

DRUGS AND THE BRAIN
MCB 62 / L&S 30 / PSYCH 19

Department of Molecular and Cell Biology
College of Letters and Sciences, Discovery Course
Department of Psychology

University of California, Berkeley - Fall Semester 2013

Nowhere are the connections between botany, chemistry, cell biology, physiology, psychology, sociology, public policy, and constitutional law more vividly illustrated than in understanding the effects of drugs on the human brain and human behavior. This course deals with just that: the biology, chemistry, psychology, and sociology of psychoactive drugs. Such substances - which include stimulants, sedatives, psychedelics, analgesics, antidepressants and antipsychotic pharmaceuticals, and others - have powerful effects on the human brain, behavior, and mental function. The origins of drugs as components of plants that have enjoyed deep historical relationships with humankind will be emphasized.

Two Required Lectures and one Required Discussion Section meeting each week.

Lecture times: Tuesday and Thursday at 3:30 - 5:00 pm - Wheeler Auditorium

Instructor: David Presti 249 Life Sciences Addition (LSA)
phone and voicemail: 643 2111 <presti@berkeley.edu>

Office hours: Tue 1:00-1:30 pm, Wed 11:00-11:30 am, Thu 11:00 am-11:30 in 249 LSA.
I will also generally be available after each lecture for questions and discussion.

Required texts: *Pharmako/Poeia* by Dale Pendell North Atlantic Books
Pharmako/Dynamis by Dale Pendell North Atlantic Books

Optional text: *Pharmako/Gnosis* by Dale Pendell North Atlantic Books

Concerning the texts: The *Pharmako* trilogy addresses the topic of psychoactive drugs via chemistry, botany, psychology, history, and, significantly, poetry. The author, Dale Pendell, is an outstanding poet and a very knowledgeable ethnobotanist. Reading these books will give you a perspective on psychoactive drugs unlike any other material written on these subjects. The books have recently (2010) been republished by North Atlantic Books in Berkeley. They are relatively inexpensive and, in my opinion, truly are works of art that one can come back to over and over again. I have read each of them multiple times and, like all good poetry, every time I read from them I appreciate new things. The current editions each have 4-5 pages of "supplemental notes" appended to the end, containing additional information that the author found particularly relevant to the subject. Other than these supplemental notes, the books are identical to earlier editions. The three books were originally published in 1995 (*Poeia*), 2002 (*Dynamis*), and 2005 (*Gnosis*) by Mercury House, and then, in 2009, issued in hardcover editions by North Atlantic Books. Any of the editions will do, as they are all the same, save for a very small number of pages of supplemental notes in the most recent 2010 editions.

Other course readings: There will be additional reading material posted throughout the semester on our class website at bSpace.berkeley.edu.

Graduate student instructors (GSIs) and their email addresses:

Adam Krause	<adamkra@berkeley.edu>
Andrew Abram	<abram06@berkeley.edu>
Brent Parsons	<brent.d.parsons@gmail.com>
Keven Laboy	<klaboy@berkeley.edu>
Melissa Newton	<mlnewton@berkeley.edu>
Thomas Langlois	<thomas.langlois@berkeley.edu>
Vlad Senatorov	<vsenatorov@berkeley.edu>
Wei-Cheng Chang	<winstonchang@berkeley.edu>

The GSIs are here to help you get the most from this class. You are encouraged to get to know and talk with your GSI. Your GSI will see you in weekly Discussion Section and will also be available to meet with you during weekly office hours. Don't be shy!

Discussion section times and locations:

101	Mon	10-11	123 Wheeler	Andrew
102	Mon	1-2	2066 VLSB	Brent
103	Mon	2-3	2070 VLSB	Wei-Cheng
104	Mon	4-5	2062 VLSB	Andrew
105	Tue	9-10	54 Barrows	Melissa
106	Tue	10-11	140 Barrows	Keven
107	Tue	12-1	285 Cory	Keven
108	Mon	3-4	243 Dwinelle	Wei-Cheng
109	Wed	9-10	2070 VLSB	Vlad
110	Wed	12-1	155 Barrows	Thomas
111	Wed	12-1	107 GPB	Adam
112	Wed	1-2	2066 VLSB	Keven
113	Wed	1-2	2062 VLSB	Melissa
114	Wed	2-3	205 Dwinelle	Adam
115	Wed	2-3	2070 VLSB	Brent
116	Wed	4-5	2066 VLSB	Brent
117	Thu	9-10	50 Barrows	Thomas
118	Thu	11-12	247 Dwinelle	Vlad
119	Thu	1-2	2038 VLSB	Vlad
120	Thu	1-2	2062 VLSB	Melissa
121	Fri	10-11	2032 VLSB	Adam
122	Fri	12-1	156 Dwinelle	Wei-Cheng
123	Fri	1-2	2062 VLSB	Thomas
124	Fri	3-4	2032 VLSB	Andrew

