

The Revival of a Compound Management Facility

BioAscent has recommissioned its facility with Titian's Mosaic software, enabling it to manage the entire Joined European Compound Library of the IMI-European Lead Factory



The decommissioning of the MSD Newhouse Research Site (Lanarkshire, Scotland, UK) in 2010 was a bitter blow to both the employees there and the Lanarkshire region. In the same year the pharmaceutical industry downsized by 50,000 jobs, and this extensive site of world-class research, focussing on the fields of anaesthesia and psychiatry, added a further 250 to this list. However, within some of the former employees there was hope.

In 2011, discussions began to revive the 13,000 m² Newhouse site. In January 2012, it reopened as BioCity Scotland – a joint venture between BioCity Nottingham and the Roslin BioCentre with an objective to provide purpose-built laboratory space for independent companies and academics. By December 2012, the former MSD compound storage and management facility at the site was revived and transferred to BioAscent Discovery (a subsidiary of BioCity Scotland), under the

direction of Dr Sylviane Boucharens, COO/CSO of BioAscent (www.bioascent.com), and her team. Pivotal to this revival was the contract award to manage the Joined European Compound Library (JECL) of the Innovative Medicine Initiative-European Lead Factory (ELF) – an international consortium of 30 partners, including Pharma companies, SMEs and academics.

BioAscent now manages the **entire** JECL, with Titian's Mosaic sample management software at its core.

The end of an era

The site which today stands as BioCity Scotland has a rich and successful history. Originally acquired by Organon in 1948, the site grew over many decades and attracted the Royal Society of Chemistry Malcolm Campbell Memorial Prize for ground-breaking work in anaesthesia. During its tenure, in 2005 Organon invested its resources in building the Automated Compound Store (ACS) at the site to house its extensive compound library. Following the acquisition of the site by Schering-Plough in 2007, the ACS was enlarged to support research sites across Europe and the US.

In 2009, a pilot project was initiated to also upgrade the ACS management software with the goal of enabling the Newhouse team to work synergistically with teams at other Schering-Plough facilities within one unifying software solution. After reviewing alternatives, Dr Sylviane Boucharens – who was Section Head, responsible for the global compound repository store and *in vitro* screening activities at the time – determined with her team that Titian's Mosaic software could provide the workflow management and flexibility needed at the facility. Mosaic also included inventory management and compound ordering capabilities – features that were missing from the facility's previous software system.

2009 also saw the merger between Schering-Plough and Merck (MSD). With Titian's Mosaic software being used as the industry standard at Schering-Plough, MSD took the decision to implement Mosaic at its other sites. However, as part of global cost cuts, the Newhouse site became earmarked for decommissioning in December 2010, along with 15 other MSD research and manufacturing facilities.



REMP LSS (Large-Size Store) with 80 Million μ Tube capacity and -20°C μ Tube picking robot



The revival of BioAscent

With the rich history and newly-upgraded capacious facilities, it is no wonder that the key personnel from the site wanted to see it revived. After BioCity Scotland was formed, Dr Sylviane Boucharens initiated a new project to recommission the ACS facility at the site, and BioAscent Discovery was subsequently formed to take over the operations. Having compared the options, it became clear that the most comprehensive and flexible route to recommission the facility was to re-implement Titian's Mosaic sample management platform.

In parallel to this, there was an opportunity to bid for a contract with the Innovative Medicines Initiative (IMI) which is a Public-Private Partnership funded by the EU and companies belonging to the EFPIA (see <http://www.imi.europa.eu/content/mission> for more details). The primary goal of the IMI is to accelerate the development of better medicines through the support of collaborative research projects that boost pharmaceutical innovation in Europe. The European Lead Factory, one of the projects funded by the IMI, was in search of a compound management facility for its pan-European drug discovery initiative. The contract required a facility that could manage the JECL, consisting of 300,000 compounds supplied by seven pharmaceutical companies and an additional 200,000 compounds that were to be developed by academics and SMEs as part of the ELF-30 consortium members in total.

BioAscent was ideally placed to bid for this contract. Not only did it have the capacity and personnel with expertise to manage the ELF compound library, but the proposal to recommission the equipment using Titian's Mosaic software at its core further strengthened its bid. In addition, BioCity Scotland provided ample laboratory facilities for the establishment of a European Screening Centre for the ELF, run by scientists from the University of Dundee and in close proximity to the BioAscent ACS.

With a winning bid and new funding from the ELF awarded in the December of 2012, the recommissioning of the compound management facility began in earnest.



Scientist retrieving compounds stored in barcoded glass vials from Kardex Paternoster Store

The BioAscent/Titian Software partnership

In repurposing the facility from a Pharmaceutical company to a services provider, BioAscent needed to make some changes to how the ACS was managed. With Titian working in partnership with BioAscent, this involved:

- Consideration of the first phase of modules and workflows to be revived
- Consideration of the new business rules implied by the external supply of compounds from the ELF contributors
- Careful scheduling of work to respond to the IMI start-up expectations, and the anticipated changes in BioAscent revenue during this phase
- Identifying the required additions and upgrades to the existing IT infrastructure and automation modules

This provided Titian with a clear understanding of BioAscent's needs, allowing Mosaic to be quickly reconfigured and the recommissioning project completed.

