

Integrating compound storage into automated laboratory workflows

James Craven, Simon Tullet, Wendy Gaisford

TTP LabTech Ltd, Melbourn Science Park, Melbourn, Royston, Hertfordshire, SG8 6EE, UK.



introduction

The demand for automated storage facilities for a wide range of compounds, small molecules, fragments and RNAi libraries and biologics is rapidly increasing as sample libraries expand across a range of industries and applications.

TTP Labtech's comPOUND® offers robust storage for chemical and biological samples, which has been successfully employed for over a decade. comPOUND modules have been relied on by large pharmaceutical companies, academic research facilities and hospitals, as well as small biotech and contract research organisations who are committed to providing rapid throughput and delivery of high quality samples.

There has been considerable investment in automated storage facilities for compound and biological libraries, alongside automated instrumentation for liquid handling, HTS, HCS and analysis. Despite this, the process of sample transfer between such instrumentation still relies on manual effort. Often samples need to be transferred over considerable distances between storage rooms or even laboratories. On arrival, scientists need to prepare samples and place tubes or microplates into automated liquid handling platforms or assay instrumentation.

This poster discusses the benefits of comPOUND for automated sample storage and delivery. TTP Labtech's pneumatic transport technology, lab2lab, enables integration of these stores with other instrumentation into managed, fully automated workflows - from sample storage to liquid handling, assay set-up, experimental analysis and QC. This allows the scientist to concentrate on research and data analysis.

1. comPOUND: reliable chemical and biological library storage

TTP Labtech's proprietary pneumatic transport technology ensures the absence of moving parts within comPOUND's cold zone, providing robust storage and module longevity. Barcoded samples are easily tracked and logged. In addition, the ability to cherry-pick only those samples required for analysis eliminates unnecessary partial thawing, ensuring the integrity of samples remaining in the store.

TTP Labtech Ltd
Melbourn Science Park
Melbourn
Hertfordshire SG8 6EE
United Kingdom

tel: +44 1763 262626
fax: +44 1763 261964

sales@ttplabtech.com

TTP Labtech Inc
One Kendall Square
Suite B2303
Cambridge MA 02139
United States

tel: +1(617) 494 9794
fax: +1(617) 494 9795

2. hub and spoke approach to drug discovery

Recent changes within the pharmaceutical industry means drug discovery has evolved to employ multiple strategic partnerships between centres of excellence, academic partners, small CROs and consumable companies.

Changes promoting the hub and spoke approach to drug discovery:

- Internal costs and changes in internal funding have lead to the outsourcing of key drug discovery processes, especially for R & D.
- Advances in genomics, epigenomics, proteomics, etc require additional resources and expertise.
- Large pharmaceutical companies with multiple research sites have begun to focus individual sites on dedicated technology areas, such as: medicinal chemistry, HTS screening, molecular biology, or biological assays.

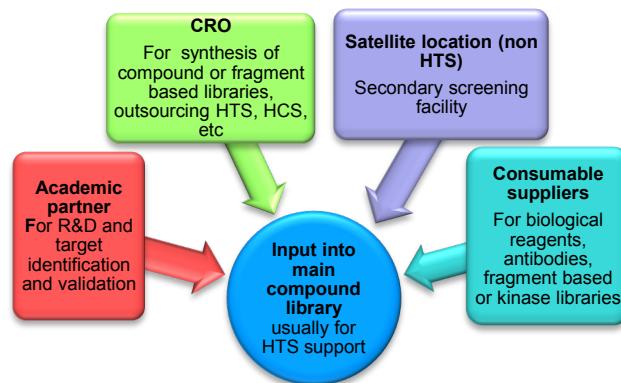


Figure 1. hub and spoke approach to drug discovery

With the increased outsourcing capabilities of CROs, subset libraries can be stored locally but accessed globally. This means large pharma companies no longer need support multiple large libraries.

3. automated workflow integration

comPOUND is easily integrated with a wide range of automated platforms and robots. The ability to decouple the storage facility from the automation improves workflow efficiencies and allows a more robust solution. By using TTP Labtech's pneumatic transport technology multiple instruments can access compound libraries, optimising the use of key high value instrumentation. TTP Labtech have implemented a number of fully integrated systems using a number of platforms.



Figure 2. comPOUND modules integrated with Agilent's BioCel, and TTP Labtech's comPILER

Creating decoupled workflows by using TTP Labtech's pneumatic transport technology removes manual handling steps and creates a true closed-loop workflow. This solution means adding other instruments is cost-effective and simple. It also has the ability to scale the automation required without creating redundant complex workflows as processes change.

4. remote sample handling

To retrieve and replace samples from comPOUND stores in remote locations, the internal pneumatic technology can be extended to deliver over long distances to a comPANION module on the lab bench or interfaced to further automation. lab2lab can schedule sample transport to analytical instrumentation for automated analysis. TTP Labtech also has the ability to integrate fully automated workflows from stored tube to finished assay plate with comPILER.



comPANION can be coupled to up to 4 comPOUND stores for the transport of selected samples from storage in remote locations to the scientist's bench, or for integration into automated platforms and robots.

The lab2lab sender, which sits on the lab bench, is used for sending samples direct to analytical equipment in a central analytical laboratory, or direct to other laboratories for HTS, etc.



5. sample transport and scheduling between disciplines

Using lab2lab in automated compound management can create a unique link between analytical chemistry and compound management departments. By using this pneumatic transport and scheduling solution, samples can be automatically passed to a number of analytical instruments to provide quantitative data on sample quality without the need to manually transfer samples. lab2lab can connect to analytical instrumentation such as HPLC, LC/MS, GC/MS, UPLC and NMR.

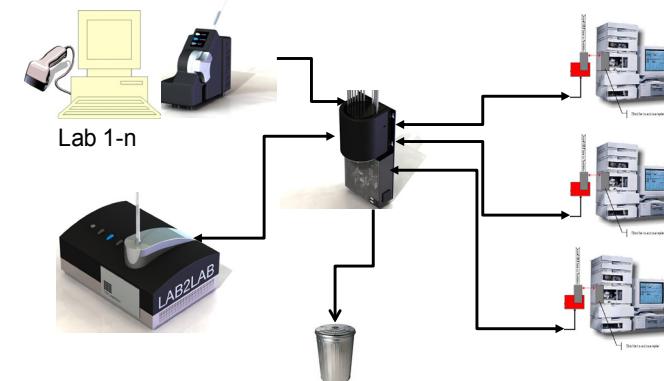


Figure 3: lab2lab schematic showing how the system connects Sender units to receivers on analytical instrumentation via the router

lab2lab enhances the management process between labs, linking scientists across multiple disciplines, connecting synthesis to purification, then to compound management and biological assays.

conclusion

The use of comPOUND modules as a key component of biological and sample storage in pharma and biotech companies for over 12 years has shown that a solution designed from the ground up can be used in single labs, all the way up to high throughput compound management for HTS compound processing. TTP Labtech's pneumatic transport technology makes a very flexible interface to further workflows.

By creating a full solution that brings together all aspects of the sample management workflow, TTP Labtech is creating robust and scalable closed-loop workflows for both sample storage and processing. These workflows can be extended into other disciplines as needed.