

Dep. of KINESIOLOGY and PHYSICAL EDUCATION
McGill University

EDKP-449 Neuromusc & Inflamm Pathophys

(3 credits)

Dr Benoit J GENTIL,

rm 210 Currie

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Coordinator: Benoit GENTIL, PhD

TA: Zacharie Cheng-Boivin

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Office Hours (Dr GENTIL): at the end of class

Course Outline
Winter 2024

Lectures:

Mondays and Wednesdays 10:05-11:25 am

Where: BIRKS 205

[McGill Interactive Accessible Network Map](#)

I. COURSE DESCRIPTION

This course reviews the pathophysiology of selected clinical disorders involving skeletal muscle dysfunction, with a particular focus on the integrative physiological response to acute and chronic exercise. The scientific basis of how the disease process impacts the ability to exercise is reviewed. In addition, we will address whether exercise training can positively impact the disease process itself and/or whether exercise training can reverse some of the effects of physical inactivity that is associated with chronic conditions. Special emphasis will also be put on novel exercise-based interventions and their scientific rationale.

II. OBJECTIVES

- 1) To acknowledge and understand the essential elements of pathophysiology of selected disorders affecting skeletal muscle function in humans
- 2) For each disorder, to acknowledge and understand the impact of the pathological condition on the acute response to dynamic and resistance exercise
- 3) For each disorder, to acknowledge and understand the positive and potentially negative effects of chronic exercise (training) on the disease process
- 4) For each disorder, to apply the knowledge of the exercise response and limitations into the design and implementation of exercise programs for therapeutic purposes

III. RECOMMENDED READINGS

- Skeletal muscle structure, function and plasticity – the physiological basis of rehabilitation. Richard L. Lieber, 3rd edition. 2010: Lippincott Williams & Wilkins (Chapters 1,2,4,5 and 6)
- Clinical Exercise Physiology (3e) Ehrman, Gordon, Visich, Keteyian. 2013: Human Kinetics
- ACSM Exercise Management for Persons with Chronic Diseases and Disabilities (3e) 2009: Human Kinetics
- Journal articles: TBA (see MyCourses)

IV. COURSE REQUIREMENTS

- 1) **Midterm** (as a quiz on MyCourses) 25%
- 2) **Research topic** 30% (20% for Research Paper, 5% for Infographic, and 5% Presentation)
- 3) **Practical cases** 10 % will be assessed by an assignment consisting of answering a short answer question related to the course. The test will be available on MyCourses. Identified as **QUIZ**
- 4) **Final Exam** (during exam period) 35%
Consists in a MCQ exam covering all the material of this course. The test will be available on MyCourses.

If you cannot attend a class to hand in a report, please email Dr. GENTIL (benoit.gentil@mcgill.ca) prior to the lab. Reports received after class will be considered late. Late assignments will incur a penalty: 1 day late = -10%, 2 days late = -30%. Papers received > 2 days after the specified due date will be marked as a zero (0). Unjustified absence will incur a penalty of 10% on all lab reports.

Research Topic:

Students, in teams of 3 to 4 per group, will work collectively to prepare a presentation on the topic of an exercise treatment for a disease condition associated with skeletal muscle dysfunction. Through a review of the literature, combined with theoretical knowledge learned throughout this course (and perhaps others), you will propose a unique treatment strategy based on exercise or exercise-related adaptation for one of the neuromuscular conditions covered in class or a condition related to that covered in class. This treatment strategy can NOT be conventional endurance or resistance training, or exactly the same as a strategy covered in one of the class lectures; but it can be a variant of what has been discussed, or it can be an exercise mimetic that affects a cellular signalling pathway involved in exercise adaptation. You will prepare a summary of your intervention (10 pages) and an infographic presentation (poster with a 5-minute talk format). **Attendance is mandatory for the presentations and unjustified absence will incur a penalty of -10% on your grade.**

Your topic (disease condition and strategy) is due on Jan 24th, 2024; after which you will receive feedback and/or approval from the course instructor during the following week.

Grading

| Grades | Grade Points | Numerical Scale |
|-------------|--------------|-----------------|
| A | 4.0 | 85 – 100% |
| A- | 3.7 | 80 – 84% |
| B+ | 3.3 | 75 – 79% |
| B | 3.0 | 70 – 74% |
| B- | 2.7 | 65 – 69% |
| C+ | 2.3 | 60 – 64% |
| C | 2.0 | 55 – 59% |
| D | 1.0 | 50 – 54% |
| F (Fail) | 0 | 0 – 49% |

V. INSTRUCTIONAL METHODS

Lecture (in blue): Didactic lectures with assigned readings and PowerPoint presentations available through MyCourses.

