DEPARTMENT OF PHYSIOLOGY AND PHARMACOLOGY

C3F6036, Physical Activity in the Management and Prevention of Metabolic Diseases, 3 credits (hec)

Fysisk aktivitet som ett medel att förebygga och behandla metabola sjukdomar, 3 högskolepoäng

Third-cycle level / Forskarnivå

Approval

This syllabus was approved by the The Committee for Doctoral Education on 2024-09-13, and is valid from spring semester 2025.

Responsible department

Department of Physiology and Pharmacology, Faculty of Medicine

Prerequisite courses, or equivalent

No prerequisite courses, or equivalent, demanded for this course.

Purpose & Intended learning outcomes

Purpose

This course will enable doctoral students to deepen their knowledge and understanding in the field of exercise physiology to prevent and treat metabolic diseases.

Intended learning outcomes

After completing this course, the participant is expected to be able:

- To explain health-related benefits of physical activity from a physiological perspective.
- To account for the current knowledge base of the molecular basis of exercise health-related benefits in metabolic diseases.
- To integrate basic knowledge of the benefits of physical activity with current research topics.
- To design a research proposal to evaluate the efficacy of a specific exercise program to combat metabolic disease.

Course content

Interactive lectures will focus on the metabolic, physiological and molecular responses to exercise in health and disease. A current understanding of the underlying molecular and cellular events that govern the acute and chronic exercise response will be provided. Topics include strategies for prescription of physical activity in various clinical situations including diabetes, obesity, musculoskeletal disorders and aging. Laboratory based lectures will give participants hands on experience in the assessment of glucose homeostasis in a context of exercise and metabolic challenge.

Forms of teaching and learning

The course meets for five days full time and will be composed of interactive seminars, lectures, laboratory practicals, group work, group presentations, discussion, and reflection.

Language of instruction

The course is given in English

Grading scale

Pass (G) /Fail (U)

Compulsory components & forms of assessment

Compulsory components

Laboratory practicals and group work are compulsory. Students that are not able to attend a part of the course must do a self-study and write an essay on the topic(s) that was missed.

Forms of assessment

Summative asseessment of an oral group presentation (10 min) and contribution to the discussions in connection to this, an individual written summary of the specific project researched by the group, and an individual laboratory report, including answers on questions related to the intended learning outcomes of the course, using the data generated by all participants. Course examiner will give short individual feedback on the assignment

Course literature

Recommended reading:

Molecular Exercise Physiology: An Introduction 2nd Edition, edited by Sharples AP, Morton JP, Wackerhage H. Oxon, UK: Routledge, 2022.

Egan, B. & Zierath, J.R. Exercise metabolism and the molecular regulation of skeletal muscle adaptation. Cell Metab 17, 162-184, 2013.

Gabriel, B.M. & Zierath, J.R. The Limits of Exercise Physiology: From Performance to Health. Cell Metab 25, 1000-1011, 2017.

Bishop, D.J., Granata, C. & Eynon, N. Can we optimise the exercise training prescription to maximise improvements in mitochondria function and content? Biochim Biophys Acta 1840, 1266-1275, 2014.

FYSS 2017 http://www.fyss.se/in-english - Chapters related to metabolic diseases.

Recent related review articles and handouts will be available before each lecture.