

**USC** Dornsife  
College of  
Letters, Arts and  
Sciences

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

**Fall 2020**

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

**Location:** VKC 156\*

**Instructor:** Kurt E. Kwast, Ph.D.

**Office:** AHF B39\*

**Office Hours:** Monday 11:00 a.m. – 12:00 p.m., Wednesday 12:00 p.m. –  
1:00 p.m. and by appointment

**Contact Info:** [kwast@usc.edu](mailto:kwast@usc.edu)

**Grader:** Margaret (Katie) Sayre

**Office:** PED B2\*

**Office Hours:** By appointment

**Contact Info:** [mksayre@usc.edu](mailto:mksayre@usc.edu)

*\* For Fall 2020, all classes and office hours will be held online via  
Zoom.*

## 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 prescription, over-the counter, and recreational drugs as well as dietary supplements.
- Construct and diagram the regulatory structure of anti-doping in sports.
- Describe and use the World Anti-Doping 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 cell phone, tablet, laptop or desktop computer, to access Blackboard, which will be the gateway for online synchronous Zoom lectures and most assignments, as well as the repository for lecture slides, Zoom videos, and other course materials. In addition, students will need to download and utilize [Respondus Lockdown Browser](#) to take all scheduled exams. Finally, students will need to use a VPN client, such as [Cisco AnyConnect Secure Mobility Client](#), to gain access to the USC library holdings in order to complete the term research paper. Support for such resources can be found through 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 edition***, edited by David Mottram & Neil Chester, Routledge Press, London, 2018 (ISBN-13: 978-0415789417). New paperback copies are available at the campus bookstore. Used and electronic copies are available from various online resources including Amazon.

## Optional Materials

**William Llewellyn's Anabolics, 11<sup>th</sup> 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 and Amazon.

**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 Amazon.

## Description and Assessment of Assignments

**Written Exams** will be administered synchronously online on specific days during the class period (see Course Schedule below) whereas **Pop Quizzes** will be unscheduled and taken during synchronous Zoom classes. Exams and pop quizzes will be used to access the first four learning objectives. Exams and quizzes 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). Students who live in a different time zone in which synchronous exam/quiz completion would be extremely inconvenient should contact me during the first week of class in order to potentially make other arrangements for completing exams and pop quizzes.

**In-Class Work** will be unscheduled during synchronous Zoom classes and will be used to access all learning objectives, especially the last two. Work may include small group assignments, polls, a summary of lecture points, open-note quizzes, problem solving in groups, a submitted question of a "muddy point," or other 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. 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 in order to potentially make other arrangements for completing in-class work.

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 paper will include supporting documentation of its performance-enhancing qualities and citations from recent primary research articles. A detailed description of the term paper and the rubric for grading will be provided at a later time. The term paper is due November 2<sup>nd</sup> and will be submitted on Blackboard for grading by the course grader.

## Grading Breakdown

Assignment	Points	% of Grade
Pop Quizzes/In-Class Work	150	15
Midterm Exam 1	150	15
Midterm Exam 2	150	15
Midterm Exam 3	150	15
Final Exam	200	20
Term Paper	200	20
<b>Total</b>	<b>1000</b>	<b>100</b>

## Grading Scale

Letter Grade	Point Ranges	Grade Point Value
A	930 - 1000	4.0
A-	900 - 929	3.67
B+	870 - 899	3.33
B	830 - 869	3.0
B-	800 - 829	2.67
C+	770 - 799	2.33
C	730 - 769	2.0
C-	700 - 729	1.67
D+	670 - 699	1.33
D	630 - 669	1.0
D-	600 - 629	0.67
F	<600	0.0

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.

### Late Work

All in-class assignments will be due by the end of class and cannot be made up if missed. Similarly, all pre-lecture and homework assignments will have published due dates and will not be accepted late. However, the lowest three assignments of each will be dropped to allow for occasional in-class absences and missed pre-lecture or homework assignment deadlines.

