Fall Semester 2018

Dr. Wolfgang Dostmann, Professor of Pharmacology, College of Medicine

Syllabus
This 3-credit course conveys the molecular mechanisms by which drugs act in the body and the principles drug design. It highlights the importance of medicinal chemistry as it overlaps with the disciplines of chemistry, biochemistry, microbiology, cell biology, and pharmacology.

Most lectures are split into two parts. Part 1 lasts 40-45 minutes and loosely follows the flow of the textbook. Following a short questions/answers break, part 2 will be more relaxing and we will take a trip back in time and review an example of the “Most important drugs in history”. These are world changing, famous compounds that have had a significant impact on civilization.

Prerequisites
Organic Chemistry and Background in Biology or Biochemistry or Permission

Course Director
Wolfgang Dostmann, Department of Pharmacology, Given B303B

Contact
wdostman@uvm.edu

Office hours
Thursday, 2-4pm, Given B303B

Time and Place
Tuesdays and Thursdays 11:40 am – 12:55 pm, Stafford Hall 101

Required Textbook
An Introduction to Medicinal Chemistry (6th Ed), Graham L. Patrick, Oxford Press, 2017
The textbook is an essential component of the course. You will be using it a lot! It is a “fun” book too.

Examination Format
Undergraduate Students: Throughout the course students will be taking 4, 60-minute exams. All exams are essentially cumulative.

Extra Credit
A total of four pop-up quizzes will provide ample opportunity for extra credit. Each quiz is worth 5 points (approximately 2.5%).
Graduate Students
Students taking the course for graduate school credit will have to submit an additional term paper on a drug considered to be one of the most important drugs in history. The paper should include the drug's discovery, structure, chemical properties, synthesis, biological effects and historical significance. Students will be graded on the thoroughness and quality of their paper.

Course Schedule

Part I: Drug Targets
08/28  Lecture 1: Introduction
        Intermolecular bonding forces
        Most important drugs in history: Salvarsan

08/30  Lecture 2:
        Proteins: Structure/Function
        Enzymes: Structure/Function
        Most important drugs in history: Penicillin

09/04  Lecture 3:
        Receptors: Structure/Function
        Receptors: Signal Transduction
        Most important drugs in history: 6-Mercaptopurine

09/06  Lecture 4:
        Nucleic acids: structure and function
        Most important drugs in history: Thalidomide

09/11  Lecture 5:
        Enzymes and Receptors as drug targets
        Review Session

09/13  EXAMINATION 1

09/18  Lecture 6:
        Nucleic acids as drug targets
        Most important drugs in history: Ivermectin

09/20  Lecture 7:
        Pharmacokinetics I
        Most important drugs in history: Hydrocortisone

09/25  Lecture 8:
        Pharmacokinetics II
        Most important drugs in history: Librium
Part II: Drug discovery, design and development

09/27 Lecture 9: Drug discovery: finding a lead I
Most important drugs in history: AZT

10/02 Lecture 10: Drug discovery: finding a lead II
Most important drugs in history: Cyclosporine

10/04 Lecture 11: Rational Approaches to Lead Discovery I
Most important drugs in history: Thorazine

10/09 Lecture 12: Rational Approaches to Lead Discovery II
Review Session

10/11 EXAMINATION 2

10/16 Lecture 13: Drug design: optimizing target interactions
Most important drugs in history: Sumatriptan I

10/18 Lecture 14: Drug design: optimizing access to the target I
Most important drugs in history: Sumatriptan II

10/23 Lecture 15: Drug design: optimizing access to the target II
Most important drugs in history: Quinine I

10/25 Lecture 16: The challenges of getting a drug to the market
Most important drugs in history: Quinine II

Part III: Selected topics in medicinal chemistry

10/30 Lecture 17: Anti-ulcer agents I
Most important drugs in history: Cimetidine

11/01 Lecture 18: Anti-ulcer agents II
Most important drugs in history: Omeprazole
Review Session

11/06 EXAMINATION 3
11/08 Lecture 19: Cholinergics
   Wellman

11/13 Lecture 20: Anticholinergics
   Wellman

11/15 Lecture 21: Adrenergics
   Wellman

11/20 **No Class - Thanksgiving Recess**

11/22 **No Class - Thanksgiving Recess**

11/27 Lecture 22: Antiviral agents
   Most important drugs in history: Ritonavir
   Dostmann

11/29 Lecture 23: Anticancer agents
   Most important drugs in history: Imatinib
   Dostmann

12/04 Lecture 24: Opioid analgesics I
   Most important drugs in history: Methadone
   Dostmann

12/06 Lecture 25: Opioid analgesics II
   Review Session
   Dostmann

12/13 **EXAMINATION 4  1:30-4:15pm  Stafford 101**