

Master in Life Sciences

A cooperation between
BFH, FHNW, HES-SO, ZFH

Module title	Foodomics
Code	F3
Degree Programme	Master of Science in Life Sciences
Group	Food
Workload	3 ECTS (90 student working hours: 42 lessons contact = 32 h; 58 h self-study)
Module Coordinator	<p>Name: Dr. Wolfram Brück (HES-SO, Sion) – Representing FNH (BFH) Phone: +41 (0)27 606 86 64 Email: wolfram.bruck@hevs.ch Address: HES-SO Valais//Wallis, Institute of Life Technologies, Route du Rawyl 64 1950 Sion</p>
Lecturers	<ul style="list-style-type: none"> • Dr. Wolfram Brück • Guest lecturers
Entry requirements	<p>Preparatory reading list given before course begins and unmarked online pre-test on reading material Preparatory work for terminology and online pre-test</p>
Learning outcomes and competences	<p>After completing the module, students will be able to:</p> <ul style="list-style-type: none"> • Explain digestive tract anatomy & function; • Explain a nutrient's absorption, metabolism, elimination or biological effects; • Evaluate current nutrigenomic, microbiome and metabolome methods (16S sequencing and metagenome sequencing (NGS-based), NMR, HPLC-MS, GC-MS); • Develop strategies to evaluate and analyse large data sets (data mining); • Formulate their own ideas on the impact of dietary regulation of gene function on human disease; • Explain the basics of systems biology.
Module contents	<ul style="list-style-type: none"> • Digestive tract anatomy & function • Nutrient absorption, metabolism, biological effect and elimination • Nutrition and the human microbiome in health and disease <ul style="list-style-type: none"> - I: Overview - II: Gut-Brain Axis and autoimmune diseases • How the Microbiome Influences Host Diet Metabolism • How Diet Impacts the Microbiome • Pre- and Probiotics • Microbiota-Targeted Therapies: An Ecological Perspective • Tools and Models for Assessment of the Microbiome and Metabolome • Dietary regulation of gene function • Metabolic disorders • Working with large data sets: Strategies, Programs, Formatting • Functional Foods and personalised nutrition • Regulatory Framework & Challenges • Systems biology
Teaching / learning methods	Self-study, group work, student and instructor presentations, instructor lead discussions, case studies

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Assessment of learning outcome	1. Presentation of group work (40%) 2. Written final examination, closed book (60%)
Format	7-weeks
Timing of the module	Spring semester, CW 8-14
Venue	Bern
Bibliography	<p><u>Pre-course reading:</u></p> <ul style="list-style-type: none"> • Pray L, Pillsbury L, Tomayko E, 2013. The Human Microbiome, Diet, and Health. The National Academic Press, Washington D.C., USA (doi.org/10.17226/13522.) <p><u>Selected reading (suggested):</u></p> <ul style="list-style-type: none"> • <u>Foodomics: Advanced Mass Spectrometry in Modern Food Science and Nutrition</u>, Editor: Alejandro Cifuentes, Print ISBN: 9781118169452 • <u>NMR-based Metabolomics</u> Editor: Hector C Keun, Print ISBN: 978-1-84973-643-5 • <u>Bioinformatics for High Throughput Sequencing</u> Editors: Naiara Rodríguez-Ezpeleta, Michael Hackenberg, Ana M. Aransay, Print ISBN: 978-1-4614-0781-2 • <u>Diet-Microbe Interactions in the Gut, 1st Edition, Effects on Human Health and Disease</u> Editors: Kieran Tuohy, Daniele Del Rio, Print ISBN: 9780124078253 • <u>The Gut Microbiome in Health and Disease</u> Editors: Dirk Haller, Print ISBN: 978-3-319-90544-0 • <u>The Gut-Brain Axis: Dietary, Probiotic, and Prebiotic Interventions on the Microbiota</u> Editors: Niall Hyland, Catherine Stanton, Print ISBN: 978-0-12-802304-4 • <u>Metabonomics and Gut Microbiota in Nutrition and Disease</u> Editors: Sunil Kochhar, Francois-Pierre Martin, Print ISBN : 978-1-4471-6538-5
Language	English
Links to other modules	The present module complements specialisation modules of BFH FNH-4 "Food for Specific Target Groups" and FNH-5 "Food Ingredients", where more specific subjects are addressed
Comments	
Last Update	25.09.2020