Prerequisites: A passion to learn! There are no University course prerequisites for this class. Both non-science and science majors are encouraged to enroll, as the course has its foundations in both conventional science and in poetry, broadly defined. The fact that the class is cross-listed in three programs - Biology, Psychology, and Letters & Sciences - speaks to the breadth of what is covered.

Please read this syllabus carefully. We have tried to make it comprehensive and address most questions that arise.

Attendance at the lectures and in discussion section is required. Lectures are every Tuesday and Thursday, 3:30 to 5:00 PM. While the factual content in the course can be learned by reading and obtaining notes from the lectures, attendance is required because we believe there are very important elements of the material that are best, if not exclusively, transmitted through in-person contact. Basically, there is more to learning than memorizing facts, even if memorizing some facts is important.

Attendance may be monitored with periodic surprise quizzes during lecture. Any quizzes will be very short, consisting of a small number of questions. They will test material from recent lectures and reading. To be prepared to take the quizzes, stay current with your understanding of lecture and reading material.

Homework:

- detailed instructions for the homework assignments are in the Resources: Homework folder on bSpace.
- Homework One is a description and analysis of an article that you find from the news media
 - due in discussion section the week of **September 9-13**
- Homework Two is a short essay related to reading in *Pharmako/Poeia*
 - due in discussion section the week of **September 16-20**
- Homework Three is about plant rituals in your life
 - due in discussion section the week of **October 7-11**
- Homework Four is about creating exam questions
 - due in discussion section the week of **October 21-25**
- Homework Five is about the topic of your topical essay (Homework Six)
 - due in discussion section the week of **November 4-8**
- Homework Six is an essay written on a topic of your choice
 - due in discussion section the week of **November 18-22**
- **Homework assignments must be turned in as paper copy in discussion section.**
- **Emailed assignments will not be accepted.**
- Assignments turned in up to one week after the due date will receive half-credit. Assignments turned in 1-2 weeks after the due date will receive zero points but will be credited as being turned in. Assignments received more than 2 weeks late may not be accepted. Note that this becomes a serious matter, since you need to receive credit for all of the homework assignments in order to receive better than a C- grade (for a letter grade) or a passing grade (for a P/NP grade) in the class. Thus, be sure to complete your homework on time. This is not an arbitrary rule, but is done to encourage completion of the homework in the way that we believe to be most useful.
- Homework assignments are meant to be interesting, informative, and enjoyable!

Debates:

- there will be three debates conducted in discussion section, with one-third of the class involved in each of the debates
- the first debate will be during the week **September 30 - October 4**, the second will be during the week **October 14-18**, and the third will be during the week of **November 18-22**
- debate guidelines are in the Resources: Debates folder on bSpace
- debate topics will be announced in class and posted on bSpace
- for one of the debates you will be graded on your participation as part of a debate team; for the other two debates you will be graded on participation in the class discussion

- we do our best to choose topics that will make for very interesting debates, where strong arguments can be made for both sides of the issue
- if ideas occur to you that would be interesting to consider as a debate topic, please let us know

Exams will consist of multiple choice and short answer questions. Each midterm exam covers the preceding portion of the course and draws from material in lectures, discussion sections, and required readings. A sampling of questions from past exams is on bSpace.

- Midterm Exam One is on **Thursday September 26** at 3:30 - 5:00 pm in Wheeler Auditorium
 - Midterm Exam Two is on **Tuesday October 29** at 3:30 - 5:00 pm in Wheeler Auditorium
 - Midterm Exam Three is on **Thursday December 5** at 3:30 - 5:00 pm in Wheeler Auditorium
- There will NOT be a cumulative final exam in this class.**
- we cannot change the days and times for these exams; mark your calendars now
 - there will be no make-up exams
 - if you miss an exam, you will receive zero points for that exam
 - if you miss one of the first two midterm exams with a credible excuse (e.g., significant medical problem documented with verifiable documentation), then your other exams will count proportionally more in determining your course grade
 - if you miss the third midterm exam with a credible excuse, you will receive an incomplete (I) grade for the course (provided you have passing status in the class prior to the exam, otherwise grade = F); you will need to resolve the incomplete grade by taking a special exam

