

USC Dornsife
College of
Letters, Arts and
Sciences

**HBIO 250G – The Pharmacology of Performance-
Enhancing Drugs (4 units)
Fall 2023**

Lecture: Monday/Wednesday/Friday 10:00 a.m. – 10:50 a.m.

Location: SLH 102

Instructor: Kurt E. Kwast, Ph.D.

Office Hours: Wednesday 12:10 p.m. – 1:40 p.m., Thursday 11:00 a.m. – 12:30 p.m. via Zoom (Meeting ID: 981 665 0147 Passcode: HBIO), and by appointment

Office Hour Location: AHF 251

Office: AHF B39

Contact Information: kwast@usc.edu

Discussion: Monday 12:00 a.m. – 12:50 a.m. (38430R)

Wednesday 2:00 – 2:50 p.m. (38431R)

Thursday 2:00 – 2:50 p.m. (38432R)

Friday 12:00 – 12:50 p.m. (38433R)

Location: PED 203

Discussion Leaders: Alexander (Zander) Bashaw (abashaw@usc.edu), Joshua Carlos (jcarlos6@usc.edu), Molly Klug (meklug@usc.edu), and Logan Lauer (litiernol@usc.edu)

Office Hours: TBA

Office Location: TBA

Course Description

The science of drugs, nutritional supplements, and ergogenic aids that are purported to enhance human athletic performance and the ethical issues surrounding their use. Students will develop an appreciation of the complex, emotive, potentially dangerous, and illegal use of performance-enhancing drugs in sports concentrating on the science behind specific drug use in particular sporting events as well as its ethical, social, political, and administrative context.

Learning Objectives

Upon the successful completion of this course, students will be able to describe and explain the effects of pharmacological and ergogenic agents on human performance in sports. Specific learning objectives include the following:

- Identify and describe the structure and function of the body's muscular, neuromusculoskeletal, and cardiorespiratory systems, their responses to exercise, and how pharmacological agents alter their responses.
- Explain the general effects and any short- and/or long-term adverse effects of commonly used performance-enhancing drugs, including illegal, recreational, prescription, and over-the-counter drugs as well as dietary supplements.
- Construct and diagram the regulatory structure of anti-doping in sports.
- Describe and use the World Anti-Doping (WADA) Code and be able to explain inclusion criteria and the categories and classification of substances as well as methods that appear on the WADA Prohibited List.
- Place performance enhancement in sports into a physiological, sociological, and ethical context.
- Apply pharmacological knowledge to solve conceptual and real-world problems in sports physiology and performance enhancement.

Technological Proficiency and Hardware/Software Required

Although there are no specific technology/software requirements *per se*, you will need an internet-enabled device with browser capabilities, such as a tablet, laptop or desktop computer, to access Blackboard, which will be the gateway for many assignments as well as the repository for lecture slides, videos, and other course materials. Should we need to go online, lectures will be delivered via Zoom. Exams may be delivered electronically and, if so, will require installation of [Respondus Lockdown Browser](#) on a PC or Mac computer (Chromebooks are not supported). Support for these resources can be found at the [ITS Customer Support Center](#).

USC Technology Rental Program

If students need resources to successfully participate in this class, such as a laptop or internet hotspot, you may be eligible for the university's equipment rental program. To apply, please [submit an application](#). The Student Basic Needs team will contact all applicants in early August and distribute equipment to eligible applicants prior to the start of the Fall semester.

USC Technology Support Links

[Zoom information for students](#)

[Blackboard help for students](#)

[Software available to USC Campus](#)

Required Materials

***Drugs in Sport*, 7th or 8th edition**, edited by David Mottram & Neil Chester, Routledge Press, London, 7th 2018 ISBN-13: 978-0415789417; 8th 2022 ISBN: 978-1003096160. New paperback copies are available at the campus bookstore. Used and electronic copies are available from various online resources including the publisher's website. Purchasing options will be covered in the first introductory lecture.

Optional Materials

William Llewellyn's Anabolics, 11th edition, Molecular Nutrition, LLC, Jupiter, FL, 2017. ISBN-13: 978-0999062111 (hardcover) or ISBN-13: 978-0999062104 (softcover). New and used copies are available from various online resources including the publisher's. NOTE: Even though I will be presenting some material from this text, it is not necessary for you to purchase this book.

Run, Swim, Throw, Cheat: The Science Behind Drugs in Sport, Cooper, C. Oxford University Press, Oxford, UK, 2012 (ISBN-13: 978-0199678785). New and used copies are available from various online resources including the publisher's. NOTE: Even though I will be presenting some material from this text, it is not necessary for you to purchase this book.

