

# Metabolomics: Unlocking the Secrets of Biological Research Through Data Analysis

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# Introduction to Metabolomics Services and Data Analysis

Metabolomics is a rapidly growing field that focuses on the study of small molecules or metabolites in biological systems. Metabolomics, especially the untargeted approach and data analysis play a crucial role in advancing our understanding of complex biological processes, such as disease development and drug response.

**Theoreo** offers metabolomics and data analysis services for biological research, ensuring a thorough understanding of the challenges faced by researchers and the benefits these services can provide.

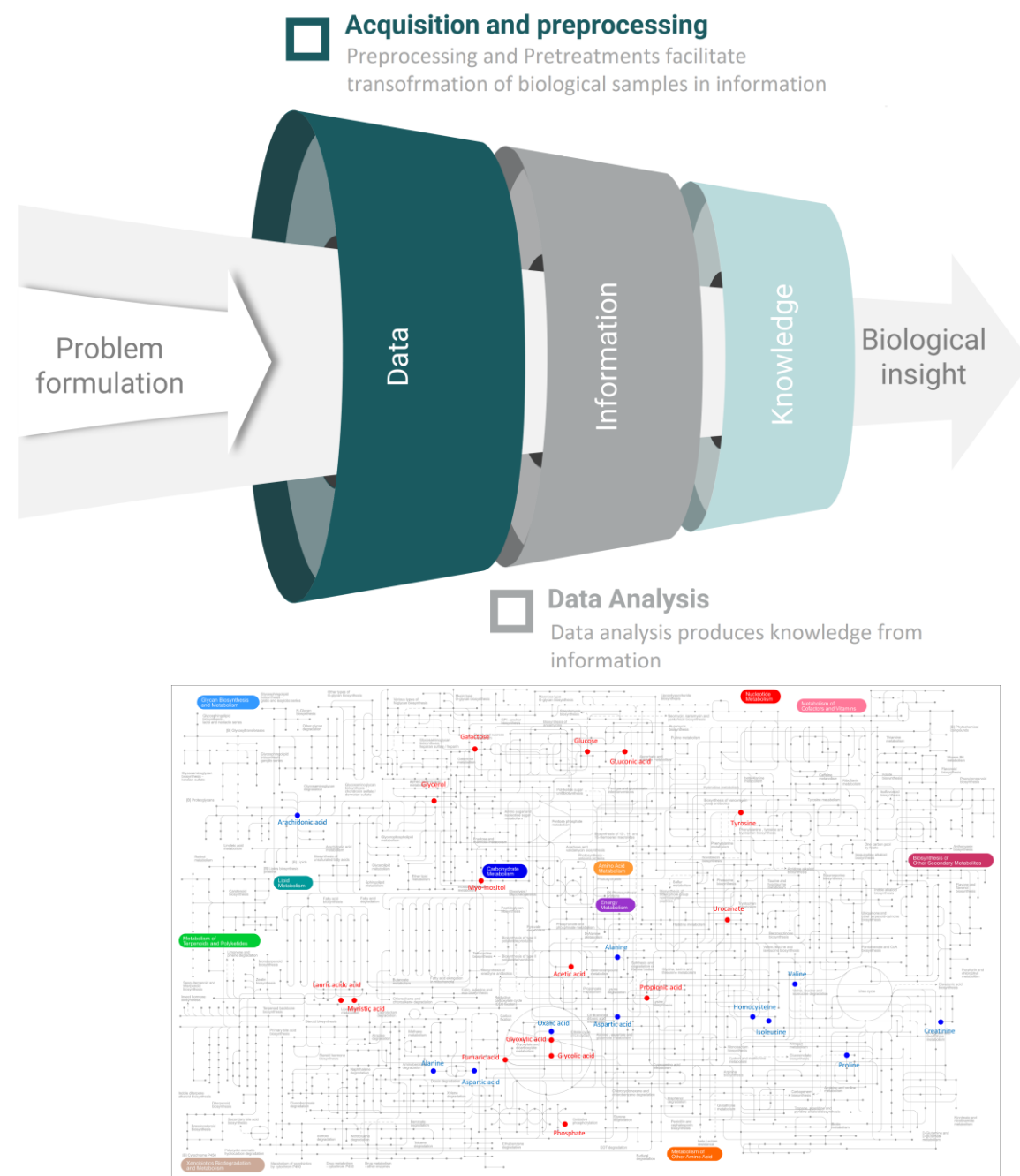


# Key Benefits of Metabolomics Services and Data Analysis

Untargeted metabolomics combined with modern machine learnings approaches offer several key benefits for biological research.

One of the main advantages is their ability to provide comprehensive and quantitative information about metabolic pathways and networks, which can help researchers gain insights into the underlying mechanisms of diseases and drug responses.

In addition, metabolomics and data analysis can also help identify new biomarkers for disease diagnosis and monitoring, as well as facilitate the development of personalized medicine. These benefits make metabolomics an essential tool for advancing our understanding of complex biological processes and improving patient outcomes.



# Challenges Faced by Researchers in Metabolomics

Despite the many benefits of targeted and untargeted metabolomics and data analysis, researchers face several challenges in this field.

