

Proteomics and Mass Spectrometry

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Since the arrival of Nick Morrice in August 2010, a new proteomics laboratory has been established on level 2 for three new mass spectrometers. The facility now has two Orbitrap Velos mass spectrometers coupled to Easy-LC II (from Thermo Fisher Scientific). This new system is ideally suited to modern day proteomics experiments such as SILAC and post-translational modification analysis owing to its greater sensitivity, speed and resolution compared to the older Q-Star system.

The experienced staff members provide advanced knowledge and expertise for initiation of proteomics projects and state-of-the-art proteomics analyses to the Institute's scientific community. Although most of the activity of the service is related to the analyses of samples for protein identification and characterisation by MS, the analysis of post-translational modifications, especially protein phosphorylation, is a particular forte of the service. Along with the investment in MS instrumentation, we are expanding the informatics capability of the facility. There is now a dedicated MaxQuant server for the analysis of SILAC data and in early 2011 the Mascot server will be expanded, to reduce database search times and to permit researchers direct access to their Mascot search results. Also in 2011, label-free quantitative tools will become available to complement the spectral counting analysis currently available through Scaffold.

The Facility focuses on four major areas:

- Complex protein mixture characterisation, which is used for the identification of protein partners in cellular pathways generated by pull-down experiments.

- SILAC quantification of protein complexes and proteomes.
- Post-translational modification analysis of individual proteins; in particular phosphorylation, acetylation, methylation and ubiquitination.
- Method development to improve the proteomics service.

In January 2011, a second Orbitrap Velos system will be installed for Sara Zanivan's group. An Exactive LC-MS system (Thermo Fisher) will also be installed for Eyal Gottlieb's group to permit metabolite profiling at the Institute for the first time.

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