

IB435 COURSE INFORMATION AND SYLLABUS

Syllabus (subject to change)

Jan	25	Lecture 1. Introduction
	27	Discussion 1. How to read (and discuss) a scientific paper
	29	Workshop 1. How to find the scientific literature and evaluate sources (K. Trei)
Feb	1	Lecture 2. Plant chemical ecology
	3	Discussion 2. Cardiac glycosides (review paper)
	5	Workshop 2. Strong inference and hypothesis testing
	8	Lecture 3. Animal chemical ecology
	10	Discussion 3. Venoms (clinical trials, bee venom)
	12	Workshop 3. Cocoa flavanols clinical trials (J. Erdman)
	15	Lecture 4. Fungal chemical ecology
	17	Discussion 4 BREAK
	19	Workshop 4. Basic statistical analysis, meta-analysis (CD, DB)
	22	Lecture 5. History of medicines from nature
	24	Discussion 5 TCM, CAM, Homeopathy/Dr. Chun-Tao Che
	26	Workshop 5. EXAM REV (CD, DB) 2:00 pm first hour exam available
March	1	First hour exam due
	3	Discussion 6. Ecological bioprospecting
	5	Workshop 6. How to write and submit a scientific review for publication
	8	Lecture 7. Antibacterial agents
	10	Discussion 7 Meta-analyses of manuka honey
	12	Workshop 7 Help session for choosing topics and writing manuscripts
	15	Lecture 8. Anti-viral agents and immunity boosters
	17	Discussion 8 Real vs bogus COVID-19 anti-viral and immunity products
	19	Workshop 8. Plant-based insect repellents
	22	Lecture 9. Antiparasitic agents
	24	Discussion 9. BREAK
	26	Workshop 9 Human genetic variation INDIVIDUAL PROJECTS DUE
	29	Lecture 10. Nervous system and psychiatric disorders
	31	Discussion 10. Kava kava, CBD, kratom, lavender?
April	2	Workshop 10. Writing for the general public/creating a podcast (Erin Allmann)
	5	Lecture 11. Urinary tract (diuretics and diet products)
	7	Discussion 11 Reading labels (“detox tea”)
	9	Workshop 11 Drug discovery Doug Mitchell
	12	Lecture 12. Skin and cosmeceuticals
	14	Discussion 12 Masks—do they work? (face, foot, and hair?)
	16	Workshop 12 Exam review 2:00 pm second hour exam available
	19	Second hour exam
	21	Discussion 13. Regulation and ethics sexual dysfunction products
	23	Workshop 13. Editing Wikipedia, creating Web content (Thom Uebele)
	26	Lecture 14. Interactions between complementary medicine and conventional medicines
	28	Discussion 14. What doctors need to know Don Briskin
	30	Workshop 14 More group planning (if needed)
May	3	Lecture 15. Future of herbal medicine
	5	Presentations of scicomm projects GROUP PROJECTS DUE

Course Information

Course Title: IB435 Critical Evaluation of Herbal Remedies

Instructor: May Berenbaum, 216 Morrill Hall, maybe@illinois.edu

Teaching assistants: Daniel Bush dsbush2@illinois.edu, Charles Dean, cedean2@illinois.edu
204 Morrill Hall

Class hours/week: MWF 1:00 pm-1:50 pm, Online

1 lecture (one hour), 1 discussion (one hour), 1 in-class workshop (1 hour) (3 credit hours).

Textbook: none

Readings: Relevant papers from the primary peer-reviewed scientific literature and from the “gray literature” (reports, patents, dissertations, conference papers, private sector research and other such publications that have not undergone stringent peer-review) where appropriate

Office Hours: By appointment

Course Description:

One-third of Americans use health care products derived from natural sources, particularly plants, animals, and fungi. This course examines the biological activity of natural products with respect to their ecological functions and their therapeutic uses. Principles of evidence-based medicine will be reviewed and students will evaluate herbal remedies through lectures, in-class activities, discussions, and analyses of scientific papers. Ideally, students develop skills useful for evaluating alternative remedies and for communicating their conclusions to the general public.

Prerequisites: IB202 or IB203 or consent of instructor.

Textbook: none. Readings will be taken from the peer-reviewed scientific literature and where appropriate from the “gray literature” (publications originating outside commercial or academic presses).

Grading (letter grades are based on the curve of total points out of 1000, with no plus/minus grades).

