UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Proteomics and Metabolomics

2223-1-F0901D046

Aims

The course will provide knowledge of proteomics technologies applied to clinical investigations.
The course will introduce metabolomics technologies and platforms applied to biomedical investigations

Contents

The course will provide knowledge of proteomics applied to clinical investigations.
The course will introduce metabolomics technologies and platforms applied to biomedical investigations

Detailed program

Introduction to the terminology and to the features of the chromatographic techniques used for quali-quantitative investigations. Knowledge of mass spectrometry applied to proteomics. Proteins identification using the “Peptide mass fingerprint” approach. Tandem mass spectrometry (MS/MS). Interpretation of MS/MS spectra of peptides. Bottom-up and top-down proteomics approaches used to identify proteins and peptides. Characterization of posttranslational modification by Mass Spectrometry. Quantitative proteomics: gel-based and gel-free; label-based and label-free. Mass Spectrometry-Imaging technology (profiling and imaging) and its applications. Examples of application in clinical researches.
Introduction to metabolomics: concepts, approaches and definitions; Analytical technologies in metabolomics; Experimental design in metabolomics; Lipidomics and Fluxomics

Prerequisites

Basic knowledge in the field of Chemistry, Biochemistry and Statistics

Teaching form

Lectures and practical lessons

Lectures / practical lessons will take place in physical presence

Textbook and teaching resource

Reviews e and scientific articles published on international journals will be provided during the course. Downard K., Mass spectrometry . A foundation course. Royal Society of Chemistry, 2004 ISBN 0-8504-609-7 Gary Siuzdak, Mass Spectrometry for Biotechnology, Academic Press 1996 Per consultazione: J. H. Gross, Mass Spectrometry. A Textbook, Berlin – Heidelberg, Springer Verlag, 2004 E. De Hoffmann, V. Stroobant, Mass Spectrometry. Principles and Application, 2nd Edition Chichester, John Wiley & Sons, 2001. C. Dass, Principles and Practice of Biological Mass Spectrometry, New York, Wiley-Interscience, 2000. ISBN 0471330531 Chapman, John R. Mass Spectrometry of Proteins and Peptides, Humana press 2000, ISBN 0- 89603-609-X Walker, John M. The Proteomics Protocols Handbook Humana Press, 2005

Semester

Second semester

Assessment method

Among the 8-10 questions are included in the written-oral test on the contents of the course of Proteomics and Metabolomics. The questions are quiz with 4-5 possible answers of which only one is correct. Among them, there is always an open one and some that may require the execution of calculations or interpretation of mass spectrums (MS / MS) of peptides. The oral examination will be done based on the written/orals questions.

Office hours

Every day upon appointment

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING