Research themes

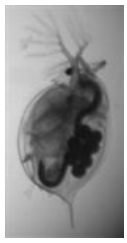
Metabolomics research at the University of Birmingham spans the breadth of the Life Sciences from fundamental biochemical studies in bacteria, to toxicological investigations in algae, invertebrates, fish and human cells, through to clinical studies of cancer, inflammatory diseases, organ transplantation and heart disease.

Metabolomics is even being developed and applied outside of the life sciences, in science-based archaeology. While these applications are wide ranging, the primary foci of metabolomics research at Birmingham are in two areas:

Clinical metabolomics (/research/activity/ssfh/index.aspx)

Metabolomics is one of the central technologies underpinning the University's **Systems Science for Health (/research/activity/ssfh/index.aspx)** initiative. Facilitated by 'omics technologies and conceptual advances, systems science uses an integrative approach to study the complex interactions between the components of a system. Here we are applying metabolomics and other 'omics technologies within a Systems Medicine framework to better understand mechanisms of disease and to expedite the discovery of novel biomarkers.

Environmental metabolomics (http://www.biosciences-labs.bham.ac.uk/viant/)



As part of the **BioSystems and Environmental Change (/research/activity/biosystems-environmental-change/index.aspx)** research theme in the School of Biosciences, we are engaged in world leading activities in the development and application of metabolomics to investigate the molecular mechanisms underpinning organism responses to environmental stress. A primary focus is to characterise the responses of freshwater species, in particular the sentinel organism Daphnia magna, to environmental pollutants and to discover molecular biomarkers that can predict adverse effects on growth and reproduction (For more on this see the **Environmental Metabolomics Research Laboratory (http://www.biosciences-labs.bham.ac.uk/viant/)** site). A second focus is to investigate the potential toxicities of engineered nanomaterials and therefore to contribute to their responsible manufacture and use.

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