

**PhD in
Molecular Medicine and Medical Biotechnology
Advanced courses 2025**

**January 20-21-22, 2025; 3:00 p.m.
Seminar room 1st floor Torre Biologica**

Proteomic and metabolomic signatures in systems biology



**Lesson one (Marianna Caterino,
DMMBM): January 20, 3:00 p.m.**

*Metabolomics and Lipidomics: new
tools in biomedicine*



**Lesson two (Michele Costanzo,
DMMBM): January 21, 3:00 p.m.**

*Multilevel protein analysis: application
and challenges in proteomics*



**Lesson three (Armando Cevenini,
DMMBM): January 22, 3:00 p.m.**

OMICs and nanotechnologies

The 'omics' methodologies in biomedical sciences allow for the detection of quantifiable biological features, or biomarkers, useful to better define the biochemical processes and the organization of the human body, in both pathological and physiological contexts. Proteomics and metabolomics use high-throughput and high-efficiency approaches with the support of bioinformatic tools to identify and quantify the total content at the protein, peptide or metabolite level in cells, tissues or biological fluids. Relevant metabolic information can be tracked investigating the alterations in the proteomes or the sub-proteomes of cells or organisms, with clear appreciation of the variations occurring in signaling pathways or interactome networks. To obtain proteome-wide information on proteins and their post-translational modification status, even at the single-cell resolution, protein quantification strategies have been developed. On the other hand, metabolomics and lipidomics technologies have helped the discovery of several potential biomarkers of diseases. The technological advances in omics fields have significantly enhanced medical discoveries and supported biomedical research, delivering branches of

knowledge with precious information at different levels, thus offering new, intriguing resources to integrate such information across these molecular layers.

References

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