

**Cellular Basis of Neuromuscular Physiology KINE 485**  
**Spring 2018, MWF 10:00-10:50**

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Course Objectives

By participating in this course, students will be able to:

- 1) describe the development of the neuromuscular system.
- 2) demonstrate an understanding of how the nervous system and muscular system interact during the process of muscle contraction.
- 3) describe and explain basic principles of biochemistry, i.e. glycolysis, the krebs cycle, oxidative phosphorylation, as they relate to the neuromuscular system.
- 4) describe and explain basic principles of cell biology, i.e. organelles, compartmentalization, myofiber types, as they apply to the neuromuscular system.
- 5) demonstrate an understanding of selected biochemical and cellular acute responses to exercise.
- 6) demonstrate an understanding of selected biochemical and cellular adaptations to exercise training.
- 7) describe the biochemical processes involved in muscular fatigue.
- 8) demonstrate an understanding of effects of aging and disuse on neuromuscular system.

Required Textbook

*Biochemistry Primer for Exercise Science, 4th edition, Tiidus, P.M., Tupling, A.R., and Houston, M.E., Human Kinetics (2012)*

Course Evaluation

Final grades will be based on the following:

- First exam = 30%
- Second exam = 30%
- Final exam (comprehensive) = 40%

## Schedule for Lecture Topics

- A) development and design of skeletal muscle
- B) contractile process
- C) innervation of muscle fibers
  - 1. recruitment patterns
  - 2. effects of exercise
- D) muscle fiber types
  - 1. different classification schemes
  - 2. effects of exercise

### EXAM 1

- E) ATP metabolism (glycolysis, glycogenolysis, TCA cycle,  $\beta$ -oxidation) – chapters 3, 4
- F) exercise induced adaptations of ATP metabolism – chapter 2
- G) substrate utilization and effects of exercise – chapters 5, 6, 7

### EXAM 2

- H) lactate production and utilization
  - 1. fiber type differences
  - 2. effects of exercise
- I) causes of fatigue
  - 1. neural
  - 2. neuromuscular
  - 3. local
  - 4. effects of exercise
- J) effects of disuse on neuromuscular system
- K) effects of aging on neuromuscular system

### FINAL EXAM (comprehensive)