PhD course: Methods in Metabolomics and Metabolism Analysis (VT 2022)

Course leader: Assoc. Prof. Daniel Globisch, Dept. Chemistry – BMC

Time: May 9th to 20th 2022, Week 19+20

Place: Uppsala University, BMC

Overview: 1st week on campus (lectures, seminars and practical laboratory work) and 2nd week for a written assignment

Credits: 3 credit points.

The PhD course “Methods in Metabolomics and Metabolism Analysis” is aimed at providing Ph.D. students with knowledge and practical skills in small molecule/drug metabolism and metabolomics research. The course is anticipated for Ph.D. students with broad educational background. Students with a background in Natural Sciences (Chemistry, Biology, Biochemistry, Chemical Biology, and Medical Sciences) and interest in metabolism and metabolomics-based research can participate in this course. This PhD course will focus on the qualitative and quantitative investigation of small molecule metabolites and/or drugs in complex biological matrices. The course aims at providing PhD students with detailed knowledge on sample preparation, sample separation as well as sample detection. Introduction to the statistical analysis of complex mass spectrometric data sets and correlation with biochemical and metabolic pathways will conclude the course to equip students with comprehension of the workflow in untargeted metabolomics research/projects and linked metabolism analysis for biomarker discovery application.

Students who accomplish this course will have detailed knowledge about analytical techniques for the investigation of small molecule metabolites and drugs in biological samples and common pitfalls related to analytical aspects of method development. Furthermore, students will gain knowledge on metabolic conversions of exogenous metabolites and be able to analyze the metabolic, catabolic and biochemical pathways of endogenous metabolites. Through coverage of cutting-edge technologies and methodologies in untargeted Metabolomics, Bioanalysis, Chemical Biology, (Bio)analytical Chemistry, and Biomarker Discovery in comprehensive seminars and lectures, students will learn about most recent developments and advances in these research fields. Besides these seminars and lectures, participating students will be introduced into sample preparation, sample separation, and sample analysis. The practical part of the course will introduce participants to detailed quantitative and qualitative analysis of selected metabolite classes.

Course outline:

- Lectures on small molecule metabolism, general metabolomics-based research, qualitative and quantitative analysis of small molecules, and biomarker discovery.
- Seminars on the analysis of biological samples and metabolism analysis.
- Practical laboratory course with examples on sample preparation, sample separation, sample analysis, and metabolomics-based data evaluation.

Requirement to pass the course:

Full-time attendance of the course and completed written assignments.

Course literature:

The literature (including reviews, scientific publications, and laboratory manuals) will be provided to every participant prior to the course start.

Contact:

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