PEP 8302 Advanced Skeletal Muscle Physiology

SPRING 2008

Section Number: 38178
Professor: CLARKE
Location: Garrison Building Room 104D
Mondays, 4pm to 7pm
Office Hours: By appointment
Contact Information: Office Tel: 713 743 9854
Email: mclarke@mail.uh.edu
Class Web-site: hhp.uh.edu/mclarke

UH GRADUATE CATALOG COURSE DESCRIPTION

8302: Advanced Skeletal Muscle Physiology
Cr. 1-3 per semester. Prerequisite: approval of department chair. Concurrent enrollment up to six semester hours is permitted. For advanced students in master's program and doctoral students.

COURSE DESCRIPTION AND GOALS

This course is designed to develop and enhance the student’s knowledge and detailed understanding of the field of muscle physiology. The course focuses on the relationship between cellular structure/function, muscle tissue histology/organization and the functional properties of skeletal muscle as it impacts muscle performance in both normal and pathological situations.
Upon completion of this class, the student will be able to;

1) demonstrate their knowledge of the cellular organization of skeletal muscle tissue and the individual cell types which make up skeletal muscle,
2) demonstrate their knowledge of the histological and ultra-structural organization of skeletal muscle,
3) demonstrate their knowledge of the sub-cellular components of skeletal muscle and their understanding of how they are involved in modulating physiological function at the tissue and systems level,
4) demonstrate their knowledge of specific cellular signaling pathways involved in the modulation of muscle growth, response to mechanical load and response to endocrine signals
5) demonstrate their understanding of how such signaling pathways are involved in modulating skeletal muscle function in health and disease.
6) demonstrate their ability to communicate to others these concepts and ideas to their peers.

REQUIRED TEXTS/READINGS


- Instructor selected readings (see web-site for references).

COURSE STRUCTURE

This class will consist of a total of 14 classes, seven of which will be seminar style in-class discussions of general and specific topic areas in muscle physiology. A total of fives classes will have a mixed laboratory/lecture format in which theoretical concepts discussed in the earlier seminar-style classes will be utilized in practical, application-based laboratory experiments. These classes will be supplemented by readings drawn from the research literature dealing with applications of the particular
experimental methods being carried out by the student. The remaining two classes will be utilized for discussion, formulation and presentation of student-selected research topics in the field of skeletal muscle physiology.

• **MODULE 1 - CLASSES 1, 2, & 3  Muscle ultra-structure and function**
  
  – muscle organization at the light and EM microscope levels, contractile proteins, membrane components, NMJ structure/function, calcium homeostasis, growth factor pathways, myofiber types, muscle biochemistry, etc…
  
  – the relationship between the cellular components and the functional properties at the macro-level of skeletal muscle will be discussed.
  
  – theoretical muscle histology components will be supplemented with in-class light microscopy demonstrations.
  
  – **Readings:**
    
  
  
  - See class web-site for additional selected readings.

• **MODULE 2 - CLASSES 4, 5, 6 & 7  Specific Focus Areas**
  
  – excitation-contraction (E-C) Coupling
  
  – receptor level interactions, calcium regulation.
  
  – membrane components of skeletal muscle
  
  – lipid composition as a modulator of membrane function (biochemical and biophysical)
  
  – maintenance of muscle mass
  
  – specific growth factor pathways, mechanical load transduction, mechanisms of hypertrophy and atrophy.
  
  – **Readings: See class web-site for selected readings**

• **MODULE 3 - CLASSES 8, 9, 10, 11 & 12**
  
  – mixed laboratory/lecture format in which theoretical concepts discussed in the earlier seminar-style classes will be utilized in practical, application-based laboratory experiments (e.g. fiber typing of skeletal muscle, measurement of muscle damage markers, membrane lipid analysis, etc.)
  
  – **Readings:** See class web-site for selected readings and information on preparing scientific manuscripts.
• **MODULE 4 - CLASSES 13 & 14**
  
  – discussion, formulation and presentation of student-selected research topics in the field of skeletal muscle physiology.
  – **Readings:** See class web-site for information on developing presentations.