One of the main challenges is the need for advanced analytical techniques and equipment, which can be expensive and require specialized expertise. **Theoreo**, is a spin-off company of the department of medicine and surgery of the University of Salerno. It is composed of staff with high experience in omics and advanced analytical sciences. It has, in ownership and availability, by means of agreements with the University of Salerno, the most advanced analytical technologies for metabolic investigations in mass spectrometry





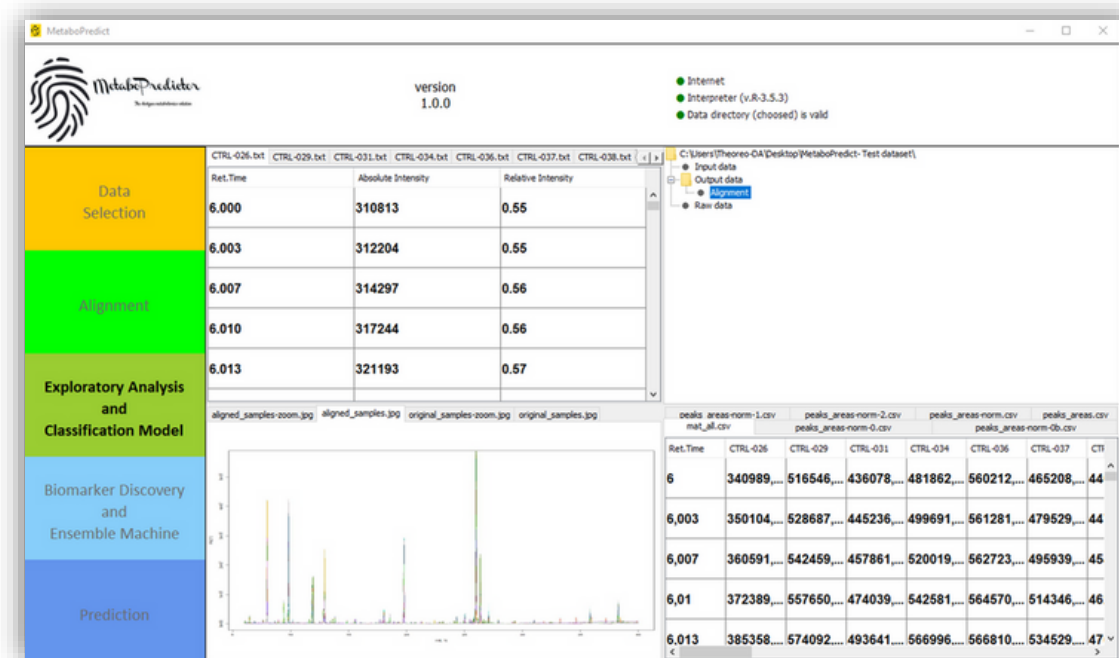
# Challenges Faced by Researchers in Metabolomics

Another challenge is the complexity and variability of metabolite profiles, which can make it difficult to identify meaningful patterns and correlations. To overcome these challenges, Theoreo developed a kit for a wider and effectively metabolites extraction, purification and derivatization from several biological samples. The kit called **MetaboPrep** was certified according the Regulation (EU) 2017/745 as Medical Device for *in vitro* diagnostics (CE-IVD)



# Challenges Faced by Researchers in Metabolomics

Moreover, the identification of pattern and correlation is another challenge in metabolomics as in other -omics science. Theoreo developed a proprietary software for untargeted metabolomics data analysis called **MetaboPredict**



MetaboPredict has been designed to show the user a simple and clean graphical interface. The data analysis is guided by means of a very intuitive and complete pre-established pipeline allowing to perform a broad exploratory analysis and to train different machine learning models, both supervised and unsupervised. The results shown in both graphical and tabular form are also saved as separate files for use in other surveys or by means of other data analysis or graphics software.

MetaboPredict also allows to enclose the models developed in an "Ensemble" classifier that can also be used for the prediction of unknown samples or to validate the results obtained by means of independent datasets.

# Our Team

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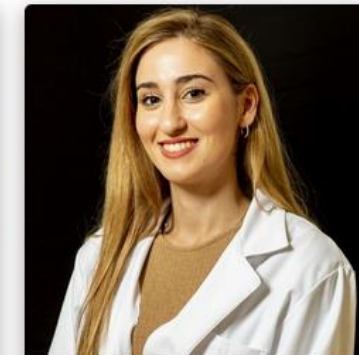
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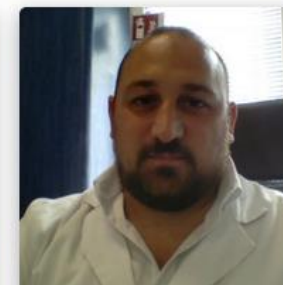
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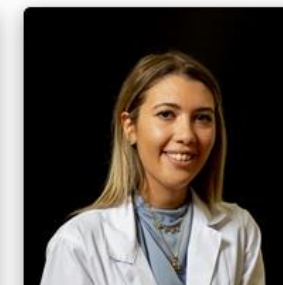
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