Nutrition: from molecules to health

Descombes Patrick, Sakamoto Kei, Wiederkehr Andreas

**Cursus**

<table>
<thead>
<tr>
<th>Sciences du vivant</th>
<th>Sem.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MA2, MA4</td>
<td>Opt.</td>
</tr>
</tbody>
</table>

**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

**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