General Overview:

Weekly meeting time: TBD
Room: TBD

Evaluation:

Preparation, presentations and participation - 50%
Annotated Bibliography - 20%
Research proposal - 30%

Recommended Text:


Section 1: Structure of the Human Motor Unit
- the motor neuron
- development of muscle innervation
- the neuromuscular junction
- muscle architecture and fibre anatomy

Section 2: Function of the Human Motor Unit
- motor unit recruitment
- neuromuscular transmission
- muscle contraction

Readings for Sections 1 & 2: - Chapters 1, 2, 3, and 10 from Skeletal Muscle Form and Function (MacIntosh, Gardiner and McComas)
Section 3: Ionic Basis of Resting and Action Potential

- origin of the resting membrane potential
- origin and propagation of the action potential
- impulse conduction along nerve and muscle
- electromyographic interpretation of motor unit activation


Section 4: Aging and Neuromuscular Function

In this section, each student will select a topic related to aging and neuromuscular function. Examples of topics include:

- aging changes in motor neurons
- aging changes in the neuromuscular junction and/or peripheral nerves
- aging changes in muscle morphology
- mechanisms of sarcopenia

You will be responsible for researching your topic and presenting it to the class. One week prior to the class, please provide 1 reading to the rest of the class (send the email link if possible) for background preparation. Your annotated bibliography assignment will also be related to this presentation.

Section 5: The Organization of the Central Nervous System


Whose Cortical Column Would that Be?

Readings in this section are required. A. Nelson will lead the discussion and students are expected to contribute discussion, critique and insightful debate.

Section 6: Sensorimotor control (all readings from Kandel & Schwartz, 5th edition)

Readings: Chapters 16 (Functional organization of perception and movt) 21 (Sensory coding)
35 (Spinal reflexes)
37 (Primary motor cortex)

All students will be required to read all material in this section. However, one student will lead the discussion on each chapter. That individual will be identified on a random basis on the day of class.
1. Find two (3) journal articles (primary research studies, not reviews) pertaining to a specific topic area related to the aging neuromuscular system, and write an annotated bibliography for each of these articles.

2. Journal articles must be recent (try not to go earlier than 2005).

3. The annotated bibliography is to be no longer than one page, but should capture the pertinent details of the paper surrounding background, purpose, methods, results, and conclusions. You may use the sample provided as a guide.

4. A 3-4 page discussion, summarizing, criticizing and comparing the three articles, will follow the annotated bibliographies.

5. Include a photocopy of the front page of each article with your assignment.

Due Date:

The purpose of this study was to determine the effects of a 10-wk low-intensity strength training program on knee extensor strength and functional ability in frail older adults, and to determine the maintenance of any training effects. Twenty-one men and women (*M* age = 76.7 yr) with low knee-extensor strength were randomized into exercise (*n*=11) and control (*n*=10) groups. Isometric knee-extensor strength and functional ability were measured at baseline, after the 10-wk training program, and again 6 months later. Participants in the exercise group engaged in supervised low-intensity training at a community facility twice per week, plus one unsupervised session at home for the 10-wk period. The exercises, done in seated and standing positions, focused primarily on the knee extensors. Resistance was provided by elastic bands. Following training, there was a significantly greater improvement in knee-extensor strength (54% vs. 13%, respectively; *p*<0.05) and the Timed Up-and-Go test (18% vs. 4%, respectively; *p*<0.05) in the exercise versus control group. A significant correlation was found (*r* = -.64) between change in knee extensor strength and change in the Timed Up-and-Go test. There was no significant change in the other tests of functional ability (timed walking test, balance test, tandem time, or box stepping). The gains in knee-extensor strength and performance on the Timed-Up-and-Go test were still evident at the 6-month follow-up test. These results suggest that a relatively short period of low-intensity training can result in significant and long-standing improvements in both strength and functional ability in frail older adults.
KIN 709 Research Proposal Assignment

Due:

General Overview of Research Proposal Assignment

The topic area for this assignment will be the neurophysiology of sensorimotor control of the upper limb. You will be proposing an experiment (or series of experiments) that test a hypothesis. It is important that you provide the necessary background (literature review) in order to understand why the research you propose is relevant, worthwhile, and likely to further knowledge in the field. You should also provide enough of a description of the methodologies used so that the reader can understand what you plan to do and whether your methods are adequate to test the hypothesis. In writing the proposal, try to follow the structure listed below:

Introduction and Brief Review of Literature (15 marks):

- Summarize what is already known about the topic.
- Identify gaps, unanswered questions, ..... what is still not known?
- Clearly state the purpose of your study, with explicit hypotheses.
- Emphasize why your proposed study(s) is important to the field.

Method (10 marks):

- Provide a detailed description of your proposed methodology (e.g. human/animal subjects, characteristics of subjects, study design, interventions, outcome methodologies). Make sure to reference your methodological approach where necessary.
- Identify the dependent and independent variables
- State your hypothesis(es)

Points of Discussion (5 marks):

It is understood that you can not really comment on the results since you haven't done the experiment yet. However, in this section I'd like you to comment on the potential outcome of your study, and what the implications are of these outcomes.

References:

Be sure to reference appropriately throughout the assignment, and provide a list of references at the end of the paper. Use a referencing style from one of the physiological journals you prefer.

Length: This assignment should be no more than 10-12 pages.

Total: 30 marks
PLEASE NOTE:

On occasion, it is difficult to predict the direction the course may take and the instructor may need to revise the course outline during term. Students will be informed as early as possible of any changes.

The Department of Kinesiology reserves the right to change dates, deadlines, and/or methods of assessment for this course in the event of unforeseen circumstances, such as illness of the instructor or a labour disruption.

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.