Description and Assessment of Assignments

Written Exams will be administered in person on specific days during the class period (see Course Schedule below). Exams may be delivered electronically and, if so, will require installation of [Respondus Lockdown Browser](#) on a PC or Mac computer (Chromebooks are not supported). Exams will be used to access all of the learning objectives. Exams may include multiple choice, multiple answer, true or false, fill-in-the-blank, short answer, or essay questions. A request to take a make-up exam must be accompanied by evidence of a university-sanctioned excused absence (*e.g.*, a letter from a doctor, athletic release, etc.) and must be made before the date of the scheduled exam. Make-up exams may be given in a different format from that of the scheduled exam (*e.g.*, essay). Should the university allow asynchronous students to enroll, online exams may be administered at a different time or day. Asynchronous students who live in a time zone in which taking exams synchronously would be highly inconvenient should contact me the first week of class to discuss arrangements.

In-Class Work will largely be unscheduled and used to access all learning objectives, especially the last two. Work may include small group assignments, polls, a summary of lecture points, open-note or closed-note quizzes, problem solving in groups, a submitted question of a "muddy point," or other individual assignments to be submitted or reported on by the end of class. When working in groups, all members will receive the same score for the work product. Students who miss an assignment as a result of either arriving late or leaving early will not have the opportunity to make up the work. However, the lowest three in-class assignments will be dropped to allow for occasional absences. Should the university allow for students to attend remotely, students who live in a different time zone in which synchronous in-class assignment completion would be extremely inconvenient should contact me during the first week of class to discuss accommodations for in-class work.

One of the purposes of having a **Discussion Section** beyond the clarification of content covered in lecture is to lay out expectations and help develop the **term paper**, which will account for 20% of your grade. In brief, the term paper will be a 4 – 5 page (double-spaced) "cause and effect" literature review research paper on a specific drug or ergogenic agent of your choice with purported performance-enhancing qualities. The discussion leader will provide a detailed description of the paper, which will include supporting documentation of its performance-enhancing qualities and citations from recent primary research articles. A rubric for grading will be provided by the discussion leader. The term paper is due November 2nd and will be submitted on Blackboard for grading by the discussion leader.

Grading Breakdown

Assignment	Points	% of Grade
Pop Quizzes/In-Class Work	100	10
Midterm 1	150	15
Midterm 2	150	15
Midterm 3	150	15
Final Exam	200	20
Discussion In-Class Work (50 points) and Term Paper (200 points)	250	25
Total	1000	100

Grading Scale

Letter Grade	Point Ranges	Grade Point Value
A	930-1000	4.000
A-	900-929	3.667
B+	870-899	3.333
B	830-869	3.000
B-	800-829	2.667
C+	770-799	2.333
C	730-769	2.000
C-	700-729	1.667
D+	670-699	1.333
D	630-669	1.000
D-	600-629	0.667
F	<600	0.000

Individual exams, quizzes, in-class assignments, and the term paper will be scored but not assigned a letter grade. Only the final point tally will be used to assign a letter grade. Additional details about grading and the possible application of a final point total curve will be discussed during the first introductory lecture.

Late Work

All in-class assignments will be due as indicated during class when delivering the assignment, typically by the end of class, and they cannot be made up unless there is a university-sanctioned excuse for missing class. Similarly, any pre-lecture or homework assignments will have published due dates and will not be accepted late. Late submission of the term paper will result in a 2% reduction in the total score per day after the due date.

Communication Policies

Students are *strongly* encouraged to contact the instructor in regard to all matters involving course content or policy during office hours. Should you have a question about specific course content and cannot attend office hours, students

are encouraged to submit their question to the course blog. Should you need to communicate with the instructor outside of class or office hours about a question other than course content, please email the instructor from your USC email account *making sure to include in the subject line the course number* (expect significant delays or no response if this information is omitted). Simple questions will be answered by email but for more complex discussions students may be instructed to visit office hours. Best attempts will be made to answer all emails within 48 hours, 72 hours over a weekend and the work day following a holiday. Note that the instructor may not respond to non-emergency emails 24 hours preceding an exam and may not respond to emails sent from non-USC accounts.

To promote independence and critical thinking, students are encouraged to work through the following process for obtaining answers to course-related questions before contacting the instructor. First, consult the course syllabus. If you cannot find the answer you need, next please consult a classmate. If you still cannot find a satisfactory answer, email the instructor using your USC email *making sure to include the course number in the subject line*. In your email, please indicate the steps you have gone through to seek the answer for your question. Use your USC email account for all correspondence with the instructor.

