


## Proteomics services

Proteomics is the systematic identification and characterisation of proteins, their structures and functions. **The Advanced Mass Spectrometry Facility** ([/facilities/advanced-mass-spectrometry/index.aspx](http://facilities/advanced-mass-spectrometry/index.aspx)) in the School of Biosciences at the University of Birmingham has extensive experience in the analyses of protein using advanced technology including mass spectrometry and bioinformatics. The facility provides support, equipment and expertise for analysing complex protein mixtures. The staff are involved in numerous research efforts in Biosciences, working within such areas as cancer research, cell signalling, microbial gene expression and modulation of plant growth.

 **Customer comment** "I would highly recommend the service provided at Birmingham to other biological scientists requiring high quality and rapid mass spec analysis."

Structural information is provided using unique techniques for ion manipulation and fragmentation. We can undertake a range of analytical services including analysis of complex mixtures, elemental composition based on mass alone, molecular weight including intact protein ("top down"), species identification, protein interactions, secondary structure and post translational modification using different fragmentation technique (CID, ECD, ETD, HCD, IRMPD). The mass spectrometry group at the School of Biosciences is also undertaking several research studies including phosphorylation and glycosylation enrichment and relative quantitation of labelling protein using SILAC and iTRAQ in mass spectrometry analysis.

**The Orbitrap Mass Spectrometer** ([/facilities/advanced-mass-spectrometry/about/orbitrap.aspx](http://facilities/advanced-mass-spectrometry/about/orbitrap.aspx)) - high resolution and accuracy essential to proteomics experiments. .

**The FT-ICR Mass spectrometer** ([/facilities/advanced-mass-spectrometry/about/ft-icr.aspx](http://facilities/advanced-mass-spectrometry/about/ft-icr.aspx)) - part of the advanced Mass spectrometry facility offers the highest performance mass spectrometry technique available.

Experiments using nano high-performance liquid chromatography (nano HPLC) followed by tandem mass spectrometry (MS/MS) are performed routinely. Complex protein mixtures are enzymatically digested and the resulting peptide mixture are then analysed using nano LC followed by MS/MS. The nanoLC-MS/MS analysis provides information on the peptide masses and their sequences. The data are searched against computer-predicted spectra generated from protein databases derived from genome sequences. The result is peptide and protein identification and sequence determination. Data analysis is performed using Sequest (Proteome Discoverer, Thermo Fisher) and Mascot (Matrix Science) software.

In addition to providing proteomics equipment for use throughout the school, the genomics lab has a Trypsinisation service . This service is for users wishing to extract peptides from 2D gels for use in mass spectrometry and uses automated techniques to extract peptides from gel plugs. Further details about the service can be obtained by downloading the booklet from the link below.

- Trypsin Digests Service Customer Information ([pdf \(http://www.genomics.bham.ac.uk/Documents/Protein%20Analysis%20book.pdf\)](http://www.genomics.bham.ac.uk/Documents/Protein%20Analysis%20book.pdf))
- Sample Processing Order Form (Must be sent with samples) ([doc \(http://www.genomics.bham.ac.uk/Documents/Protein%20Analysis%20Request1.doc\)](http://www.genomics.bham.ac.uk/Documents/Protein%20Analysis%20Request1.doc))
- 2D Electrophoresis Guide ([pdf \(http://www.genomics.bham.ac.uk/Documents/2D%20Electrophoresis.pdf\)](http://www.genomics.bham.ac.uk/Documents/2D%20Electrophoresis.pdf))
- Protein Purification Guide ([pdf \(http://www.genomics.bham.ac.uk/Documents/ProteinPurification.pdf\)](http://www.genomics.bham.ac.uk/Documents/ProteinPurification.pdf))
- WebScientific -PreCast Gels ([pdf \(http://www.genomics.bham.ac.uk/Documents/Thin%20Precast%20Gels%20pdf.pdf\)](http://www.genomics.bham.ac.uk/Documents/Thin%20Precast%20Gels%20pdf.pdf))
- WebScientific - IPG Strips ([pdf \(http://www.genomics.bham.ac.uk/Documents/IPG%20STRIPS%20FLYER.pdf\)](http://www.genomics.bham.ac.uk/Documents/IPG%20STRIPS%20FLYER.pdf))

Take a look at the Bio-Rad interview about our proteomics facility ([pdf \(http://www.genomics.bham.ac.uk/Documents/BioRad.pdf\)](http://www.genomics.bham.ac.uk/Documents/BioRad.pdf))

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