INSTRUCTORS

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Office hours by appointment.

OVERVIEW

An in-depth advanced investigation in the integrated function of various physiological systems involved in the response to exercise. Focus will be on human models where possible, but animal and cellular models are also studied. The course will be mainly focused on reading and interpretation of primary research papers. Topics covered can include neuromuscular, cardiovascular, and/or skeletal muscle metabolic regulation. Evaluation is usually in the form of research presentations, class participation, and a major research paper(s).

OBJECTIVE

The objective of the course is to provide students with a detailed appreciation for the physiological processes that regulate the acute and chronic response to exercise in humans, with a focus on skeletal muscle metabolism. Various types of exercise will be considered (traditional aerobic/endurance, interval/intermittent and strength/resistance) and the potential influence of factors such as aging, diet, disease and disuse. Common investigative techniques employed in human research studies will also be examined. Students will have the opportunity to refine science their communication skills through participation in classroom discussions, oral presentations and writing assignments.

FORMAT

The course is organized into two distinct 6-week sections, each coordinated by one of the instructors. It places a heavy emphasis on reading and interpreting scientific literature. There is no textbook or printed courseware pack. Each weekly 3-hour class will typically consist of instructor-guided, student-led discussions of original research papers that are focused on a specific topic, and informed by relevant reviews and background material that is circulated in advance. The instructors will select the required readings and distribute materials electronically in advance of each class.
It is expected that all students will have read the articles prior to each class. Students will be assigned to the lead discussant on specific articles on a rotating basis. The discussions will not be formal, but students should highlight the purpose hypothesis of the study, methods used, key results, and interpret the main findings. Following each summary, there will be a group discussion, and during the final portion of each class an attempt will be made to compare and contrast findings from the various articles.

**TOPIC SCHEDULE**

Week 1: Introduction and overview: regulation of exercise metabolism  
Week 2: Metabolic regulation during prolonged steady-state exercise  
Week 3: Metabolic regulation during intense intermittent exercise  
Week 4: Training-induced adaptations in substrate metabolism  
Week 5: Dietary manipulation of substrate metabolism and training adaptations  
Week 6: Student Presentations #1  
Week 7: Regulation of protein turnover: feeding, aging, disuse, and exercise  
Week 8: Regulation of protein turnover with exercise  
Week 9: Regulation of protein turnover with feeding  
Week 10: The impact of aging on protein turnover  
Week 11: Protein turnover in disuse  
Week 12: Student Presentations #2

**EVALUATION**

Each section of the course consists of the same required elements and will be worth half of the overall grade. The following scheme will be used to determine the student’s final mark. No changes to the scheme will be permitted under any circumstances.

1. Research Presentation #1: 20%  
2. Research Paper #1: 25%  
3. Research Presentation #2: 20%  
4. Research Paper #2: 25%  
5. Weekly discussions: preparation, participation, insight (2 sections x 5%): 10%

Research presentations #1 and #2 will be scheduled during class in week 6 and 12, respectively. Research papers #1 and #2 are due one week after the last scheduled class in week 6 and 12, respectively. See the appendices for additional guidelines.

**MODIFICATIONS TO COURSE**

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.
ACADEMIC INTEGRITY

Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences (e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript reading "Grade of F assigned for academic dishonesty", and/or suspension or expulsion from the university). It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, specifically Appendix 3, located at: http://www.mcmaster.ca/univsec/policy/AcademicIntegrity.pdf

The following illustrates only three forms of academic dishonesty:
• Plagiarism (e.g. the submission of work that is not one's own or for which other credit has been obtained),
• Improper collaboration in group work.
• Copying or using unauthorized aids in tests and examinations.

ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES

Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contacted by phone (905) 525-9140 ext. 28652 or email sas@mcmaster.ca. For further information, consult McMaster University’s Policy of Academic Accommodation of Students with Disabilities. http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicAccommodation-StudentsWithDisabilities.pdf

STUDENT ABSENCES AND MISSED WORK

Students are expected to attend all classes and submit assignments by the specified due dates. Absences for any reason (e.g., illness, religious, personal) must be reported to the instructors as soon as possible and with appropriate supporting documentation. Students should contact the instructor(s), normally within two working days of any missed class or assignment, to discuss what relief may be granted and relevant details such as revised deadlines.

USE OF COURSE MATERIALS

Course materials provided by the instructor are for use by students registered in this class only. Under no circumstances are these materials to be shared, posted, sold or disseminated in any manner. Recording of lectures is also prohibited without explicit written permission from the instructors.
APPENDIX A: STUDENT PRESENTATION GUIDELINES

The goal of this assignment is to provide students with experience presenting in front of a group by simulating a conference-style free communication session. Each 10-min presentation should summarize the findings from one scientific study that has been published as an original journal article. Presentations will be evaluated with equal weight given to presentation style and the quality of the article critique.