BioAscent's IT infrastructure with Titian's Mosaic software at its core enables:

- **Inventory Tracking** – live tracking of all inventory items, including compound identity and position throughout the workflow
- **Ordering** – placement of compound orders and determination of whether samples are available in the required form for immediate despatch and, if not, the initiation of the workflow to create them
- **Workflow Management and Robotic Integration** – management and guidance through all manual and automated processes for storage, cherry-picking, reformatting and distribution – passing data automatically at each step and providing the ability to deliver an order (within the operational target of 3 days)
- **Data Exchange** – import of received compound data and export of data related to despatched items, supporting exchanges between the BioAscent inventory system and those of the 30 ELF members and other customers

BioAscent in the ELF

BioAscent is now responsible for the collection, storage, distribution, HTS logistics and tracking of the European Lead Factory Compound Collection, standing at approximately 360,000 compounds as of November 2014. This is well within the facility's capacity of four million compounds in solution and 500,000 in dry powder form.

Providing flexible and scalable automated storage and distribution for the ELF's eight screening centres (seven Pharma plus the on-site European Screening Centre), driven by Mosaic, BioAscent houses:

- One 'REMP LSS' (Large-Size Store) – a dual robot, two aisle system with the capacity to cherry pick up to 1,000 tubes per robot per hour (for solubilised compounds)
- Two 'REMP MSS' (Mid-Size Store) – one robot, single aisle systems with the capacity to cherry pick up to 1,000 tubes per robot per hour (currently not recommissioned as this capacity is not yet required)
- Three dedicated 'Kardex' Paternoster stores with the combined capacity for 500,000 glass vials (for neat compounds)
- Associated equipment and instrumentation to reformat and distribute up to 6M samples per year



Stäubli Robot arm moving a REMP μ Tube plate in a dehumidified environment

The future

With the recommissioning process complete, including the re-implementation of Titian's Mosaic sample management platform, BioAscent is able to manage all of the compound requests for the ELF consortium – requiring only a small percentage of its potential capacity – with just four full-time personnel. Dr Sylviane Boucharens and her team are therefore looking to use their spare capacity to ramp up operations with new additional contracts.

Supported by Titian's Mosaic software, BioAscent offers a number of services:

Compound Management: With well-established compound management and logistics expertise, backed by Mosaic's integrated inventory management and ordering functionality, BioAscent can act as an external compound management facility to store, retrieve and ship compounds quickly and securely. Rapid robotic systems, all integrated with Mosaic, maximise efficiency and minimise the time for delivery.

Compound Supply: BioAscent can provide access to a Lead-like compound collection of over 120,000 small molecule compounds inherited from MSD. Mosaic's ordering functionality and robotic integration allows requested compounds of interest to be cherry-picked from this collection and shipped quickly and easily in assay-ready plate format. BioAscent may add Mosaic's Tracked Shipping module to further enhance this workflow in the future.

Compound Collection Sharing: BioAscent can support open innovation projects by acting as a secure broker in the management and sharing of a compound collection between two or more organisations, much as it does for the 30 member-strong ELF consortium. Compounds from different sources can be tracked, reformatted and shipped to recipients easily through Mosaic's managed workflow. This guides all manual and automated processes and ensures data is transferred automatically at each step and in a highly compatible format to recipients.

Disaster Recovery: Being located in an area safe from natural disasters and a facility with substantial security, fire protection and IT infrastructure redundancy, BioAscent can be a secure off-site backup for compound collections as part of a disaster recovery plan. Mosaic software is robust, its inventory data are maintained redundantly with no synchronisation delay and it can be accessed remotely.



Conclusion

Now in its second year of operation, BioAscent manages the **entire** pooled compound collection for the 30 European Lead Factory members, with Titian's Mosaic sample management software at its core. Substantial capacity and rapid, automated and secure storage will benefit new contracts and allow the revived facility to continue expanding its operations.

Throughout the recommissioning process, Titian has supported Dr Sylviane Boucharens and her team, implementing a sample management solution that supported a winning bid for the European Lead Factory contract worth 8.7 million Euros. Titian's Mosaic software provides an efficient, robust and internationally-regarded sample management solution and with new contracts on the horizon, Titian will continue to support BioAscent as its compound management needs evolve.



Working in partnership with Titian Software, we were able to make a successful bid to the IMI for the European Lead Factory contract and then recommission the facility and deliver the first screening plates within six months. I am pleased to say that Titian's Mosaic software not only provides all the functionality we need to manage all our ELF operations at BioAscent – it is efficient, flexible and supports all of our sample preparation workflows – but also provides a stamp of quality for us as we look to expand and work with other Pharma and SMEs. Titian now continue to support us by providing the software updates and consultancy we need as the company grows.

Dr Sylviane Boucharens, COO/CSO of BioAscent

