Nutrition: from molecules to health

Descombes Patrick, Hager Jörg, Rezzi Serge, Wiederkehr Andreas

Cours: Ingénierie des sciences du vivant
Sem. MA2, MA4
Type Opt.

Language: English
Credits: 4
Session: Summer
Semester: Spring
Exam: During the semester
Workload: 120h
Weeks: 14
Hours: 4 weekly
Lecture: 2 weekly
Exercises: 2 weekly

Number of positions

Remarque
Integrated and holistic systems approach from molecules to health - For MSc students only

Summary
We will introduce the fundamentals of nutrition and its impact on human health and disease. Then we will introduce a concept and strategy termed "Integrated systems approach", i.e., a multidisciplinary methodology to better define human health based on holistic phenotyping of human individuals.

Content
• Fundamentals of nutrition and its impact on human health and disease
• Discussion of traditional and novel experimental designs for evaluating the role of nutrition in human health
• Introduction and current utility/challenges of omics technologies for nutritional and health sciences, with emphasis on the characteristics of the technologies (genomics, proteomics, metabolomics, lipidomics, micronutrient analysis)
• Translations and applications of molecular phenotyping in the areas of human ageing and metabolic/gastrointestinal health.
• Molecular signaling pathways and regulation of nutrient uptake and utilization
• Concept and utility of molecular phenotyping and integrated systems analysis.

Learning Outcomes
By the end of the course, the student must be able to:
• Define the basics of nutrition and its impact on human health
• Demonstrate knowledge about current omics technologies and their utility and limitations for human nutrition and health research
• Develop a molecular and systems understanding of the role of nutrition in health
• Define key molecular and cellular pathways that control glucose and energy homeostasis

Transversal skills
• Access and evaluate appropriate sources of information.
• Summarize an article or a technical report.
• Demonstrate the capacity for critical thinking

Teaching methods
Lectures and exercises

**Expected student activities**

Reading, analysis and presentation of articles.

**Assessment methods**

Written exam during the semester