Students are free to choose any paper that broadly relates to the relevant section of the course, but are encouraged to focus on physiological mechanisms (e.g., underlying metabolic control) rather than simply describing changes in exercise performance. In selecting papers, students should try to identify significant or impactful work. Students may consult with the instructor regarding their potential article in advance and must confirm their final choice before the presentation. Duplicate articles will not be permitted.

A copy of the PowerPoint presentation must be delivered to the instructor by e-mail at least 24 hours before the presentation date. This will allow time for troubleshooting if the file cannot be opened and also avoid unnecessary delays during the tutorial sessions. All presentations will be loaded in advance onto a single laptop computer.

**Evaluation criteria and tips for an effective oral presentation:**

Format (Overall style) = 50% of assignment mark, based on:
- keep on time and consider using the “one slide per minute” rule
- speak in a strong clear voice and minimize word whispers (“um”, “ah”)
- show enthusiasm for topic area and
- address audience rather than screen and avoid use of “crib” notes
- use large, bold lettering on screen (i.e., at least 24 pt font)
- minimize use of text (e.g., use bullet points rather than full sentences or paragraphs)
- consider making custom figures or tables if the original versions are not appropriate

Content (Evaluation of article) = 50% of assignment mark, based on:
- include brief introduction and relevant background information
- include clear statement of study purpose and hypothesis
- include an overview of research design and essential methodology
- focus on the key results and major findings
- use figures and tables to highlight key findings without overcrowding the screen
- include succinct summary/conclusion key points
- attempt to place findings in context with respect to the field of research
APPENDIX B: RESEARCH PAPER GUIDELINES

The goal of this assignment is to provide students with experience interpreting scientific literature and writing concisely. The topic of each research paper should broadly relate to the appropriate section of the course, however considerable latitude will be permitted in this regard. The paper could be an expansion of a topic discussed in class, or a topic not specifically addressed during lectures but one that is of interest to the student. Students are encouraged to consult with the instructor and start thinking about potential topics early in each section of the course.

The research paper should introduce the topic, summarize important relevant literature, integrate the findings from various studies and highlight key issues that remain to be resolved. It is not sufficient to simply describe the results from a number of studies. Rather, a major objective for the student is to present his/her own view of the literature, and frame their ideas and opinions into a coherent message. The majority of information contained in the paper should come from primary research articles published in scientific journals. Secondary sources, such as review articles and textbooks, should be used sparingly but these can be effective to cite well-established or classic findings.

The entire document should be double-spaced with 1-inch margins around. Use Arial or Times font and 12-pt size throughout. The main body of the research paper, excluding the abstract and references, should ~1500 words or five pages, depending on the inclusion of any figures or tables. Adhere strictly to the following page guidelines:

Page 1 (Abstract): The abstract is not an introduction, but rather should be a concise, 200-word summary of the key messages contained in the main body of text.

Pages 2-6 (Main text): Include a clearly defined introduction including statement of purpose; appropriate subheadings that attempt to integrate and interpret study findings; and a summary/concluding section that reinforces key points and highlights topics to be resolved and specific suggestions for future research initiatives. Cite references numerically in the text. Students are encouraged to make use of up to three figures and/or tables, which are effective to highlight key findings or concisely summarize information (and aid the reader by breaking up the monotony of rows of text). Insert figure or tables directly into the main document, accompanied by an appropriate legend that concisely explains the material presented and acknowledges the source. If figures or tables are inserted in the main text, up to one additional page can be included to make sufficient space. Note there is no "one sized fits all" approach, and it is up to the student to determine what is the most appropriate manner in which to format their paper and convey their information.

Pages 7+ (References): Cite a minimum of 10 and a maximum of 25 references, which can include reviews as well as original articles. Cite references numerically in the text and in alphabetical order in the reference list, using the style recommended for American Physiological Society journals: http://www.the-aps.org/mm/Publications/Info-For-Authors/Composition#references
**Tips for getting started and general evaluation criteria:**

Begin by trying to find one or two review papers that are dedicated to your general topic area. Your instructor can be of assistance in this regard, or perform a PubMed search and include the word “review” as one of the search criteria (this will narrow the search results to review articles only). Review papers help direct you to the relevant body of scientific literature which has been published on various aspects of the topic, and should help you narrow or broaden the focus of your own research paper. Review articles are also a good source of references (i.e., primary journal articles which describe the results of original research studies). Following this initial search, try to sketch an outline of your intended research paper. What are the major sub-categories of the main topic that you plan to cover? Identify several potential key references for each area. Perform your own search for additional original articles. Finally, begin to develop the various sections of the paper in greater detail and be prepared to further expand or condense the topic depending on available information. Have a classmate or friend read an initial draft and offer suggestions for revision.

Similar to the evaluation of the research presentation, the research paper will judged on both “style” and “content” in equal measure, using the following general criteria:

**Style (50% of overall mark):** Based on literary presentation and writing style, including grammar, sentence structure and overall format.

**Content (50% of overall mark):** Based on scope and quality of scientific analyses, in terms of integration and interpretation of literature cited and insight into the topic.