

University of Guelph

Department of Human Biology & Nutritional Science

NUTR 4360

NUTR 4360 Current Issues in Nutrigenomics

Essentials of Nutritional Genomics-Nutrigenomics. The need for and functions of nutrients in gene expression; gene-diet interactions and personalized diets.

Instructor: Marica Bakovic
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Office hours: T 10:00-12am; W 1:00-5:00pm;
Lecture: Monday 7:00-9:50 pm; ROZ 102

Course Objectives: To familiarize students with basic concepts in NUTRITIONAL GENOMICS, to develop an understanding of GENOMICS AND GENE REGULATION WITH RESPECT TO DIET and to obtain an appreciation for the role and importance of nutrition in prevention of POLYGENIC DISEASES. Students will gain some practical knowledge to apply NUTRAGENOMICS in laboratory and clinical settings (bioinformatics, single-nucleotide polymorphisms, microarrays, proteomics, metabolomics, system biology) and design nutritional strategies for prevention of chronic diseases such as cardiovascular disease, obesity, type-2 diabetes and cancer.

To reach these objectives students will need to search literature and learn how to use genomic databases, read relevant original research papers, actively participate in preparing specific lecture topics, and discuss concepts and ideas with other students in the class. In addition, students will work in groups and/or individually on several class/home assignments and write a research grant application.

Examination:

Class participation (Weekly essays-250 words)	10%
2 Assignments -10% each	20%
Group Presentations	30%
Grant Proposal	40%

Text: Ruth M. Debusk : "Genetics: The Nutrition Connection", 2003, American Dietetic Association, ISBN 0880911956

Tentative Schedule

Date	Lecture
Jan 6	Course Outline, Introduction to Nutrigenomics (Implications of the Human Genome Project for understanding gene –diet interaction Genetic variations, nutrition, preventive medicine and personalized diets)
Jan 13 + Assignment 1	Nutrient sensors (regulation of gene expression; lipids as ligands for nuclear receptor PPAR, RXR, SREBP; glucose and insulin signaling; gene–diet and gene –gene interactions)
Jan 20	Genomics from nutritional perspective (Principles, tools, polymorphisms, genotypes, phenotypes)
Jan 27 + Assignment 2	Genetic individuality and dietary responses (Single-nucleotide polymorphisms and Bioinformatics in Nutritional Sciences)
Feb 3	Methods to study cellular responses to changes in the nutritional environment: Functional nutrigenomics I: Transcriptomics and Proteomics (Expression microarrays, data analysis, examples on application)
Feb 10	Functional nutrigenomics II: Methyl donors and Epigenetics
Feb 17	<i>Spring Break week</i>
Feb 24	Nutrient-gene interaction and complex diseases (Genetic susceptibility to diets, Models; Biomarkers; Evidence-based nutrition and Epidemiology)
March 3	Folic acid and homocysteine metabolism –choline, MTHFR polymorphisms
March 10	Dietary lipids, lipoprotein responses to diet and genetics of atherosclerosis (polymorphisms of genes involved in lipid/cholesterol biosynthesis and transport)
March 17	Metabolic Syndrome (obesity, diabetes, insulin resistance and dyslipidemia; genetic influences and molecular biomarkers for preventive therapies)
March 24	Genetic and environmental influences on cancer prevention (polymorphisms of cancer genes, regulatory enzymes, nutrients as cofactors and antioxidants; DNA methylation, histones and acetylation)
March 31 + Final paper	Genetics, epigenetics and cancer prevention (polymorphisms of cancer genes, regulatory enzymes, nutrients as cofactors and antioxidants; DNA methylation, histone modifications)

Standard Statements – Graduate Course Outlines

E-mail Communication

As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course in writing, with your name, id#, and e-mail contact. See the graduate calendar for information on regulations and procedures for Academic Consideration:

http://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec_d0e1400.shtml

Drop Date

The last date to drop one-semester courses, without academic penalty, is DATE HERE. Two-semester courses must be dropped by the last day of the add period in the second semester. Refer to the Graduate Calendar for the schedule of dates:

<http://www.uoguelph.ca/registrar/calendars/graduate/current/sched/sched-dates-f10.shtml>

Academic Misconduct

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection. The Academic Misconduct Policy is detailed in the Graduate Calendar:

http://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec_d0e1687.shtml

Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded in any electronic media without the permission of the presenter, whether the instructor, a classmate or guest lecturer.

Resources

The Graduate Calendar is the source of information about the University of Guelph's procedures, policies and regulations which apply to graduate programs:

<http://www.uoguelph.ca/registrar/calendars/graduate/current/>