UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Genetics of Metabolic Diseases

2627-2-F0902D015-F0902D01502

Aims

The aims of the Course is to provide the student with a critical knowledge of the technical instruments and strategies normally employed in defining the pathophysiology of metabolic disorders and possible new therapeutic approaches.

Contents

The course will provide a general introduction to the methodologies used to identify genes involved in multifactorial diseases and discuss how these approaches have led to the identification of genes associated with obesity, diabetes, and Metabolic Associated Fatty Liver Disease.
The course will also provide students with a critical understanding of the molecular regulatory mechanisms that lead to the evolution of metabolic diseases, such as those involved in the progression of MAFLD, MASH, and hepatocellular carcinoma. The most recent methodologies aimed at identifying the various characteristics of cells involved in the development and/or progression of these diseases will also be discussed, emphasizing the role of biotechnology in their diagnosis and therapeutic approaches.

Detailed program

Multifactorial Diseases: Concepts
Approach for Identifying Causative Genes: Classical Genetics and LOD Score
Approach for Identifying Causative Genes: Polymorphisms and GWAS
Identification of Genes Involved in Obesity, Diabetes, and MAFLD
Molecular Biology Methods: qPCR, Next-Generation Sequencing, Crispr-Cas9, Spatial Transcriptomics
Molecular Mechanisms Involved in the Evolution of MAFLD, MASH, and HCC

Iron Metabolism and Its Role in Liver Damage, Iron Overload, and Ferroptosis
Interaction between Metabolism and Microbiota

Prerequisites

Advanced knowledge in genetics, biology and molecular biology.

Teaching form

12 two-hour classes delivered in presence.

Textbook and teaching resource

Slides utilized during the classes and reviews published in international journals.

Semester

First semester

Assessment method

These subjects will be evaluated within the exam of the integrated course, as described in the Syllabus of the whole course.

Office hours

By appointment
Please write to donatella.barisani@unimib.it

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | GENDER EQUALITY