Course information will be posted on Avenue2Learn (A2L) Course shell. If this course is not visible on your Avenue2Learn, please contact Dr. Gupta.

Course Information

Course Description
This course will introduce students to the basic concepts in Pharmacology and the working and resistance mechanisms of a broad range of chemotherapeutic drugs (e.g. Antibacterial, Antiviral, Antifungal and Anticancer drugs). Impact of genomics on the discovery of new drugs and pharmacology will also be briefly discussed. Some applications of drug-resistant mutants for genetic, biochemical and cell biological studies will also be described.

Term 1 - September 2020
Monday:  3:30-14:20 pm
Tuesday:  4:30-5:20 pm
Thursday:  3:30-14:20 pm

The classes will be held online using Zoom (or WebEx) Video conferencing platform

Course Objectives

By the end of this course the student should be able to:

- Describe in general terms how drugs are absorbed, distributed, metabolized and eliminated from the body and a general understanding of the drug-receptor interactions
- Describe the main classes of antibacterial drugs, as well as some antifungal drugs, how they work and how resistance to them develops and spread in population. Demonstrate some understanding of the role of genomics in the discovery of new drugs.
- Demonstrate understanding of the mechanisms of action of the main classes of anticancer drugs as well as some antiviral drugs, how resistance to them develops, and some of the difficulties encountered in cancer/viral chemotherapies.
- Describe some applications of the drug-resistant mutants for insights into biological problems and the mechanisms of action of drugs.
Textbook
There is no required textbook for this course. Pdf copies of all lecture slides will be posted in advance of any lecture on the Learnlink. These notes will generally be sufficiently detailed. With access to these notes and by attending classes regularly to supplement these notes for any other material covered in the class, the students generally will not need any textbook on a regular basis. For some topics covered in the course, specific scientific articles (or links to them) will be posted on the LearnLink, enabling students to obtain further details on the subject matter.

Although a text book is not required, for some material covered in this course, the following books are useful resources.

1. Biochemical Pharmacology (2012), by Michael Palmer, Alice Chan, Thorsten Dieckmann and John Honek. This book is available for free download from the following link.
   https://www.nwcbooks.com/get/ebook.php?id=NhE6-BgFVvQC

2. Pharmacology 7th edition (Lippincott Illustrated Reviews) by Karen Whalen, Published by Lippincot Williams & Wilkins, (4th to 6th edition of this book may also be adequate).


Course Evaluation

The students evaluation in this course will likely be based a number of different components including:

(i) Completion of an assignment, (10-20% of marks)
(ii) Critical review of an assigned scientific paper (15-20% of marks)
(iii) In-class tests or quizzes involving multiple choice questions or short answers to specific questions. (30-50% of marks)
(iv) Class participation (5-10% marks)
(v) Final examination (0-50% marks)

The exact details as to which of these components will be used for course evaluation and their specific weightage (marks assignment) will be finalized before the beginning of the class.
Topics Covered

First class  
Course Introduction,

8-10 lectures  
Basic Concepts in Pharmacology, Pharmacokinetics and Pharmacodynamics, Drug absorption, distribution, elimination, drug metabolism, drug interactions, Drug-receptor interaction, Dose-response relationships, Therapeutic index, Brief Discussion of Pharmacogenomics.

10-12 Lectures  
General Principals of Drug therapy: Overview of Drug resistance; Mechanisms of action and cellular resistance to Antibacterial Drugs 
(a) Inhibitors of Bacterial Cell wall synthesis (Penicillin, Cephalosporin, Carbapenam, Vancomycin) Structure of bacterial cell wall; 
(b) Inhibitors of protein synthesis (tetracycline, streptomycin, erythromycin, chloramphenicol etc.). 
(c) Origin of drug resistance and mechanisms responsible for its spread in the population. Antimetabolites and other classes of antibacterial drugs (quinolones, methenamine). Tuberculosis and drugs used for its treatment. Genomic-based and other approaches used for the discovery of new drugs or enabling the effectiveness of existing drugs.

8-10 Lectures  

3-4 Lectures  
Replication cycles of certain viruses including Corona, Influenza, HIV; Mechanism of action of some antiviral drugs.

1-2 Lectures  
Mechanism of action and cellular resistance to bacterial toxins (cholera toxin, diphtheria toxin). (Tentative, this topic may not be covered.)

1-2 Lectures  
In addition to the topics listed above, 1-2 guest lectures may also be scheduled during the course.
ACADEMIC INTEGRITY
You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. It is your responsibility to understand what constitutes academic dishonesty.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/

The following illustrates only three forms of academic dishonesty:
- plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

AUTHENTICITY / PLAGIARISM DETECTION
Some courses may use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.). For more details about McMaster’s use of Turnitin.com please go to www.mcmaster.ca/academicintegrity.

COURSES WITH AN ON-LINE ELEMENT
Some courses may use on-line elements (e.g. e-mail, Avenue to Learn (A2L), LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

ONLINE PROCTORING
Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.
CONDUCT EXPECTATIONS

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the Code of Student Rights & Responsibilities (the “Code”). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, whether in person or online.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students’ access to these platforms.

ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University’s Academic Accommodation of Students with Disabilities policy.

REQUESTS FOR RELIEF FOR MISSED ACADEMIC TERM WORK

McMaster Student Absence Form (MSAF): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar “Requests for Relief for Missed Academic Term Work”.

ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students should submit their request to their Faculty Office normally within 10 working days of the beginning of term in which they anticipate a need for accommodation or to the Registrar’s Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

COPYRIGHT AND RECORDING

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, including lectures by University instructors.

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

EXTREME CIRCUMSTANCES

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.