Exams: Two hour exams (drop lowest score) and one final (20% each) 40%

Individual project paper—*review/meta-analysis of the scientific literature relating to natural products in one therapeutic chemical class or one natural product with multiple uses* 20%

Group project—*popular article/blogpost/wiki evaluating the therapeutic value of products derived from nature* 20%

Participation 20%

Lecture participation will involve answering short questions within a week of the lecture through the Moodle site

Discussion sessions will focus on assigned readings from the literature, although the format will vary; workshop participation occurs optimally in real-time but can be carried out asynchronously with permission.

Learning outcomes:

--by the end of the semester, students should be able to read the label of an herbal product and know how to find information about the purported function of all ingredients, evaluate evidence for its efficacy, and explain to a non-scientist why you do or do not think it's worth buying.

COURSE POLICIES

General:

This course will follow all policies in the *Student Code*.

<http://www.admin.uiuc.edu/policy/code/index.html>

As stated in the Student Code, “It is the responsibility of each student to refrain from infractions of academic integrity, from conduct that may lead to suspicion of such infractions, and from conduct that aids others in such infractions”.

If you need disability accommodations, please just contact me at your earliest opportunity so that I can make sure to provide you with the assistance you need. According to campus, “Disability Accommodations -To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES you may visit 1207 S. Oak St., Champaign, call 333-4603 (V/TTY), or e-mail a message to disability@illinois.edu.”

Attendance: Attendance is highly desirable for all class sessions, but, in view of the pandemic, there will be flexibility--please alert a TA if you know you won't be able to attend workshops or discussions in real time. Lectures will be recorded for offline viewing if you can't attend in real time. If you anticipate problems completing assignments on time, accommodations can be made by contacting the instructor.

Class Format

Lectures: Every Monday there will be a 50-minute lecture. **The first section** of the semester will introduce students to the diversity of biologically active compounds in plants, animals, and microbes and their ecological functions in the lives of the organisms that produce them. **The second section** of the semester will acquaint students with the history of medicines from nature and with the evidence-based standards that govern contemporary medical practices. These lectures will provide students with the foundation needed for evaluating natural products used in conventional, alternative, and complementary medicine in the two writing assignments. In the **third section** of the course, each week the lectures will focus on drug targets, organ- or system-level physiological effects, and therapeutic intent (https://www.whocc.no/atc/structure_and_principles/) The final week (**the fourth section**) will consider the value of bioprospecting in advancing contemporary medicine, the utility of ecologically based approaches to guide bioprospecting and increase the success rate of finding new products for enhancing human health, and the potential environmental and cultural consequences of “mining biodiversity” for profit.

Discussions: Wednesdays will be 50-minute discussions involving the scientific literature in some way. In some weeks, all students will read one or two papers that relate to the Monday lecture of that week and be ready to ask a question for discussion. In other weeks, a controversy relating to the Monday lecture topic will be the focus and students will be assigned to teams that will debate the issue). Other formats may include Science Speed Dating, DiscussProv, IgNobel Prize, and others.

Workshops: Friday workshops vary in function and include presentations, demonstrations, experiments, and mastery of skill sets. Students will need an electronic device with Internet connectivity each week to participate in the planned activities; PLEASE LET ME KNOW IF THIS WILL BE A PROBLEM AND I CAN HELP YOU WITH ACCESS. These workshops are configured so as to provide experiences that develop skills that will hold students in good stead post-graduation in making evidence-based decisions that relate to health claims and in explaining those decisions to individuals who do not have a biology background.

Individual project: For the **first writing assignment** each student should consult with me to identify a particular natural product, based on your personal interest or relevance (e.g., family tradition, recent experience) or a particular medical condition for which herbal remedies are sold, and conduct a systematic review or meta-analysis of the available scientific literature that either supports or refutes the purported medicinal properties. **This paper should be written in the format of an appropriate scientific journal, following all instructions to contributors.** Papers are worth 200 points (15% of the total grade) and each paper grade breaks down as follows:

- Abstract, Introduction, Hypothesis: 40
- Methods for testing hypothesis: 40
- Results/Analysis of findings: 40
- Discussion: 40
- References: 20
- Formatting: 20

Group project: The group project requires students to work in groups to assemble and present scientific evidence that either supports or refutes the purported medicinal properties of a particular natural product in a format that is accessible to an audience without extensive training in biology. The format could be traditional (e.g., op-ed, popular magazine article) or electronic (wiki, blog, Twitter lecture, Facebook page, podcast). An aspirational goal is to make these group projects available to the general public in the real world (e.g., op-ed in local newspaper, Instagram lecture, Wikipedia correction). Projects are worth 200 points (20%) and each group project grade breaks down as follows:

- Accuracy of science: 50
- Appropriateness of language for the public: 50
- Effectiveness of use of media: 50
- Effectiveness of group effort: 50 (assessed by individuals in the group)