Longitudinal Metabolomics for Disease Pathology Research

Untargeted metabolomics and machine learning technologies for temporal metabolic profiling, biomarker discovery, and disease modeling

Prediction of disease severity and understanding disease progression is essential for development of therapeutics, implementation of treatment plans, and allocation of medical resources in a health crisis. Samples from patient cohorts collected at multiple timepoints can be analyzed to gain insight into the course of disease and to predict disease severity. Longitudinal or time-course measurements using untargeted metabolomics combined with machine learning offers a global and unbiased view of metabolism with temporal resolution, allowing discovery of disease-associated metabolite biomarkers. Panome Bio's™ Next-Generation Metabolomics makes it possible to go beyond standard binary studies and to handle complex experiments such as longitudinal samples from large cohorts. Our next-generation methods uncomplicate complex experiments while our comprehensive workflow and personalized data analysis reports are tailored to your unique research needs.

Highlights

Next-Generation Metabolomics™
Through an untargeted analysis and robust computational methods we provide an unbiased and global view of metabolism. We then use next—generation methods to decrease the complexity of datasets, allowing more impactful experimental designs than previously possible, including multi-omic integration, longitudinal analysis, large cohorts >1k, and more.

Comprehensive Workflow
Starting from sample preparation, to experimental design and data analysis, we handle all aspects of your metabolomics screen.
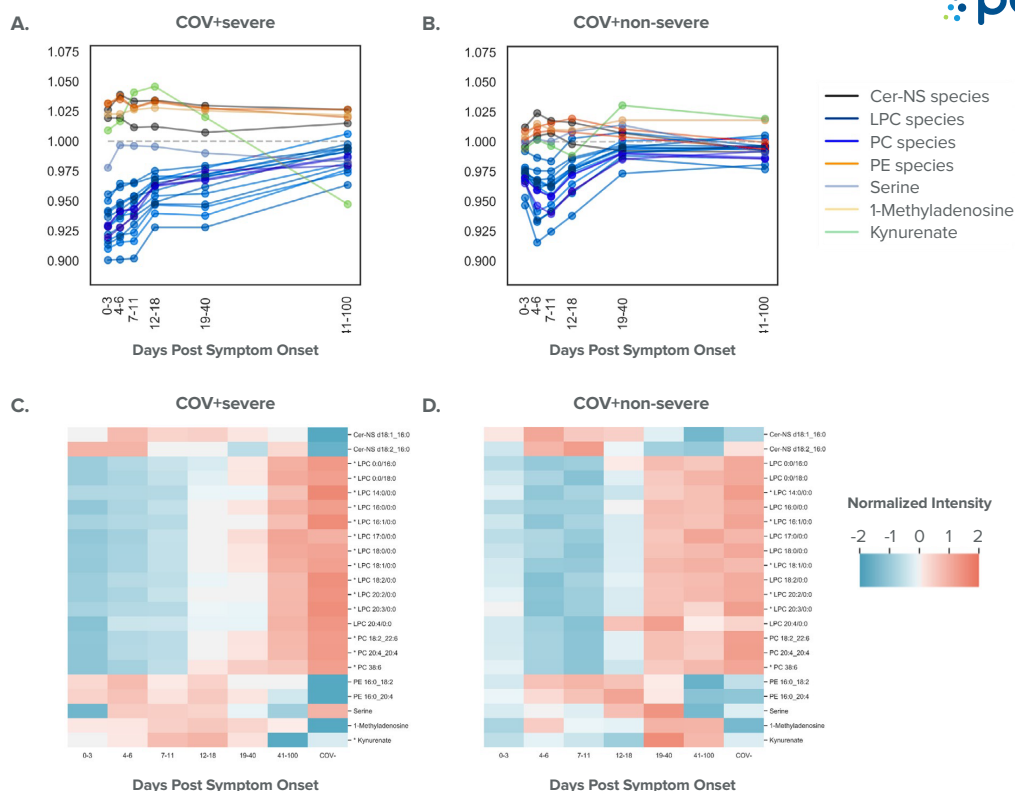
Personalized Data Analysis Report
Metabolomics data is complex, personalized data analysis reports provide a straightforward interpretation of your results. We work with you to define an analysis plan that will meet your needs.