Research articles: Case-based workshops where problem-solving skills are practiced. Several laboratories (in red) require previous preparation.

Right to write in English or in French: *In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.* (approved by Senate on 21 January 2009 - see also the section in this document on Assignments and

evaluation.) Knowledge of a language is not an object of this course. However, spelling will be considered as well as quality of your writing and may influence your grade.

VI. **Course Content:** *Calendar (subject to minor changes according to government directives)*

| | <i>lectures</i> | | | |
|----|-----------------------------|--|------|--|
| | <i>Labs/questions/tests</i> | | | |
| wk | date | Mo 10:02am to 11:25 am | date | We 10:02am to 11:25 am |
| 1 | 1/8 | No class | 1/10 | Introduction Information session for Research Paper |
| 2 | 1/15 | Genetics and epigenetic (Dr Gentil BJ) | 1/17 | Guillain-Barré (Dr Gentil BJ) |
| 3 | 1/22 | Multiple Sclerosis (Dr Gentil BJ) | 1/24 | Charcot-Marie-Tooth disease (Dr Gentil BJ) Dead line: groups composition and topic |
| 4 | 1/29 | Amyotrophic Lateral Sclerosis (Dr Gentil BJ) | 1/31 | Inflammation and skeletal muscle (Dr Gentil BJ) |
| 5 | 2/5 | Skeletal muscle biology (Dr Gentil BJ) | 2/7 | 'The strongman syndrome' (Dr Gentil BJ) |
| 6 | 2/12 | Muscle damage (Zacharie Cheng-Boivin) | 2/14 | QUIZ |
| 7 | 2/19 | Muscular Dystrophy (Dr Gentil BJ) | 2/21 | Myasthenia Gravis (Dr Gentil BJ) |
| 8 | 2/26 | (Support and review session) | 2/28 | Midterm (24h window) |
| 9 | 3/6 | Study Week (No Class) | | |
| 10 | 3/11 | Information session for Infographic (Support and review session) | 3/13 | Information session for Infographic (Support and review session) |
| 11 | 3/18 | Research Topic: (presentation) (due date for the report and presentations) | 3/20 | Research Topic: (presentation) |
| 12 | 3/25 | Research Topic: (presentation) | 3/27 | Research Topic: (presentation) |
| 12 | 4/1 | Research Topic: (presentation) | 4/3 | Research Topic: (presentation) |
| 14 | 4/8 | (Support and review session) QUIZ | 4/10 | (Support and review session) |
| | | Timed Final exam (TBD) | | |

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VII. Academic integrity

McGill University values academic integrity. <http://www.mcgill.ca/integrity> Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see www.mcgill.ca/students/srr/honest/ for more information).

L'université McGill attache une haute importance à l'honnêteté académique. <http://www.mcgill.ca/integrity> Il incombe par conséquent à tous les étudiants de comprendre ce que l'on entend par tricherie, plagiat et autres infractions académiques, ainsi que les conséquences que peuvent avoir de telles actions, selon le Code de conduite de l'étudiant et des procédures disciplinaires (pour de plus amples renseignements, veuillez consulter le site www.mcgill.ca/students/srr/honest/

In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change

For religious holidays, please consult McGill policy. <http://www.mcgill.ca/importantdates/holy-days-0/policy-holy-days>

Additional policies governing academic issues which affect students can be found in the McGill Charter of Students' Rights (The Handbook on Student Rights and Responsibilities is available at www.mcgill.ca/files/secretariat/Handbook-on-Student-Rights-and-Responsibilities-2010.pdf).

Right to submit written work in English and French

In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

En accord avec la charte de McGill des droits des étudiants, Les étudiants de ce cours ont le droit de soumettre leurs travaux écrits en Anglais ou en Français.

VIII. Additional Statements:

In the event of extraordinary circumstances beyond the University's or the course instructor's control, the content and/or evaluation scheme in this course is subject to change

As the instructor of this course I endeavor to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with me and the Office for Students with Disabilities, 514-398-6009.

Additional policies governing academic issues which affect students can be found in the McGill Charter of Students' Rights (see [Student Rights and Responsibilities - McGill University](#) and [charter of student rights last approved october 262017.pdf \(mcgill.ca\)](#))

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The work submitted for this assessment is expected to be your own. The use of technologies such as ChatGPT are prohibited and will be considered a violation of Code of Student Conduct.