

scientific computing world

Whitepaper

Cancer Research UK – Beatson Institute – Case Study Part III: Biological data management

By Dotmatics

One of Cancer Research UK's core-funded institutes, the Beatson Institute of Cancer Research, is consolidating its Drug Discovery Programme (DDP) and RNAi Screening Facility (RSF) biological data in a centralised, fully searchable database that can be accessed via a flexible and configurable web interface.

During the past five years, the DDP and RSF groups have invested in the complete Dotmatics suite of informatics solutions, and thanks to the suite's modular nature, have quickly added new capabilities as and when needed. The latest addition – a comprehensive biologics registration system dubbed Bio Register – is being implemented with a view to improving the tracking and traceability of vital biological components like protein expression, purification, cell line and biological reagents.

By fully integrating with Browser, a powerful web-based querying and reporting tool designed to pull data from multiple disparate data sources, Bio Register's data will further enhance Browser, which acts as a central resource that can be accessed by biologists, structural biologists, chemists, informatics professionals and management across the DDP and RSF groups. All experimental information, from compound creation through to final results data, will be retrievable from one interface – in this case, Browser.

The DDP and RSF groups also use two components within the Dotmatics suite – Studies, which is used for the majority of the standardised plate-based high throughput/high content screens, and the Studies ELN (electronic laboratory notebook). The latter is very useful for collating assay development information, uploading bespoke in-house screening data, as well as any outsourced data. Furthermore the scripting functionality can be used to extract data from bespoke in-house screening data and outsourced reports.

'The ELN is going to feature more heavily in our future workflows, and all data associated with experiments will be stored electronically,' said Daniel James, Principal Informatics Manager for the DDP/RSF. 'Our ultimate aim is to eliminate all paper notebooks and we're certainly nearing that goal. But beyond capturing processes, the ELN can be used as a repository for ideas and information that isn't necessarily created in the lab. This knowledge is then searchable via Browser.' He added that as Dotmatics offers standardised reporting, scientists at the Beatson are able to extract information in a variety of formats.

In the beginning, Daniel James explained, much of the groups' initial set-up was chemistry-centric but that is changing. 'Bio Register will provide biologists with a useful tool for tracking biological entities in real time, and the improved efficiency and availability of data will ultimately improve experimental turnaround and throughput,' he said. 'For a relatively small group that is trying to achieve in an academic environment what industry is currently doing with its resources, it's crucial that everything runs as smoothly as possible.

'Rather than dealing with the lag that comes with updating spreadsheets, emailing colleagues or the time wasted when discovering that the freezer inventory is not wholly up to date, biologists can retrieve information as and when they need it.' James added that barcoding to check items in and out of freezers to ensure that samples can be tracked in real time. Most of the processes at the DDP and RSF groups involve barcode labelling with unique identifiers that link to information within the database, and both Bio Register and Browser will improve how that information is collated, stored and accessed.

Although the Dotmatics suite is used exclusively by the DDP and RSF groups at the Beatson Institute, the design of the Dotmatics Platform and flexibility of the Dotmatics licensing scheme will allow internal access by other Beatson groups, or indeed external groups, if required. Chemists in contract research organisations, for example, could be provided with specific access to components within the informatics suite in order to facilitate collaboration. With some other vendors, adding new software licences or components, and subsequently upgrading processes, can often be incredibly time consuming and can require a large amount of planning in advance. With the Dotmatics suite, however, upgrades can be done in minutes, ensuring minimal downtime and therefore no impact on users.

In addition, the Institute is looking to invest in tablet computers so that scientists can have all information available at their fingertips, wherever they are. 'It would certainly boost efficiency if chemists and biologists were able to quickly find compounds, track their progression and find any associated data without having to leave the lab,' commented James. 'Because the Dotmatics suite is web-based, it can be run on a tablet, and as an added bonus we will save space by removing some of the aging laptops.'

With the addition of BioRegister to the suite of Browser, Studies and Studies ELN, the scientific teams at Beatson now have the capability to capture, store and search all of their biological and small molecule research data and experiments in a single fully integrated suite.