

IB435 COURSE INFORMATION AND SYLLABUS

Course Title: IB435 Evaluating herbal remedies (myth or medicine?)

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

Teaching assistant: Charles Dean, 204 Morrill Hall, cedean2@illinois.edu

Class hours/week: MWF 1:00 pm-1:50 pm, 2083 Natural History Building

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:

Exams: One hour exam and one final (15% each) 30%

Group project paper 1—*review/meta-analysis of the scientific literature relating to natural products in one therapeutic chemical class or one natural product with multiple uses* 15%

Group project paper 2—*popular article/blogpost/wiki evaluating the value of natural products within one therapeutic chemical class* 15%

Participation 40%

For every weekly discussion each student should post one question about the assigned reading by midnight the night before; workshop participation will be assessed in real-time in class

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 mandatory for all class sessions unless prior permission has been obtained from the instructor or the teaching assistant.

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, organized more or less according to the World Health Organization Collaborating Centre for Drug Statistics Methodology Anatomical Therapeutic Chemical Classification System (according to which “*the active substances are divided into different groups according to the organ or system on which they act and their therapeutic, pharmacological and chemical properties*” (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 discussion sessions based on a peer-reviewed scientific paper that relates to Monday’s lecture topic. All students are expected to read the paper before Wednesday’s class and by midnight the night before should upload one discussion question about the paper. Depending on the topic, these discussions may take on a debate-style format, with students defending a particular position about a particular herbal product. These readings will be posted for students to read with Monday’s Powerpoint and will be as current as possible.

Workshops: Friday workshops vary in function and include presentations, demonstrations, experiments, and mastery of skill sets. Students should bring an electronic device with Internet connectivity each week to participate in the planned activities. 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.

Writing assignments: Students will form groups of 4 or 5 for each of two writing assignments. For the **first writing assignment** each group will identify a particular natural product, based on personal interest or relevance (e.g., family tradition, recent experience) or a particular medical condition for which herbal remedies are sold and conduct a 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.

The **second writing assignment** 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).

IB435 Evaluating Herbal Remedies

		<i>Lecture</i>	
Jan	22	Lecture#0	Introduction
	24	WORKSHOP#0	<i>Meet the scientific literature (K. Trei)</i>
	27	Lecture#1	Chemical ecology
Feb	29	Discussion#1	Phytochemicals
	31	WORKSHOP#1	<i>Strong inference and hypothesis testing</i>
	3	Lecture#2	Animal chemical ecology
	5	Discussion#2	Venoms
March	7	WORKSHOP#2	<i>Statistical analysis (CD)</i>
	10	Lecture#3	Fungal chemical ecology
	12	Discussion#3	Mycotoxins
	14	WORKSHOP#3	<i>Case study: Cordyceps and cordycepin</i>
	17	Lecture#4	History of medicines from nature
	19	Discussion#4	Who uses complementary medicines and why
	21	First hour exam	
	24	Lecture#5	Antimicrobials
	26	Discussion#5	MRSA
	28	WORKSHOP#5	<i>Case study: manuka honey</i>
March	2	Lecture #6	Anti-parasitic products
	4	Discussion#6	Insect repellents
	6	WORKSHOP#6	<i>Experiment: human genetic variation</i>
	9	Lecture#7	Digestion
	11	Discussion#7	Cholesterol control
March	13	WORKSHOP#7	<i>Case study: red yeast rice and statins</i>
	14-22	Spring break	
	23	Lecture#8	Blood, cardiovascular, and respiratory systems
	25	Discussion#8	Allergies
	27	WORKSHOP#8	<i>Experiment: Samosas and fennel seeds</i>
April	30	Lecture#9	Skin
	1	Discussion#9	Cosmeceuticals
	3	WORKSHOP#9	<i>Case study</i>
	6	Lecture#10	Nervous system and sensory organs
	8	Discussion#10	Anxiety
	10	Second hour exam	
	13	Lecture#11	Urogenital and reproductive organs
	15	Discussion#11	ED
	17	WORKSHOP#11	<i>Case study: Herbal Viagras</i>
	20	Lecture#12	Interactions between complementary and conventional medicines
May	22	Discussion#12	Aromatherapy exercise
	24	WORKSHOP#12	<i>Communicating with the public</i>
	27	Lecture#13	Ecologically guided bioprospecting
	29	Discussion#13	Ethics and economics of bioprospecting
	1	WORKSHOP#13	<i>Legal issues: regulations and lawsuits</i>
	4	Conclusions	
	6	Review	

Final 7:00-10:00 p.m., Monday, May 11