Biochemistry 4Q03: Biochemical Pharmacology

Contact Information

Instructor
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Teaching Assistants
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Course Website
Course information will be posted on Learn Link (First Class). If this course is not visible on your Learn Link page, 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.

Monday and Wednesday: 8:30 am – 9:20 am
Friday: 10:30 am – 11:20 am
Term 1
BSB-119

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

- Describe in general terms how drugs are absorbed, distributed 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, how resistance to them develops, and some of the difficulties encountered in cancer chemotherapy.

• Describe some applications of the drug-resistant mutants for insights into biological problems and the mechanisms of action of drugs.

Textbook and other Required Materials

Textbook
There is no required textbook for the course. However, for some of the material covered in this course, Pharmacology 3rd (or 4th) Edition (Lippincott's Illustrated Reviews) by Richard D. Howland and Mary J. Mycek, Published by Lippincot Williams & Wilkins, is a good resource and it is recommended. For other topics covered in the course, specific scientific articles will be posted on Learnlink as may be necessary. A few other useful books covering some of the course material are:


Calculator
Only the McMaster standard calculator (Casio fx-991MS) will be allowed during all tests and exams. It is available at the Campus Store

Course Evaluation

Student evaluation will be based on two tests and a final examination. The tests will be held during the class period whereas the final exam will be scheduled by the Registrar's office. The tests and exams will be based primarily upon the material covered in class and they will be in the form of short answers to the given questions, as multiple choice, true-false and fill-in-the-blanks type of questions. The times and dates for the tests are given below.

Grade Breakdown and Test Dates

<table>
<thead>
<tr>
<th>Item Graded</th>
<th>% of Final Grade</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test 1</td>
<td>20%</td>
<td>October 17</td>
</tr>
<tr>
<td>Test 2</td>
<td>20%</td>
<td>November 21</td>
</tr>
<tr>
<td>Final Exam</td>
<td>60%</td>
<td>TBD</td>
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</tbody>
</table>
September 5

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 discovery of new drugs or
enabling the effectiveness of existing drugs.

8-10 Lectures

General principles of cancer chemotherapy; Mechanisms of action and cellular
resistance to different classes of anticancer drugs (purine and pyrimidine
analogs, antimitotic drugs, DNA intercalating agents, alkylating agents,
methotrexate, etc.). Multidrug phenotype and its genetic and biochemical basis.
Resistance involving gene amplification. Genetic and biochemical characteristics
of gene amplification mutants. Studies with mutants resistant to
Podophyllotoxin and Etoposide. The use of monoclonal antibodies for cancer
chemotherapy.

3-4 Lectures

Mechanism of action of some antiviral drugs. Importance of purine and
pyrimidine salvage pathway enzymes in genetic and biochemical studies.

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. The dates and information regarding the guest lecturer will
be provided during the course, as necessary.

Final Exam
This course will have a final exam, scheduled by the Registrar’s office during the December exam period. Please refer to the registrar’s website for the exam schedule, when released.

Course Policy Regarding Missed Tests

If you are absent from the university for a minor medical reason, lasting fewer than 5 days, you may report your absence, one per term, without documentation, using the McMaster Student Absence Form (http://www.mcmaster.ca/msaf/). Absences for a long duration or for other reasons must be reported to the Associate Dean of Science office, with documentation, and relief may not necessarily be granted. After filling out the MSAF you must immediately contact your course instructor (normally within 2 working days) by email to learn what relief may be granted for the work you have missed and relevant details for submission or location of make-up test. Please note that the MSAF may not be used for term work worth 30% or more, nor can it be used for the final exam.

For any missed test that fall within the allowable category, its marks will be added to the final examination, increasing the overall weight of the final exam. For example, if you missed one test that is worth 20% of the total marks, your final exam instead of 60% will account for the 80% of the overall marks for the course. Please note that the above mechanism for reporting absence does not apply to the Final Examination.

For any reason that extends beyond the above, the student can petition the Associate Dean’s office with supporting documentation. The Associate Dean’s office will either send an ‘approved’ or ‘discretionary’ note to the course instructor. A ‘discretionary’ note means that the student did not have a valid reason to miss the work. If you missed the test for "an Approved reason", its marks will be added to the final exam. However, for any 'Discretionary' note received from the Associate Dean’s office, no allowance will be made.

Remarking Work
If you would like to have any work regraded, please adhere to the Department of Biochemistry and Biomedical Sciences Regrading Policy available here: http://fhs.mcmaster.ca/biochem/undergraduate/forms_and_procedures.html under regrading requests.
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. 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. It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at www.mcmaster.ca/academicintegrity.

The following illustrates only three forms of academic dishonesty:
1. Plagiarism, e.g. the submission of work that is not one’s own or for which other credit had been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.

Course Online Content
In this course we will be using (email, Learn Link, Avenue to Learn, etc.). Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster email 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 this course will be deemed consent to this disclosure. If you have questions or concerns about such disclosure, please discuss this with the course instructor.

Student Accessibility
Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail sas@mcmaster.ca. For further information, consult McMaster University’s Policy for Academic Accommodation of Students with Disabilities.

Changes to the Course Outline
The instructor and University reserve the right to modify elements of the course during the term. The University may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and opportunity to comment on changes. It is the responsibility of students to check their McMaster email accounts and course websites weekly during the term and to note any changes.