### Communication Policies

Students are *strongly* encouraged to contact the instructor in regard to all matters involving course content or policy during Zoom 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 and your full name* (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 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 and your full name in the subject line* (expect significant delays or no response if this information is omitted). 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**

During synchronous Zoom sessions, it is expected that students will use their 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 work. Please make sure all electronic devices are silenced so as not to disturb classmates or the instructor during synchronous sessions. 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 to class. If you require an internet-enabled device, please see the “Technological Proficiency and Hardware/Software Required” section above.

## **Attendance**

Attendance in synchronous Zoom sessions 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.) or because they live in a time zone in which attending such sessions is extremely inconvenient and they have made other arrangements for the assessment of in-class skill sets with the instructor.

## **Classroom Norms**

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

## **Zoom Etiquette**

In order to simulate an in-classroom experience during 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**

All synchronous sessions except for office hours will be recorded and posted on Blackboard, typically within a few hours of the session.

## **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	Lecture Topic	Mottram & Chester
Aug. 17	Introduction	
Aug. 19	What are Performance Enhancing Drugs and Ergogenic Factors?	Ch. 1
Aug. 21	Limits to Human Performance and Influence of Drugs	Ch. 1 - 2
Aug. 24	History of Doping, Oversight and Current Regulations (IOC, WADA, etc.)	Ch. 2 - 5
Aug. 26	Pharmacology	
Aug. 28	Pharmacokinetics	
Aug. 31	Skeletal Muscle Design I	
Sept. 2	Skeletal Muscle Design II	-
Sept. 4	Skeletal Muscle Growth Pathways	-
Sept. 7	<b>LABOR DAY HOLIDAY</b>	-
Sept. 9	Review of Material for Midterm Exam 1	-
Sept. 11	<b>MIDTERM EXAM 1</b>	
Sept. 14	Cardiovascular System	-
Sept. 16	Respiratory System	-
Sept. 18	Bioenergetics	-
Sept. 21	Anabolic Agents I	Ch. 9 + 12
Sept. 23	Anabolic Agents II	Ch. 9 + 12
Sept. 25	Peptide Hormones	Ch. 10
Sept. 28	$\beta$ -2 Agonists	Ch. 11
Sept. 30	Diuretics and Masking Agents	Ch. 13
Oct. 2	Oxygen Transport (Hemoglobin / RBCs / EPO)	Ch. 14
Oct. 5	Blood Doping, EPO and O <sub>2</sub> Carriers	Ch. 14
Oct. 7	Review of Material for Midterm Exam 2	
Oct. 9	<b>MIDTERM EXAM 2</b>	
Oct. 12	Narcotics	Ch. 18
Oct. 14	Narcotics / Cannabinoids	Ch. 18 & 19
Oct. 16	Glucocorticoids	Ch. 20
Oct. 19	Alcohol	Ch. 21
Oct. 21	Beta Blockers	Ch. 22
Oct. 23	Caffeine	Ch. 25
Oct. 26	NSAIDS	Ch. 23
Oct. 28	OTC Drugs / Herbs	Ch. 17 & 24

Oct. 30	Supplements for High-Intensity Exercise	
Nov. 2	Exercise Nutrition ( <b>Term Paper Due</b> )	
Nov. 4	Review of Material for Midterm Exam 3	
Nov. 6	<b>MIDTERM EXAM 3</b>	
Nov. 9	Artificial Environments	-
Nov. 11	Gene Doping	Ch. 16
Nov. 13	Wrap Up and Final Review	-
Nov. 23	<b>FINAL EXAMINATION 8:00 a.m. – 10:00 a.m.</b>	

### **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, *i.e.*, 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. Additional information can be found in SCampus as well as university policies on scientific misconduct (policy.usc.edu/scientific-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](http://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](http://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](http://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](http://equity.usc.edu), [titleix.usc.edu](http://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.symplicity.com/care\\_report](http://usc-advocate.symplicity.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](http://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](http://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](http://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](http://dps.usc.edu), [emergency.usc.edu](http://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](https://dps.usc.edu)

Non-emergency assistance or information.

**Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)**  
[ombuds.usc.edu](https://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.