

NEUROMUSCULAR ADAPTATION

APK6118 ~ 3 CREDITS ~ SPRING 2021

INSTRUCTOR:

Lan Wei-LaPierre Ph.D

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Preferred Method of Contact: email/in person at class

OFFICE HOURS:

By appointment

MEETING TIME/LOCATION: Fridays, Period 3-5 (9:35am-12:35pm), FLG 230,

COURSE DESCRIPTION: This course will combine a highly cellular and molecular approach to muscle and nerve function and then apply these to integrative views of muscle properties in the context of adaptation to exercise, disuse atrophy and disease states.

PREREQUISITE KNOWLEDGE AND SKILLS: Throughout the course we will review cell physiology and elementary biophysics as we enter into each topic. It is not required that students have an extensive background in advanced physiology, biophysics or biochemistry, but these will be incorporated in a "ground up" approach to understanding fundamental principles. Students taking the course and mastering the material should be prepared to enter into more advanced muscle physiology research or physical therapy research and will have a sufficient background to explore a wide range of topics from a cellular perspective in physiology. Although there is a heavy emphasis on skeletal muscle, the course will incorporate some introductory aspects of neuronal function and adaptation.

Students will be expected to be active participants through in class discussions and presentations.

REQUIRED AND RECOMMENDED MATERIALS: There is no required text for this course. All lectures and outside reading material will be in the form of review articles and research articles provided on the Canvas, e-learning platform. One text, which is not

required, but has useful information for students of Muscle Biology is “Skeletal Muscle Structure, Function and Plasticity” by Richard L. Lieber, Third edition. The instructor will use information from the text in some parts of the course. The instructor will also use Molecular Biology of the Cell by Alberts et al., Fourth edition for portions of the class, a standard text in cell biology. Finally, several papers that are comprehensive reviews of topics will be provided for each course modules to serve as background material.

Papers: The primary literature forms the basis of fundamental concepts for physiology. Some concepts become sufficiently accepted to appear in textbooks, whereas others may not become substantiated enough to be part of the general knowledge. Further, in some areas of exercise physiology, there is a change in concepts, and so textbooks, which are many years behind in current knowledge, may not adequately address a new area. Thus, we will spend a large proportion of class time reviewing emerging concepts and classic papers in muscle and nerve physiology.

COURSE FORMAT: Lecture time will be generally divided among the following activities:

- 1) didactic presentations to provide background on the weekly topic
- 2) student presentations of the research papers
- 3) student discussion of the papers in the context of the weekly topic

Two take-home exams will be given in lieu of lecture.

COURSE LEARNING OBJECTIVES: By the end of this course, students should be able to:

- **Understand** fundamental principles of muscle and neuromuscular adaptation to stresses imposed from exercise, stretch, injury, fatigue, and genetic disease.
- **Explain** methodology, terminology and instrumentation used in muscle research.
- **Critically review**, understand and appreciate a wide breadth of cellular and molecular physiology literature, largely related to striated muscle.
- **Interpret** the literature and to discuss it in the context of fundamental physiological principles.

COURSE AND UNIVERSITY POLICIES:

ATTENDANCE POLICY: Attendance is encouraged for all class time sessions. It will be part of the Class Participation grade (see below). You will be excused from class if you have a legitimate reason to be gone; please send an email before class starts as to why you need to miss the class. These will be kept on file for the semester. Please note: the University has specific reasons that are acceptable for missing class, which apply to both undergrad and grad students. You can find this at

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>:

“In general, acceptable reasons for absence from or failure to participate in class include illness, serious family emergencies, special curricular requirements (e.g., judging trips, field trips, professional conferences), military obligation, severe weather conditions, religious holidays and participation in official university activities such as music

performances, athletic competition or debate. Absences from class for court-imposed legal obligations (e.g., jury duty or subpoena) must be excused. Other reasons also may be approved."

In general, cell phones or computers are allowed in class, particularly to follow along with the lectures and assignments. However, please put your phone on "silent" or airplane mode during class and do not answer the phone or respond to a text message during class. If whatever you are doing is disturbing the class, you will be asked to leave.

PERSONAL CONDUCT POLICY: For written assignments the instructor submits all material to TURNITIN.com, which is designed to determine whether what you have written is original material. Penalties for plagiarism will be enforced in this class. It may have extreme consequences such as receiving an F (failure) for the entire class, depending on the severity of the infraction. Understanding this aspect of scholarship is required to prepare you as a scientist, scholar and professional. Please review the UF Honor Pledge Code for students (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>), which specifies a number of behaviors that are in violation of the code and possible sanctions. Furthermore, you are obliged to report any condition that facilitates academic misconduct in others. Please contact me directly if you have any concerns about ongoing misconduct.

EXAM MAKE-UP POLICY: If you miss an exam due to an excused absence, a make up exam will be scheduled at the earliest feasible date. If an exam is missed due to an unexcused absence, then a make up exam will be scheduled, but 10 points will be deducted from the final score for every 3 days of delay.

A student experiencing an illness should visit the UF Student Health Care Center or their preferred healthcare provider to seek medical advice and obtain documentation. If you have an illness, family emergency or death, please contact the Dean of Students Office (www.dso.ufl.edu) and follow the DSO Care Team procedures for documentation and submission of a request for make-up assignment (<https://care.dso.ufl.edu/instructor-notifications/>). The DSO will contact the instructor. Do not provide any documentation to the instructor regarding illness or family emergency. This is your personal and protected information. The DSO is qualified to receive and verify the documents you provide. The instructor will follow the recommendations from the DSO. Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>."

