BIOLOGY 4855 - PHARMACOLOGY
2015 Serial

1. Instructor. Dr. Robert J. Omeljaniuk, CB-4013, 343-8236

2. Intent. To provide senior undergraduate students with an opportunity to study selected aspects of pharmacology in a directed study approach.

3. Marking Scheme. 10 Assignments valued at 10 final marks each = 100 final marks. **Assignments are to be submitted into the Assignment box no later than 1200 hrs on the Friday of the Assignment Deadline week.**

4. Execution.

a. General. Students will be assigned specific readings from the course textbook and will be prepared to discuss the subject matter and any difficulties they may have with it in group discussion on a weekly basis. Attendance at coordination and discussion meetings is required. Students' comprehension and mastery of the material will be evaluated on the basis of assignments submitted no later than one week following discussion of the subject matter. Answers to assigned questions may take any neatly presented format including text, figures and tables submitted as a hard copy; paragraph and short-essay answers supported by diagrams of the student's own design will be most appropriate. All assignments must be credibly completed; in the event a student completes the course with a mark between 40 and 49 %, they will be eligible to apply for a Special Exam to be arranged with Lakehead University Scheduling. The examination will cover the entire course material and the examination mark will take the place of the course mark. **Attendance to all scheduled coordination meetings is mandatory; absences for which there is not a satisfactory explanation may result in the respective assignment being returned unmarked and graded zero.**

b. Timings. Assignments are due as indicated. Late assignments will not be accepted. Students experiencing unusual circumstances are nonetheless encouraged to request extensions in writing prior to submitting assignments.

c. Tentative Outline.

Serial	Reading	Discussion Date (week of)	Assignment Deadline (week of)
1	Chapter 2: How drugs act: general principles	05 Jan	12 Jan
2	Chapter 3: How drugs act: molecular aspects (Part A)	12 Jan	19 Jan
3	Chapter 3: How drugs act: molecular aspects (Part B)	19 Jan	26 Jan
4	Chapter 7: Method and measurement in pharmacology	26 Jan	02 Feb
5	Chapter 8: Drug absorption and distribution	02 Feb	09 Feb

6	Chapter 9: Drug metabolism and elimination Chapter 10: Pharmacokinetics	09 Feb	16 Feb
7	Chapter 12: Chemical mediators and the autonomic nervous system	Self Study	23 Feb
8	Chapter 13: Cholinergic transmission	23 Feb	02 Mar
9	Chapter 14: Noradrenergic transmission	02 Mar	09 Mar
10	Chapter 19: Peptides and proteins as mediators; and Chapter 20: Nitric oxide.	09 Mar	16 Mar

5. Textbook.

Pharmacology (7th ed). H.P. Rang, M.M. Dale, Ritter, J.M., and Moore, P.K. Churchill Livingstone. Toronto. 777 pp. 2012.

Assignment 1.

1. Explain how the law of mass action (first order) can be used to predict receptor occupancy and the measurement of drug binding to receptors. (4 page narrative limit, 3 marks).

2. Define, describe and mechanistically explain the varied antagonism mechanisms. (5 page narrative limit, 5 marks).

3. Describe the relationship(s) between drug dose and agonist response. (2 page narrative limit, 2 marks).

Assignment 2.

1. Discuss and compare the organization and operation of the Channel-linked receptors with the G-protein-coupled receptors. Cite appropriate examples and illustrate mechanisms to substantiate comparisons. (8 page narrative limit, 10 marks).

Assignment 3.

1. Discuss and compare the organization and operation of the Kinase-linked receptors with the receptors that regulate gene expression. Cite appropriate examples and illustrate mechanisms to substantiate comparisons. Use the references cited in Table 2.1 to for additional information elsewhere in the textbook. (8 page narrative limit, 10 marks).

Assignment 4.

1. Discuss the organization and design of bioassays. As well, identify and define critical parameters and contrast design limits between bioassays in man versus other living systems. (5 page narrative limit, 5 marks).

2. Identify and discuss the critical elements of clinical trials. (3 page narrative limit, 3 marks).

3. Discuss the measurement and expression of toxicity. In particular, consider the concept of risk:benefit at the individual and population levels. (3 page narrative limit, 2 marks).

Assignment 5.

1. Discuss the movement of drugs across membranes and comment on the role of ionization on drug partitioning between compartments and clearance implications. (4 page narrative limit, 4 marks).

2. Identify and discuss advantages and disadvantages of different routes of administration including Special Drug Delivery Systems. (2 page narrative limit, 3 marks).

3. Discuss the factors that influence the distribution of drugs in the body. (3 page narrative limit, 3 marks).

Assignment 6.

Note: The material in this chapter is very important to your understanding of pharmacology.

1. Discuss in detail, Phase I and Phase II reactions. Do not get bogged down employing excessive numbers of examples. (4 page narrative limit, 4 marks).

2. Be aware of the important elements of renal and biliary clearance routes. No response is required but you may wish to submit notes to consolidate your information for your own future use.

3. Pharmacokinetics. (This is the most critical part of this chapter.).

Identify and qualitatively compare the single compartment model with the two compartment model. Identify the implications of saturation kinetics. (6 page narrative limit, 6 marks).

Assignment 7.

1. Describe the neuroanatomic organization of the autonomic nervous system. (2 page narrative limit, 2 marks).

2. Overview the basic neurochemistry of the autonomic nervous system. (1 page narrative limit, 1 mark).

3. Identify and discuss the principles of chemical neurotransmission. (4 page narrative limit, 4 marks).

4. Discuss and compare mechanisms of transmitter release with termination of transmitter action. (3 page narrative limit, 3 marks).

Assignment 8.

1. In narrative form, define and compare the operational and pharmacological characteristics of cholinergic receptor classes. (3 page narrative limit, 2 marks).

2. Describe the important features of acetylcholine synthesis and secretion. (2 page narrative limit, 3 marks).

3. Identify and compare the pharmacological determinates of muscarinic- and nicotinic-receptor pharmacology. (2 page narrative limit, 2 marks).

4. Describe the operation and pharmacological modulation of the cholinergic synapse. (6 page narrative limit, 5 marks).

(Yes, I can still do arithmetic!)

Assignment 9.

1. Describe the elements of catecholamine biosynthesis and secretion. (2 page narrative limit, 1 mark).

2. Discuss catecholamine metabolism and its regulation. (3 page narrative limit, 3 marks).

3. Describe and compare the pharmacology of adrenoreceptor agonists and antagonists. (3 page narrative limit, 3 marks).

4. Discuss the variable means by which noradrenergic transmission can be manipulated. Use illustrative examples sparingly. Use of additional material from Table 14.3 is advisable as a source of examples for specific pharmacologic probes. (3 page narrative limit, 3 marks).

Assignment 10.

1. Describe the mechanisms for peptide synthesis, maturation and release. Illustrate your answer using relevant examples. (6 page narrative limit, 5 marks).

2. Identify and describe noteworthy roles of peptides as primary messengers and drugs. (3 page narrative limit, 3 marks).

3. Briefly describe the biosynthesis, metabolism and biological activities of nitric oxide. (3 page narrative limit, 2 marks).