**CLASS READINGS AND ASSIGNMENT DUE DATES**

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<tr>
<th>DATE</th>
<th>TOPIC &amp; READINGS</th>
<th>ASSIGNMENTS</th>
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<tbody>
<tr>
<td>Jan. 14</td>
<td>Course Overview, see assigned readings</td>
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<td>Jan. 28</td>
<td>Class 1, see assigned readings</td>
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<td>Feb. 4</td>
<td>Class 2, see assigned readings</td>
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<td>Feb. 11</td>
<td>Class 3, see assigned readings</td>
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<td>Feb. 18</td>
<td>Class 4, see assigned readings</td>
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<td>Feb. 25</td>
<td>Class 5, see assigned readings</td>
<td>Written Exam on Module 1 (Classes 1 - 3)</td>
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<td>Mar. 3</td>
<td>Class 6, see assigned readings</td>
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<td>Mar. 10</td>
<td>Class 7, see assigned readings</td>
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<td>Mar. 17</td>
<td><strong>Spring Break (No class).</strong></td>
<td>Presentation Topic Due by March 15th.</td>
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<td>Mar. 24</td>
<td>Class 8 (Lab Class – meet in LIP)</td>
<td>Written Exam on Module 2 (Classes 5 - 7)</td>
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<td>Mar. 31</td>
<td>Class 9 (Lab Class - meet in LIP)</td>
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<td>Apr. 7</td>
<td>Class 10 (Lab Class – meet in LIP)</td>
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<td>Apr. 14</td>
<td>Class 11 (Lab Class – meet in LIP)</td>
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<td>Apr. 21</td>
<td>Class 12 (Lab Class – meet in LIP)</td>
<td>E-Laboratory Notebook Due by April 26th</td>
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<td>Apr. 28</td>
<td>Class 13</td>
<td>Class Project E-Manuscript Due by May 3rd</td>
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<td>May 5</td>
<td>Class 14</td>
<td>In-Class Presentation</td>
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COURSE ASSESSMENT

A student’s performance will be assessed on a number of different levels.

Firstly, students will be assessed on the quality and accuracy of their written exams. **Written exams** will be administered at the **beginning** of Class 4 and Class 8. Written exams will form **30%** of the student’s final grade.

Students will also be assessed on the quality of their laboratory reports generated during their practical-based classes. These reports will take the form of (1) a detailed laboratory note-book in which students will record experimental design, all methodology used, results, data analysis, etc (*to be sent to the instructor in electronic format by April 26th*) and (2) results will be written up in research paper format that will include an introduction, methods, results, discussion and reference section (*to be sent to the instructor in electronic format by the end of May 3rd*). The manuscript will be a collaborative group effort between students. **Written assignments** generated from laboratory-based classes will form **40%** of the student’s final grade (25% from individual laboratory note-books, 15% from group-generated manuscript).

Students will also be assessed on the quality of their final in-class presentation. **Presentation topic** must be approved by the instructor by **March 15th**. **Class presentations** will form **30%** of the student’s final grade.

Final grades will be by **LETTER** using the following scale: A = 94-100, A- = 90- 93, B+ = 87- 89, B = 83- 86, B- = 80- 82, C+ = 77- 79, C = 73-76, C- = 70- 72, D+ =67-69, D = 63- 66, D- = 60- 62, F = 0- 59)

**Attendance in all classes, submission of all written assignments, participation in all class discussions/practical laboratory experiences and completion of all in-class presentations are required for a student to have completed this course and for the student to be eligible for assignment of a final grade.**
COURSE POLICIES AND PROCEDURES

Students are expected to abide by the university’s academic honesty policy in all matters concerning this course. (http://www.uh.edu/dos/hdbk/acad/achonpol.html).

In particular, plagiarism, “Representing as one’s own work the work of another without acknowledging the source,” whether intentional or unintentional, will not be tolerated.

All rules regarding student conduct, sexual harassment, and academic dishonesty will be strictly enforced and the professor reserves the right to impose stricter penalties, including issuing a failing grade (which is the department's policy) or being dropped from the course, than those provided in any and all student handbook(s) or regulations.

When possible, and in accordance with 504/ADA guidelines, we will attempt to provide reasonable academic accommodations to students who request and require them. Please call the Center for Students with Disabilities at ext. 3-5400 for more assistance.

Students will not be allowed to take an Incomplete in this course due to poor planning on their part. If you find you do have a legitimate reason for an Incomplete, please talk with me as soon as possible to discuss the situation and to identify the documentation that will be required to support your request. Please review the University of Houston catalog to review conditions under which an incomplete may be granted.

Additional Course Policies and Procedures

The following information is designed to help the class run smoothly. The instructor reserves the right to make additions and adjustments as necessary.

Statement on Course Material. Some of the writings, lectures, films, or presentations in this course may include material that conflicts with the core beliefs of some students. Please review the syllabus carefully to see if the course is one that you are committed to taking. If you have a concern, please discuss it with me at your earliest convenience.
**Please note the following important dates.**

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<tr>
<th>Event</th>
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<tr>
<td>Last day to drop a course or withdraw without receiving a grade.</td>
<td>January 28th, 2008  Monday</td>
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<td>Last day to drop a course or withdraw.</td>
<td>April 1st, 2008     Tuesday</td>
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<td>Last day of the semester</td>
<td>May 8th, 2008      Tuesday</td>
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