ACCOMMODATING STUDENTS WITH DISABILITIES: Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center by visiting their Get Started page at <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

COURSE EVALUATIONS: Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

COVID-RELATED: For face to face courses a statement informing students of COVID related practices such as:

- We will have face-to-face instructional sessions to accomplish the student learning objectives of this course. In response to COVID-19, the following policies and requirements are in place to maintain your learning environment and to enhance the safety of our in-classroom interactions.
- You are required to wear approved face coverings at all times during class and within buildings. Following and enforcing these policies and requirements are all of our responsibility. Failure to do so will lead to a report to the Office of Student Conduct and Conflict Resolution.
- This course has been assigned a physical classroom with enough capacity to maintain physical distancing (6 feet between individuals) requirements. Please utilize designated seats and maintain appropriate spacing between students. Please do not move desks or stations.
- Sanitizing supplies are available in the classroom if you wish to wipe down your desks prior to sitting down and at the end of the class.
- Follow your instructor's guidance on how to enter and exit the classroom. Practice physical distancing to the extent possible when entering and exiting the classroom.
- If you are experiencing COVID-19 symptoms ([Click here for guidance from the CDC on symptoms of coronavirus](#)), please use the UF Health screening system and follow the instructions on whether you are able to attend class. [Click here for UF Health guidance on what to do if you have been exposed to or are experiencing Covid-19 symptoms](#).
- Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work. [Find more information in the university attendance policies](#).

PRIVACY: Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded

during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

GETTING HELP:

Health and Wellness

- U Matter, We Care: If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575
- Counseling and Wellness Center: <https://counseling.ufl.edu/>, 352-392-1575
- Sexual Assault Recovery Services (SARS) - Student Health Care Center, 392-1161
- University Police Department, 392-1111 (or 9-1-1 for emergencies)
<http://www.police.ufl.edu/>

Academic Resources

- E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. <https://lss.at.ufl.edu/help.shtml>
- Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling. <https://career.ufl.edu/>
- Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.
- Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. <http://teachingcenter.ufl.edu/>
- Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <http://writing.ufl.edu/writing-studio/>
- Student Complaints On-Campus: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/> On-Line Students Complaints: <http://distance.ufl.edu/student-complaint-process/>

INCLUSION, DIVERSITY, EQUITY, AND ACCESSIBILITY RESOURCES

For suggestions or concerns related to IDEA, please reach out to any of the following:

- Dr. Leo Ferreira, APK IDEA Liaison, ferreira@hhp.ufl.edu
- Dr. Rachael Seidler, APK Graduate Coordinator, rachaelseidler@ufl.edu
- Dr. Joslyn Ahlgren, APK Undergraduate Coordinator, jahlgren@ufl.edu

GRADING:

Exams: There will be a midterm and a final exam. The final will not be comprehensive. Both exams will be open book/notes. These exams will comprise 60% of the grade.

Assignments: Students will be asked to submit short assignments on the readings for each week. The format of the assignments will entail choosing a figure from one of the

papers for discussion, and discussing the results, underlying methodology/analysis, and the context of the findings presented with respect to the whole paper. These assignments will be worth 10% of the final grade.

Class Participation/Presentations: A central part of learning in this course is discussion of the topics, and challenging each other (and the professor!) about statements or findings. IN addition, students will be responsible for paper presentations throughout the semester. Class discussion and student presentations will comprise 30% of the grade. A portion of these discussion points will be given just for showing up to class, and those who are more vocal in class will receive full credit.

Evaluation Components (number of each)	Points Per Component	Approximate % of Total Grade
Exams (2)	30 pts each = 60 pts	60%
Assignments (10)	1 pts each = 10 pts	10%
Class Participation (1)	10 pts each = 10 pts	10%
Paper presentation (2)	10 pts each = 20 pts	20%

GRADING SCALE: Grades for quizzes will be uploaded into Canvas within 48 hours after completion. For the student BYOA project, routine review of the weekly assignments will be given so that students can revise these prior to the final assessment of the project at the end of the course. Grades will be calculated to the nearest 2 decimal places. More detailed information regarding current UF grading policies can be found here: <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>. *Any requests for additional extra credit or special exceptions to these grading policies will be interpreted as an honor code violation (i.e., asking for preferential treatment) and will be handled accordingly.*

Letter Grade	Percent of Total Points Associated with Each Letter Grade	GPA Impact of Each Letter Grade
A	94.00-100%	4.0
A-	90.00-93.99%	3.67
B+	87.00-89.99%	3.33
B	84.00-86.99%	3.0
B-	80.00-83.99%	2.67
C+	77.00-79.99%	2.33
C	70.00-76.99%	2.0
D+	67.00-69.99%	1.33
D	60.00-66.99%	1.0
E	0-59.99%	0

WEEKLY COURSE SCHEDULE:

Week	Dates	Topic
1	Jan 15	Introduction and organization
2	Jan 22	Quiz review and Muscle & Nerve didactics
3	Jan 29	Muscle Hypertrophy I-Growth factors
4	Feb 5	Muscle Hypertrophy II-Satellite Cells
5	Feb 12	Muscle Atrophy I-Atrogenes
6	Feb 19	Muscle Atrophy II-Autophagy
7	Feb 26	Muscle injury, Rhabdomyolysis
8	Mar 5	Take home exam 1 (Mid-term)
9	Mar 12	Muscle Plasticity I - Fiber types
10	Mar 19	Muscle Plasticity II - Intracellular Signaling
11	Mar 26	Neural plasticity
12	Apr 2	Plasticity and microRNAs
13	Apr 9	Muscle and metabolism
14	Apr 16	Take home Exam 2 (Final)

SUCCESS AND STUDY TIPS:

All students are encouraged to ask questions during and after class, and engage in discussions during class. An important aspect of this is reading the papers for discussion so that participation is possible.