Grading: Your grade in the class is based on exam performance (three midterm exams) (~ 75-80% of your grade) and discussion section assignments (~ 20-25% of your grade). The discussion-section assignment portion of your grade comes from the written homework assignments and participation in oral-group debates. The exact % contributions of the various exams and assignments will be determined at the end of the semester. We do not indicate the exact % contributions of the grade components at the beginning of the semester because we wish to discourage the running computation of points and accompanying preoccupation with how well one is doing in the class. The GSIs and I do not wish to hear questions of the form: "how well do I need to do on the last midterm exam in order to get an 'A' in the class?" Our answer to any questions of this sort will always be: do as well as you can on all exams and assignments! The task is to enjoy learning the material; the assignments and exams will hopefully assist with this.

If you are taking this class for a letter grade, you cannot earn better than a "C-" grade without receiving credit for ALL of the homework assignments and participating in the debate. If you are taking this class pass/not-pass, you must turn in ALL of the homework and participate in the debate, in order to pass the class.

Your letter grade in the course will be determined according to absolute standards of performance. This hopefully relates to your acquisition of knowledge and understanding of the material. Importantly, you will not be competing against fellow students in the sense that we do not force letter grades to conform to a predetermined distribution. If everyone does extremely well, everyone could receive an "A" grade. If everyone does poorly (highly unlikely), then everyone could get a low grade. Rather than devoting energy to worrying about where grade cut-offs are, if you are truly interested in this subject and in getting the most from this class, we urge you to study seriously from the beginning, do the readings, and truly make an effort to learn the material. You will be rewarded with deep knowledge and understanding of some really fascinating topics. Good grades will be a natural side effect.

In past years the percentage of students earning an "A" or a "B" in this class has been between 60 and 70%. Thus, the majority of students do well in this class. However, in order to do well in the class you do have to learn a bunch of stuff. It is also easy to get a "C" or even lower grade in the class, if you don't put in sufficient effort.

Do not make the mistake of not keeping up with the material and then trying to negotiate a last-minute deal to improve your grade. On bSpace (in the Resources: General Reading folder) there are some examples of desperate emails I have received in past years. It is very sad. We recommend that you not get yourself into the position of needing to write such emails. We do not offer extra credit or make other arrangements to boost grades. If you want a good grade, you must learn the course material in a timely manner. It's as simple as that. Hopefully it will be enjoyable.

Honor Code: The student community at UC Berkeley has adopted the following Honor Code: "As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others." The hope and expectation is that you will adhere to this code.

Collaboration and Independence: Reviewing lecture and reading materials and studying for exams can be enjoyable and enriching things to do with fellow students. This is recommended. However, unless otherwise instructed, homework assignments are to be completed independently and materials submitted as homework should be the result of one's own independent work.

Cheating: A good lifetime strategy is always to act in such a way that no one would ever imagine that you would even consider cheating. Anyone caught cheating on a quiz or exam in this course will receive a failing grade in the course and will also be reported to the University Center for Student Conduct. In order to guarantee that you are not suspected of cheating, please keep your eyes on your own materials and do not converse with others during the quizzes and exams.

Plagiarism: Your homework essays must be original writing composed by you. To copy text or ideas from another source without appropriate reference is plagiarism and will result in a failing grade for your assignment and usually further disciplinary action. The originality of your essays may be checked against the entire worldwide web and additional databases of written material (see www.turnitin.com for more information on this process). For additional information on plagiarism and how to avoid it, see: <http://gsi.berkeley.edu/teachingguide/misconduct/prevent-plag.html>

Academic Integrity and Ethics: Cheating on exams and plagiarism are two common examples of dishonest, unethical behavior. Honesty and integrity are of great importance in all facets of life. They help to build a sense of self-confidence, and are key to building trust within relationships, whether personal or professional. There is no tolerance for dishonesty in the academic world, for it undermines what we are dedicated to doing - furthering knowledge for the benefit of humanity.

Your experience as a student at UC Berkeley is hopefully fueled by passion for learning and replete with fulfilling activities. And we also appreciate that being a student can be stressful. There may be times when there is temptation to engage in some kind of cheating in order to improve a grade or otherwise advance your career. This could be as blatant as having someone else sit for you in an exam, or submitting a written assignment that has been copied from another source. And it could be as subtle as glancing at a fellow student's exam when you are unsure of an answer to a question and are looking for some confirmation. One might do any of these things and potentially not get caught. However, if you cheat, no matter how much you may have learned in this class, you have failed to learn perhaps the most important lesson of all.

