Spring 2-1-2007

BMED 495.02: Molecules and the Mind

John Gerdes

University of Montana, Missoula

Follow this and additional works at: https://scholarworks.umt.edu/syllabi

Let us know how access to this document benefits you.

Recommended Citation

https://scholarworks.umt.edu/syllabi/11121

This Syllabus is brought to you for free and open access by the Course Syllabi at ScholarWorks at University of Montana. It has been accepted for inclusion in Syllabi by an authorized administrator of ScholarWorks at University of Montana. For more information, please contact scholarworks@mso.umt.edu.
BMED 495-02, Spring 2007, CRN 34937

Molecules and the Mind

3 credits, traditional grading; Mon 5:00-6:40 pm, SB 336; Thurs 4:10-5 pm, SB 335.

Instructor: John Gerdes
BMED, Office: Chemistry 311A
Office hours: Drop in anytime, or with appointment
Phone: 243-4084; e-mail: john.gerdes@umontana.edu

Course in Brief:

Prereq., CHEM 222, BIOC 380, or BIOC 481; or equiv. A medicinal chemistry perspective of central nervous system drugs, their cultural context, discoveries, compositions, modes of actions, therapeutic and other uses, regulation status and political impact.

Course Particulars

Overall Course Objective. The objective of this course is to provide a survey and an initial understanding of the diverse, rich and interwoven domain involving the medicinal chemistry of select central nervous system (CNS) drugs and related agents. These agents will be discussed in relation to their: discovery, preparation, modes-of-action, therapeutic implications, cultural context, laboratory usefulness and marketplace value. The individual will use the awareness obtained from these discussions as a launch point for subsequent self-motivated discovery and graduate course participation.

Participants. This course is intended for advanced undergraduate students and graduate students, whose interests and studies are focused on medicinal chemistry and neuroscience, encompassing several related disciplines (chemistry, biochemical, biological, psychological, pharmacological, physiological, pharmaceutical, toxicological and cultural).

Prerequisites. Since this course covers a variety of disciplines, it is recommended that students have taken at least one of the following courses (or their equivalent): CHEM 222, Organic Chemistry or BIOC 380 Fundamentals of Biochemistry or BIOC 481 Biochemistry.

The following course is not a required prerequisite but would serve as useful background, PSYC 300S Abnormal Psychology.

Permission. If the student has not taken any of the courses noted above, yet is compelled to participate in this course, the instructor may grant permission after a brief discussion between the instructor and student, where other background training and experiences are taken into account.

Course Relationships. This course may serve as a gateway course for the following graduate level courses: CHEM 569 Medicinal Chemistry, PHAR 621 Advanced Medicinal Chemistry, PHAR 610 Neuropharmacology, PHAR 615 Molecular Pharmacology.
**Course Philosophy.** The course is presented as an opportunity for students with diverse backgrounds to learn easily and collectively from a variety of information sources (texts, journals, databases and web sites) facilitated by the instructor, other faculty and student colleagues brought forward by lectures, focus discussions (recitations, query sessions and special topics informal seminars) and specific projects (course collective and individualized).

**Course Specific Aims.** With focus on the central nervous system pharmacopoeia, we will gain an appreciation of the following:

- What the medicinal chemistry discipline encompasses, in the context of psychopharmaceutical drugs
- Terminology (chemical, biochemical, neuroscience, pharmacological, pharmaceutical and clinical)
- Neuronal organization, receptor classification (G-coupled receptors, ion channels, biogenic amine transporters) and function
- Contemporary views of select CNS disease etiologies
- Unique biochemical modes-of-actions of various CNS agents and drugs
- Germane considerations of receptor protein tertiary structure, amino acid constituents and sequence
- Methodology of probing drug interactions both in vivo and in vitro
- Classification of CNS pharmaceuticals (opioids, depressants, stimulants, antipsychotics, psychedelics and dissociatives)
- Modern paradigms of drug discovery: robots and matrices vs. craftsmanship
- The double blind-placebo controlled study and its role in drug development
- Case histories of select drug discoveries and their subsequent marketplace maturation
- Chemical hardships and syntheses and also stereochemical issues associated with various CNS drugs and ligand probes
- Regulatory agencies (USP, FDA & DEA), their missions and effects on CNS drug activities
- Select laws that have impacted the CNS pharmacopoeia
- Special topics provided by class participants and other experts (ADHD, Cocaine history, the Ibogaine story, MDMA, the tryptamines and phenethylamines, oxygen radicals and brain disorders, among others).

**Routine work schedule:** Periods will be afforded as formal lectures; a lecture period portion will be for focus discussions (recitations, query sessions and special topics informal seminars) based on assigned reading and information gathering tasks.

**Text** (available from bookstore as a course pack, $ 64): “The Chemistry of Mind-Altering Drugs; History, Pharmacology, and Cultural Context”, Daniel M. Perrine; American Chemical Society, 1996 (a good resource for your long-term use and is out of print). ISBN: 0841232539

**Other resource materials.** The internet will serve as a valuable tool. Additionally, the titles noted below, along with others not mentioned here, will be available through the course:
Course assessments, projects, and grades.

The course has a value of 250 points, which may be acquired through the following accomplishments. Grades will be based on acquiring the 250 points; the class is not curved, traditional grade assigned.

- **Individual assessment**: 100 points. Each student will provide a written formal paper on CNS drugs.
- **Small work group project**: 100 points. Participants will work in small groups (2-3 students) to produce a formal paper or a presentation on one specific area of CNS therapeutics, diseases or laboratory based discovery modes; (area assigned by instructor or via small group recommendation); development of the discourse will be with the instructor and class participants; paper or presentation due at the end term of the course.
- **Collective efforts for the routine assigned dissertations of the assigned reading and information gathering tasks**: 50 points. All participants will contribute to the production of a web-based resource encompassing CNS therapeutics and diagnostics, diseases and laboratory based discovery modalities, which shall be perpetuated through the CHEM 495 web site. Students will inform their peers of the sites and also review the sites for content. Additionally, attendance and dynamic participation during the recitation focus discussions will be taken into account.

Important dates.

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 22</td>
<td>First class</td>
</tr>
<tr>
<td>Feb 19</td>
<td>Presidents Day</td>
</tr>
<tr>
<td>Mar 26 &amp; 29</td>
<td>Spring Break</td>
</tr>
<tr>
<td>May 3</td>
<td>Last class</td>
</tr>
<tr>
<td>Mar 15</td>
<td>First assignment, paper</td>
</tr>
<tr>
<td>Apr 30 &amp; May 3</td>
<td>Final assignment, April 30</td>
</tr>
</tbody>
</table>