Technology Policies

It is expected that students will use any internet-enabled device(s) to participate in activities guided by the instructor alone. Such activities include looking up terms, doing research, and completing in-class assignments. Please make sure all electronic devices are silenced so as not to disturb classmates or the instructor during class. Use of electronic devices for other purposes during class is strongly discouraged and you may be asked to put a device away should your instructor deem it to be disruptive. If you require an internet-enabled device, please see the “Technological Proficiency and Hardware/Software Required” section above.

Attendance

Attendance is mandatory given in-class assignments cannot be made up unless a student has been excused from such an assignment due to a university-sanctioned excuse (*e.g.*, illness, religious holiday, athletic event, etc.). Should the university allow remote students to enroll, if you live in a time zone in which attending class would be extremely inconvenient, please contact the instructor to make other arrangements for the assessment of in-class skill sets.

Diversity, Equity, and Inclusion Statement

I and your discussion leader are committed to the creation and maintenance of inclusive learning spaces in which you will be treated with respect and dignity and where all individuals are provided equitable opportunity to participate, contribute, and succeed. In HBIO 250, all students are welcome regardless of race/ethnicity, gender identities, gender expressions, sexual orientation, socio-economic status, age, disabilities, religion, regional background, Veteran status, citizenship status, nationality and other diverse identities that each of you and the faculty bring to class. I view the diversity that all of us bring to this class as a resource that cultivates strength and benefit.

Your success at USC and beyond is enhanced by the innovation and creativity of thought that inclusive classrooms facilitate. The success of an inclusive classroom relies on the participation, support, and understanding of you and your peers. I encourage you to speak up and share your views, but also to understand that you are doing so in a learning environment in which we all are expected to engage respectfully and with regard to the dignity of all others.

It is my intent that all students be well served by this course and that your learning needs be addressed both in and out of class. If your needs are not being met, please talk to me or the appropriate resource provider listed at the end of this syllabus.

Classroom Norms

At all times, students are expected to promote and support a positive learning environment, to listen actively and attentively, to follow best practices of inclusivity, to be respectful of the instructors' and fellow students' views and opinions, and to only provide *constructive* criticisms and critiques when asked to do so.

Zoom Etiquette (if applicable)

In order to simulate an in-class-room experience during any synchronous Zoom sessions, one that promotes positive interactions and feedback to the instructor and fellow students, students are strongly encouraged to attend the sessions dressed in classroom attire and to turn on their webcams if they are located in a learning-appropriate environment. So as to circumvent Zoom bombing, synchronous Zoom sessions will be password protected and students will only be allowed to enter through the USC's Blackboard site when displaying their full name as it appears in the class roster (aliases are not permitted). Microphones should be muted unless actively asking questions or involved in discussion. In-meeting chat will likely be enabled but actively monitored for disruptive or inappropriate posts and recorded for further review. Disruptive or inappropriate behavior will not be tolerated and anyone engaging in such behavior shall be removed from the session. Should bandwidth be an issue, try joining with the video from your webcam and use your cellphone for the audio. If you have any questions or concerns about complying with these policies, please email the instructor.

Synchronous Session Recordings

If we are instructed to do so by the administration, all synchronous sessions save for office hours will be recorded and posted on Blackboard, typically within a few hours of the session. Should the university not require lectures to be recorded, it will be up to your course instructor and discussion leader to decide based upon factors such as in-person attendance.

Sharing of Course Materials Outside of the Learning Environment is Strictly Prohibited

USC has a strict policy (SCampus Section 11.12[B]) that prohibits sharing of *any* synchronous and asynchronous course content outside of the learning environment. Any student who violates this policy will be prosecuted to the maximum extent allowable by the USC Student Conduct Code, including failure of the course and suspension from the University.

Distribution or use of notes or recordings based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study is a violation of the USC Student Conduct Code. This includes, but is not limited to, providing materials for distribution by services publishing class notes. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the Internet or via any other media. (See Section C.1 Class Notes Policy).

