Course Outline  
Biochemical Pharmacology 4Q03  
September-December 2013

Instructor: Dr. Radhey S. Gupta, Offic-HSC-4H2, Ext. 22639  
Email: gupta@mcmaster.ca

Lectures: Monday and Thursday 9:30-10:20; Tuesday 10:30-11:20

Location: PC-155

Office Hours: Wednesday, 12:00-1:00 pm or by appointment.

Teaching Assistants:
H. Sohail Naushad, Hsc-4H2, Ext. 22178; Email: naushahs@mcmaster.ca  
Stephen Woo, Email: woosm2@mcmaster.ca

Course Objectives
The objective of this course is to familiarize students with the basic concepts in Pharmacology and to introduce them to the working of a broad range of chemotherapeutic drugs (e.g. Antibacterial, Antiviral, Antifungal and Anticancer drugs). The potential impact of genomics on the discovery of new drugs and pharmacology will also be briefly discussed. The main emphasis of this course will be on learning the mechanisms of action of the above groups of drugs and how cellular resistance to them develops. Some applications of drug-resistant mutants for genetic, biochemical and cell biological studies will also be described.

By the end of this course students will 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.
• Able to describe some applications of the drug-resistant mutants for gaining insights into biological problems and the mechanisms of action of drugs.
## Topic Covered

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 5</td>
<td>Course Introduction, 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.</td>
</tr>
<tr>
<td>October 1, 2013</td>
<td>Guest Lecture by Dr. Gurmit Singh, Pathology Department, McMaster University “General principles about signaling pathways and novel cancer agents”</td>
</tr>
<tr>
<td>10-12 Lectures</td>
<td>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</td>
</tr>
<tr>
<td>November 26</td>
<td>Possible Lecture by Dr. Herb Schellhorn, Biology Department, McMaster University &quot;Genetically-engineered Animal Models for human nutrition&quot;.</td>
</tr>
<tr>
<td>3-4 Lectures</td>
<td>Mechanism of action of some antiviral drugs. Importance of purine and pyrimidine salvage pathway enzymes in genetic and biochemical studies.</td>
</tr>
<tr>
<td>1-2 Lectures</td>
<td>Mechanism of action and cellular resistance to bacterial toxins (cholera toxin, diphtheria toxin). (Tentative, this topic may not be covered.)</td>
</tr>
</tbody>
</table>

**Note:** The topics indicated above and the numbers of lectures on them are tentative and they may change as deemed necessary.
Textbook:
There is no prescribed 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 source and it is recommended. For a number of other topics covered in this course, specific scientific articles will be posted during the course on Learnlink. A few other useful books for some of the material covered in this course are:


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 in the form of short problems/essays including multiple choice and true-false questions, based upon the material covered in class. The times and dates for the tests are given below.

<table>
<thead>
<tr>
<th>Test</th>
<th>Date</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test #1</td>
<td>Tuesday October 15, 2013</td>
<td>20%</td>
</tr>
<tr>
<td>Test #2</td>
<td>Monday November 25, 2013</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>Date and time to be announced by the Registrar’ Office</td>
<td>60%</td>
</tr>
</tbody>
</table>

The instructor and the university also 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 or the tests in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites (Learnlink) during the term and note any changes.” If it becomes necessary to cancel a particular class for some unforeseen reason, information for this will be posted on the Learnlink.

Course Policy Regarding Missed Tests

Using the McMaster student absence form (MSAF), undergraduate students can report absences of up to two missed tests (or course work) per academic term and can request that allowance be made for them. The submission of medical or other supporting documentation is normally not required. However, students must immediately follow up with the instructor to inform of the missed tests.
For any missed test that fall within the allowable category, the marks for the missed test 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.

**Academic Ethics and Integrity**

Students 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](http://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 has been obtained.

2. Improper collaboration in group work.

3. Copying or using unauthorized aids in tests and examinations.