



**PhD Program in Biochemistry and Molecular Biology - BiBiM 2.0**  
**Teaching Day 2025**  
**19 September 2025**  
**Room 14, Polo Scientifico San Miniato, Siena**  
**Webex: <https://unisi.webex.com/meet/lorenza.trabalzini>**

**Programme**

10.00-10.15	Registration and Welcome message	<b>Lorenza Trabalzini</b> , Coordinator of the PhD Program in Biochemistry and Molecular Biology-BiBiM 2.0 Department of Biotechnology, Chemistry and Pharmacy, University of Siena
10.15-11.15	Xenobiotic metabolism enzymes and drug-nutraceutical interactions	<b>Vincenzo Longo</b> , Institute of Biology and Agricultural Biotechnology (IBBA), National Research Council (CNR), Pisa
11.15-12.15	Nutraceuticals and their role in Metabolic syndrome (MetS) prevention	<b>Luisa Pozzo</b> , Institute of Biology and Agricultural Biotechnology (IBBA), National Research Council (CNR), Pisa
12.15-13.15	Metabolomics in Natural Product Discovery	<b>Andrea Bernini</b> Department of Biotechnology, Chemistry and Pharmacy, University of Siena
13.15-13.30	General discussion and conclusions	<b>Lorenza Trabalzini</b>

## Abstracts of the seminars

### **Xenobiotic Metabolism Enzymes and Drug-Nutraceutical Interactions**

Vincenzo Longo

Xenobiotic metabolism enzymes, particularly those of the cytochrome P450 (CYP) family, play a critical role in the biotransformation and elimination of foreign compounds, including drugs and nutraceuticals. Interactions between pharmaceuticals and nutraceuticals can significantly influence drug metabolism, potentially altering therapeutic efficacy and safety. Nutraceuticals—such as herbal supplements and dietary components—can modulate enzyme activity by inducing or inhibiting key metabolic pathways. These interactions may lead to increased toxicity or reduced drug effectiveness. Defining the concentrations of nutraceuticals before use is critically important to help assess and potentially exclude harmful drug–nutraceutical interactions.

### **Nutraceuticals and their role in Metabolic Dysfunction-Associated Fatty Liver Disease (MAFLD) prevention**

Luisa Pozzo

Nutraceuticals are natural bioactive compounds that offer therapeutic potential in the prevention and management of Metabolic Dysfunction-Associated Fatty Liver Disease (MAFLD). This condition, characterized by excessive fat accumulation in the liver linked to metabolic dysfunction, is driven by insulin resistance, oxidative stress, and chronic inflammation. Nutraceuticals such as polyphenols (e.g., resveratrol, epigallocatechin gallate), omega-3 fatty acids, silymarin, curcumin, and vitamins D and E have shown hepatoprotective effects. They can reduce hepatic fat accumulation, improve insulin sensitivity, modulate lipid metabolism, and exert anti-inflammatory and antioxidant actions. These compounds act on multiple molecular pathways involved in MAFLD pathogenesis, offering a safe and effective adjunct to dietary and lifestyle interventions. Their use supports liver health and may slow or reverse disease progression in at-risk populations.

### **Metabolomics in Natural Product Discovery**

Andrea Bernini

Natural products (NPs), produced as metabolites, originate from a variety of sources including plants, microbes, and marine organisms. These compounds have long been recognized for their bioactive properties and beneficial effects on humans and other living beings. Recent progress in metabolomics and bioinformatics has accelerated the traditional processes of extracting and characterizing these bioactive compounds, as well as performing qualitative and quantitative analyses. The metabolomics workflow involves selecting suitable sources, harvesting, storing, extracting, identifying compounds, conducting analytical and statistical analyses, and finally depositing the data into relevant databases.