

PSL 460, Topics in Cell Physiology
Section 2: Metabolic Regulation in Muscle.
Monday, 3:00 – 4:50 PM, Biochemistry 208

Introduction:

This informal lecture/discussion course for senior physiology majors will examine selected topics in muscle cell adaptation and metabolism important for understanding muscle performance.

Learning Objectives:

- Understand the basics of two exercise methodologies, resistance and endurance.
- Explain how muscle adapts to each type of exercise at the macro and molecular level.
- Develop a mental model that incorporates the material covered in this course.
- Identify which physiological core concepts apply to your mental model.
- Design novel experiments capable of improving our knowledge on physiological adaptations in muscle.

Instructor:

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Office hours: by appointment

Grading: 30% class participation, 20% quizzes (top 5 scores), 20% group presentations, and 30% final term paper.

Course Outline (tentative and flexible):

Week 1, Jan 13: Introduction and Preliminaries

Week 2, Jan 20: University Holiday

Week 3, Jan 27: Muscle Function and Metabolism

Jan 31: Quiz 1 due on D2L

Week 4, Feb 3: Regulation of Mitochondrial Biogenesis

Feb 7: Quiz 2 due on D2L

Week 5, Feb 10: Signaling Pathways that Regulate Muscle Energy Metabolism

Feb 14: Quiz 3 due on D2L

Week 6, Feb 17: Endurance vs Resistance Training and Myonuclear Domain Theory

Feb 21: Quiz 4 due on D2L

Week 7, Feb 24: High Intensity Interval Training and Exercise Intensity / Discuss Group Presentation Format

Feb 28: Quiz 5 due on D2L / Group Presentation Papers Due

Week 8, March 3: Spring Break

Week 9, March 10: Detraining / Discuss Individual Review Assignment Format

March 14: Quiz 6 due on D2L

Week 10, March 17: Group Presentations (3 groups, 25 min each)

Week 11: March 24: Group Presentations (3 groups, 25 min each)

Week 12: March 31: Group Presentations (2 groups, 25 min each)

Week 13: April 7: Prof. John Halliwill from the University of Oregon Presenting / Individual Review Papers Due

Week 14: April 14: Student Led Discussion on Selected Topics

Week 15: April 21: Student Led Discussion on Selected Topics / Discussion of Final Paper

Final paper due: 11:59 PM May 2nd, 2025

Course Materials: Distributed on www.d2l.msu.edu.