Tentative Course Schedule

DATE	TOPIC, EVENT, OR HOLIDAY	MOTTRAM & CHESTER, 7 th
Aug. 21	Introduction	
Aug. 23	What is a Performance Enhancing Drug (PED) and Ergogenic Factor?	Ch. 1
Aug. 25	PEDs & Limits to Human Performance and Influence of Drugs	Ch. 1 - 2
Aug. 28	History of Doping, Oversight and Current Regulations (IOC, WADA, etc.)	Ch. 3 - 5
Aug. 30	History of Oversight Continued Pharmacology	
Sept. 1	Pharmacology, Pharmacodynamics, & Pharmacokinetics	
Sept. 4	LABOR DAY HOLIDAY	
Sept. 6	Pharmacology Continued & Skeletal Muscle Architecture and Organization	-
Sept. 8	Skeletal Muscle Architecture and Organization Continued	-
Sept. 11	Skeletal Muscle Design II Skeletal Muscle Growth Pathways	-
Sept. 13	Skeletal Muscle Growth Pathways	-
Sept. 16	Review of Material for Midterm Exam 1	
Sept. 18	MIDTERM EXAM 1	-
Sept. 20	Skeletal Muscle Excitation-Contraction Coupling	-
Sept. 22	Motor Unit Recruitment, Types of Contractions & Bioenergetics	-
Sept. 25	Bioenergetics Continued	-
Sept. 27	Respiro-Cardiovascular System	-
Sept. 29	Respiro-Cardiovascular System Continued	
Oct. 2	Anabolic Agents	Ch. 9 +12
Oct. 4	Peptide Hormones	Ch. 10
Oct. 6	β -2 Agonists	Ch. 11
Oct. 9	Diuretics and Masking Agents	Ch. 13
Oct. 11	Oxygen Transport (Hemoglobin / RBCs / EPO)	Ch. 14
Oct. 13	FALL RECESS	
Oct. 16	Blood Doping, EPO and O ₂ Carriers	Ch. 14
Oct. 18	Review of Material for Midterm Exam 2	
Oct. 20	MIDTERM EXAM 2	
Oct. 23	Narcotics	Ch. 18
Oct. 25	Cannabinoids	Ch. 19
Oct. 27	Glucocorticoids	Ch. 20
Oct. 30	Alcohol	Ch. 21
Oct. 31	Beta Agonists & Antagonists	Ch. 22
Nov. 1	Caffeine & Other Stimulants (Term Paper Due)	Ch. 17 + 25
Nov. 3	NSAIDS and OTC Drugs	Ch. 23
Nov. 6	Supplements for High-Intensity Exercise/Exercise Nutrition	Ch. 24

Nov. 8	Other Supplements	Ch. 24
Nov. 10	VETERAN'S DAY HOLIDAY	
Nov. 13	Review of Material for Midterm Exam 3	
Nov. 15	MIDTERM EXAM 3	
Nov. 17	Artificial Environments	
Nov. 20	Gene Doping	Ch. 16
Nov. 22 & 24	THANKSGIVING BREAK	
Nov. 27	Muscle Adaptations to Increased Use	
Nov. 29	Select Topics	
Dec. 1	Wrap Up and Final Exam Review	
Dec. 11	8:00 a.m. – 10:00 a.m. FINAL EXAMINATION	

Academic Accommodations

Any student requesting academic accommodations based on a disability are required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to the instructor as early in the semester as possible. DSP is located in Student Union (STU) 301 and is open 8:30 a.m. – 5:00 p.m. Monday – Friday. The phone number for DSP is (213) 740-0776.

Academic Integrity and Conduct

Students who violate University standards of academic integrity are subject to disciplinary sanctions, including failure of the course and suspension from the University. Given that dishonesty in any form harms not only the individual but other students and the University, academic integrity policies will be strictly enforced. Please familiarize yourself with the Academic Integrity guidelines found in the current SCampus (Student Handbook).

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on [Research and Scholarship Misconduct](#).

Academic Integrity Violations

Academic dishonesty/misconduct, e.g., plagiarism, cheating, unauthorized collaboration, etc., will not be tolerated. All academic integrity violations will result in a grade sanction and will be reported to the Office for Student Judicial Affairs. It is your responsibility to “reasonably” protect your own work from the plagiarism of others.

If plagiarism is detected on a group project, all members of the group will be held responsible.

You are expected to be familiar with the Academic Integrity guidelines found in the current SCampus. An electronic version is available at <http://usc.edu/scampus>.

Disruptive and Threatening Student Behavior

Behavior that persistently or grossly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. Such behavior inhibits other students' ability to learn and the instructor's ability to teach. A student responsible for disruptive behavior may be required to leave class pending discussion and resolution of the problem and may be reported to the Office of Student Judicial Affairs for disciplinary action.

Support Systems

Counseling and Mental Health - (213) 740-9355 – 24/7 on call

studenthealth.usc.edu/counseling

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call

suicidepreventionlifeline.org

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press "0" after hours – 24/7 on call

studenthealth.usc.edu/sexual-assault

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) - (213) 740-5086 | Title IX – (213) 821-8298

equity.usc.edu, titleix.usc.edu

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298

usc-advocate.symplcity.com/care_report

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity | Title IX for appropriate investigation, supportive measures, and response.

The Office of Disability Services and Programs - (213) 740-0776

dsp.usc.edu

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Campus Support and Intervention - (213) 821-4710

campussupport.usc.edu

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101

diversity.usc.edu

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

dps.usc.edu, emergency.usc.edu

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call

dps.usc.edu

Non-emergency assistance or information.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

ombuds.usc.edu

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.