

NEUROMUSCULAR ADAPTATION

APK6118 ~ 3 CREDITS ~ SPRING 2022

INSTRUCTOR:

Elisabeth Barton, PhD

Office: 202D FLG

Office Phone: 352-294-1714

Email: erbarton@ufl.edu

Preferred Method of Contact: email or at class

OFFICE HOURS:

Fridays 11:30 – 12:30 pm, or by appointment

Appointments may be scheduled in person or by email

MEETING TIME/LOCATION:

FLG 225, Fridays Periods 6-8 12:50 PM – 3:50 PM

COURSE DESCRIPTION: Research developments that describe neural and muscular function and adaptation to acute and chronic exercise.

PREREQUISITE KNOWLEDGE AND SKILLS: APK6116C or permission by the instructor.

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. I will use information from the text throughout the course. I 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, I will provide several papers that are comprehensive reviews of topics within the course modules that will serve of background material.

COURSE FORMAT: There will be ~1 lecture hour per week by the instructor to cover basic principles and concepts. The remaining time will be discussions of both classic and cutting edge research publications led by students or problem solving sessions led by the instructor.

COURSE LEARNING OBJECTIVES: The goal of this course is to provide an overall background in cellular and molecular physiology as it applies to skeletal muscle and nerve tissue. Students will be given sufficient background to be able to communicate fluently and understand the work of investigators studying basic muscle cell biology and to apply this knowledge to areas related to exercise and muscle adaptation. Very introductory material will be coupled with state-of-the-art concepts and developments.

1. Compare neuromuscular adaptation to stresses imposed from exercise, stretch, injury, fatigue, and genetic disease.
2. Explain methodology, terminology and instrumentation used in skeletal muscle research, such as muscle cell culture, microscopy, fluorescent proteins, PCR, membrane potential measurements, patch clamping, protein measurements.
3. Critically review, understand and interpret cellular and molecular physiology literature related to striated muscle.

COURSE AND UNIVERSITY POLICIES:

ATTENDANCE POLICY: In general, for small graduate classes, graduate students are expected to show up. In grad school, you are missed when you are not there. Learning discipline is part of the graduate education experience. As you move up in your education, your teachers become more and more like colleagues. Missing class is like missing a meeting with a colleague in business; you just don't do it unless it is necessary. However, I understand that sometimes experiments in the lab cannot be postponed on a given day, or you need to be at a national meeting presenting a paper. I will also have commitments that will conflict with class time, and I will ensure that guest lecturers are in place to present material.

I also understand if you are sick...no one wants you to be in class when you are sick, so stay home. You will be excused from class if you have a legitimate reason to be gone and all I ask is that you send me an email before class starts as to why you need to miss the class. That email is dated and I can keep a record of it. 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 the following link:

<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 I do not discourage you from having cell phones or computers in class, in fact I very much encourage you to bring your computer to follow along with the lectures and assignments, and to perform web searches on relevant topics. 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 or me, I will ask you to leave.

PERSONAL CONDUCT POLICY: Students are expected to exhibit behaviors that reflect highly upon themselves and our University. UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.”

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 <https://sccr.dso.ufl.edu/process/student-conduct-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: 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/>. Good participation in these evaluations is extremely important for maintaining and improving the quality of coursework at UF. Consider it a privilege to participate in UF's future by doing your evaluations. The outcome of these is used in many ways to make this a better environment for you and future students.

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. Joslyn Ahlgren, APK IDEA Liaison, jahlgren@ufl.edu
- Dr. Rachael Seidler, APK Graduate Coordinator, rachaelseidler@ufl.edu

GRADING:

Evaluation of performance in the course will be determined with the following:

1. Midterm exam 30%
2. Final exam (not comprehensive) 30%
3. Student presentations 20%
4. Weekly homework assignments 10%
5. Class participation 10%

Exams. The midterm and final exams will be open book/notes. They will consist of essay questions covering the material in the first and second parts of the course, respectively. The points will be determined by

1. Did you correctly state the answer?
2. Did you justify your answer (citing points from slides/papers)

3. Note that even if you are incorrect in criterion 1, you can still gain points in criterion 2 if your justification is logical. Each response should be 300-500 words. Points will be SUBTRACTED for lengthy (>800 words) answers.

Student Presentations. Each student will present papers that represent classic and cutting edge research associated with the lecture topics. The student presentations will be a critical review of a relevant paper, consisting of a presentation of the goals/hypothesis, methodology and results, and interpretation of the findings. The instructor will provide an example presentation of an article so that students have an understanding of the scope of the presentation. It is anticipated that each student will present twice during the semester, and these will be organized early in the course.

Homework Assignments. All students in the class will be required to submit the description of 1 figure and/or table from the paper to be discussed, via canvas. This is to ensure involvement in the class discussions. The template for this assignment can be found in the introductory module in Canvas.

Class Participation. It is expected that students engage in discussions of the weekly papers. Questions are encouraged during lecture presentations as well. The goal is to learn from each other, by asking “how?” “why?”, and to develop ways to solve experimental problems.

Grading Scale. Grades for exams will be posted to Canvas approximately 1 week after submission, with comments on the answers. Grades for presentations will be uploaded within 3 days of the presentation, with pointers on what went well, and where to improve. Rubrics for presentations are provided in the Introductory module of the Canvas shell. Students may request a meeting to review exams or presentations, but all scores are considered final. Grades for participation and weekly assignments will be posted at the end of the course. Students may inquire about their level of participation at any time during the course. Grading will be determined by a standard conversion of a percent score to a letter grade using the transformation below.

More detailed information regarding current UF grading policies can be found here: <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>.

Letter Grade	Grade Point	Percentage
A	4.0	94 - 100%
A-	3.7	90 - 93%
B+	3.3	87 - 89%
B	3.0	83 - 86%
B-	2.7	80 - 83%
C+	2.3	77 - 79%
C	2.0	73 - 76%
C-	1.7	70 - 72%
D+	1.3	67 - 79%
D	1.0	60 - 66%
F	0.0	0 - 59%

PRELIMINARY COURSE SCHEDULE:

Date	Activity/Topic
7 th January	Intro & Organization How to read a paper/How to present a paper/Quiz
14 th January	Quiz review/Muscle & Nerve Didactics
21 rd January	Muscle Hypertrophy I - Growth Factors
28 th January	Muscle Hypertrophy II - Satellite Cells
4 th February	Muscle Atrophy I - Atrogenes
11 th February	Muscle Atrophy II- Autophagy
18 th February	Muscle Regeneration
25 th February	Take home Exam 1 (January 21 – February 18)
4 th March	Muscle Plasticity I - Fiber types
11 th March	No Class (Spring Break)
18 th March	Muscle Plasticity II - Signaling
25 th March	Neural Plasticity
1 st April	Metabolic Plasticity
8 th April	Muscle Pathology
15 th April	Take home Exam 2 (March 4 - April 8)

LECTURE RECORDINGS:

PRIVACY: Our class sessions may be audio visually recorded for students in the class to refer back to 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 sharing of recorded materials is prohibited.

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled as per Florida House Bill 233. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish

recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does *not* include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third-party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.