Communication and E-mails: We like teaching this class! The material is fascinating and, we believe, useful and important stuff to know. I enjoy being available during office hours and after lectures to answer questions and further discuss the material. I greatly prefer in-person contact to email. Toward this end, I hold office hours three days a week and am generally available following lectures for brief questions and discussion. Questions of importance or ones that require detailed answers must be addressed in person. In most circumstances, I am unlikely to respond to e-mail questions. **Always make sure to see me in person about any important matter.** It will never be an acceptable excuse to say to me something like: "Well, I sent you an email and never heard back." **As stated: Always make sure to see me in person about any important matter.** E-mail is a wonderful tool and very convenient. However, it is not a substitute for direct personal contact, especially when such contact is easy, as it is with me.

Thanks again for your interest in this subject. We truly hope you have a very enjoyable and fulfilling experience in this class this semester!

- University holidays

- no discussion sections or lectures on these days

Monday, September 2 - Labor Day, remember and honor the workers of the world

Monday, November 11 - Veteran's Day, remember and honor the military veterans of the world

Thursday, November 28 - Thanksgiving Day, give thanks

Friday, November 29 - day after Thanksgiving Day, continue giving thanks

- Important astronomical dates and days of ancient ritual

New Moons: August 6, September 5, October 4, November 3, December 2

Full Moons: August 20, September 19, October 18, November 17, December 17

Autumn Equinox: September 22

Halloween / Samhain: October 31

Total Solar Eclipse: November 3 (Atlantic Ocean and Central Africa)

Winter Solstice: December 21

- reference for lunar and solar information

"Astronomical Applications Department of the US Naval Observatory"

<www.usno.navy.mil/USNO/astronomical-applications>



- approximate course timeline of topics, with corresponding readings from the *Pharmako* texts indicated by page numbers; additional readings and lecture supplements posted on bSpace.

Week 1: 29-30 Aug	Course logistics and overview. Drugs, poisons, plant medicines, allies, curanderos, abuse, addiction. (<i>Poeia</i> 1-27)
Week 2: 3-6 Sept	How drugs enter the body and the brain. Nervous system, brain, cells, molecules, membranes.
Week 3: 9-13 Sept	Neurons, synapse, neurotransmitters, receptors, pharmacology, autonomic nervous system, alkaloids, hallucinogenic solanaceous plants. (<i>Poeia</i> 29-30)
Week 4: 16-20 Sept	Tobacco and nicotine. (<i>Poeia</i> 31-50)
Week 5: 23-27 Sept	Alcohol. (<i>Poeia</i> 51-97) Midterm Exam One on Thursday Sept 26.
Week 6: 30 Sept - 4 Oct	Fermentation, distillation, alcohol types, effects, and toxicities, ethanol pharmacology, sedative-hypnotics. (<i>Poeia</i> 99-115) Debate One in discussion section.
Week 7: 7-11 Oct	General anesthetics, pharmaceutical sedative-hypnotics, inhalants, absinthe, thujone, drug law history, controlled substances and schedules.
Week 8: 14-18 Oct	Cannabis. (<i>Poeia</i> 177-225) Debate Two in discussion section.
Week 9: 21-25 Oct	Cannabis and drug policy. Opium, opioids, and endorphins. (<i>Poeia</i> 117-143)
Week 10: 28 Oct - 1 Nov	Midterm Exam Two on Tuesday October 29. Coffee, tea, caffeine, cacao, chocolate. (<i>Dynamis</i> 1-118)
Week 11: 4-8 Nov	Coffee, tea, caffeine, cacao, chocolate. (<i>Dynamis</i> 1-118) Ephedra, khat, amphetamine. (<i>Dynamis</i> 124-155)
Week 12: 11-15 Nov	Coca and cocaine. (<i>Dynamis</i> 156-177) Addiction and treatment. (<i>Dynamis</i> 178-195)
For those who have the optional <i>Pharmako/gnosis</i> , the entire book concerns psychedelics.	
Week 13: 18-22 Nov	Psychedelics, LSD, magic mushrooms, psilocybin. Debate Three in discussion section.
Week 14: 25-29 Nov	DMT, ayahuasca, peyote, mescaline.
Week 15: 2-6 Dec	Nitrous oxide. Brain and mind. (<i>Dynamis</i> 228-231) Midterm Exam Three on Thursday December 5.