n/day	d0	d3	d7	d14	d28	d84
	140	66	29	6	9	6
	123	98	80	48	14	6
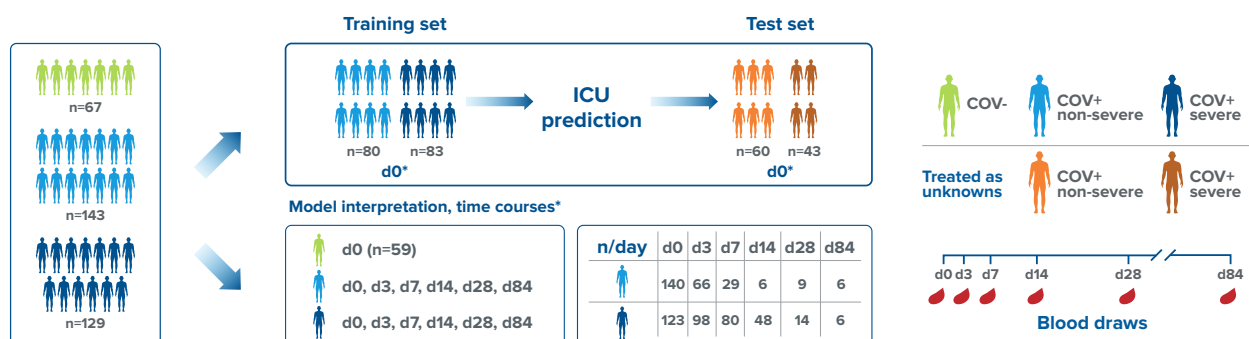
*Day 0 (d0) sample not available from all patients.
#Availability of longitudinal samples dependent on survival and after-discharge compliance

A COVID-19 disease study of >300 patients using longitudinal metabolomics was used to predict disease severity. Blood samples were taken over the course of 84 days and metabolites associated with severe COVID-19 were discovered.

A. COV+severe

B. COV+non-severe

Legend:
- Cer-NS species
- LPC species
- PC species
- PE species
- Serine
- 1-Methyladenosine
- Kynurenate

C. COV+severe

D. COV+non-severe

Normalized Intensity: -2 -1 0 1 2

Days Post Symptom Onset

Read more about this study: Sindelar et al., Cell Rep Med. 2021 Aug 17; 2(8): 100369

Longitudinal trends in COV+ patients **(A)** Profile plot of the mean predictor metabolite intensities relative to d0 COV- samples (n = 59, gray) in symptomatic SARS-CoV-2-positive individuals with severe COVID-19 (n = 123, COV+ severe). **(B)** Profile plot of the mean predictor metabolite intensities in symptomatic SARS-CoV-2-positive individuals with non-severe disease (n = 140, COV+ non-severe). **(C and D)** Heatmaps showing relative mean intensity of predictor metabolites in longitudinal profiles of symptomatic COV+ severe patients (C) or COV+ non-severe patients (D).

Panome Bio™ - Biomarker Discovery with Next-Generation Metabolomics™
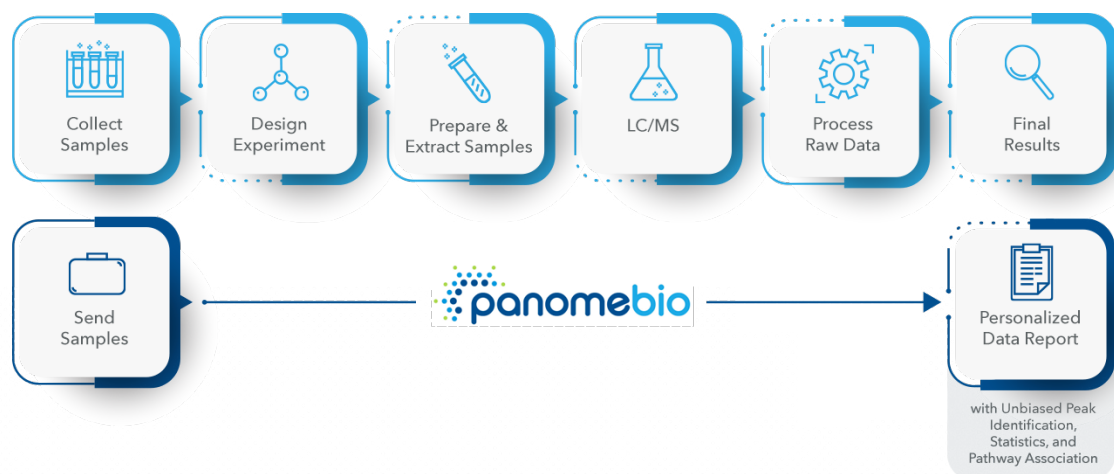
Panome Bio can help you profile and discover biomarkers with Next-Generation Metabolomics while saving time and resources. Our next-generation methods can take your research beyond A versus B studies and into more complex experiments such as drug-target mapping, metabolic kinetics, and longitudinal analysis. Our technology provides you with a global and unbiased view of metabolism with quantitative accuracy while our computational methods provide a clear view of your complex metabolomics data. Contact us to be your partner in research!