

TTP LabTech: putting the logic back into biological sample management

The physical and chemical composition of biological samples is more diverse than that of medicinal compounds. Types of samples vary but include proteins, nucleic acids, blood and serum samples, cell suspensions, tissue biopsies, and antibodies. One result of this diversity is that any storage system must be flexible enough to accommodate the storage requirements of different sample types.

Modular storage of biological samples

Over recent years comPOUND® has established itself in the field of compound storage, however many of its key features make it equally applicable to the storage of biological samples. These include:

- **Modularity** – capable of growing along with your sample collection.
- **Fully self contained** – enabling easy integration into your existing workflows and infrastructure.
- **Flexibility** – capable of accommodating samples with a wide range of storage requirements.
- **Reliability** – well proven in the field.
- **Security** – supplied with a robust inventory management system ensure all samples are tracked thus compliant with the ethical and legal requirements associated with the management of many biological samples.

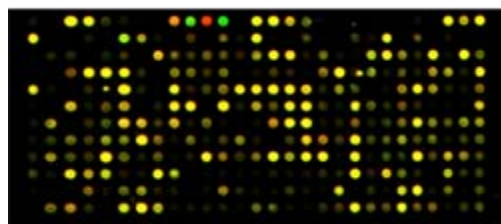
Each comPOUND® storage module holds up to 200,000 samples with the facility to add further modules as required. Any sample within the store is capable of being accessed in an average of 5 seconds.

The system is compact and entirely self-contained providing sample storage in a dark, inert nitrogen atmosphere. Modules can be configured for manual front of store retrieval, remote delivery and walk away overnight processing. The self contained nature of the store also means that investment in special services or custom facilities can be avoided. The modularity of the system also means that the expansion or relocation of sample collections is straightforward if laboratory processes change.

Storage conditions can be set to a user-defined temperature between ambient and -20°C thus providing the flexibility required to store a range of biological samples such as:

Purified DNA

Debate continues over the best conditions for the long term storage of nucleic acids. For the short term storage, purified samples of genomic and cDNA appear stable at 4°C, which avoids freeze/thaw cycles, however some researchers prefer to store these samples at -20°C.

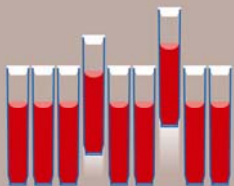


RT-PCR primer-probe sets

Real-time PCR (RT-PCR) is a well accepted research tool. The process involves the use of primer-probe sets individually designed to allow the detection and qualification of specific gene expression levels. Laboratories performing this type of analysis typically need to store primer-probe sets in a stable condition over extended periods with the ability to access them as needed.

Proteins and antibodies

Purified proteins and antibodies are used extensively for biochemical and immunoassays, respectively. Generally, -20°C storage is regarded as best for such reagents with little or no benefit gained from storage at lower temperatures. Suppliers of antibodies demand rapid access of pre-labelled microtubes for efficient order despatch. Regardless of sample type, comPOUND® can cherry-pick samples and retrieve them to user-defined formats allowing assay plates to be easily constructed.



When comPOUND® retrieves a sample, it doesn't pick and defrost an entire rack or plate. Instead, each individual microtube is cherry-picked from the hermetically sealed storage chamber using pneumatics. Retrieved tubes can be arrayed in user-specified formats in racks to simplify subsequent plate creation. Samples are effectively "dialled up" and can be presented in 96 well formats for either manual or robotic workflows.

The unique system is based on pneumatic technology which provides a number of additional benefits including:

- Increased reliability as the majority of moving parts are kept outside of the temperature controlled environment and not subject to rapid temperature and humidity changes which can lead to mechanical failures with other systems.
- Pneumatic technology allows samples to be delivered remotely. Storage modules can be located in different rooms on different floors with samples being delivered to defined locations. If required the system can also be integrated with TTP LabTech's Lab2Lab sample transport system which then allows samples to be sent and retrieved across almost any distance within research facilities.

Every storage tube has a 2D barcode, which is read on the way into and out of the store ensuring that the correct sample is retrieved. This is a key requirement for the storage of many biological samples but especially those derived from human origin. If a tissue/sample donor withdraws consent for use of their tissue in a study the company or institution must identify and remove all related samples and data. Even for those samples which have been consented, a record of their current location must be maintained at all times. The comPOUND inventory management system makes this process easy.

The Queensland Compound Library resides within the Eskitis Institute of Cell and Molecular Therapies at Griffith University. The QCL provides dedicated compound management and logistics support to a range of Australian organisations and allows Australian chemists and biologists to deposit and access samples from a central repository. This consists of 3 comPOUND stores (TTP LabTech) and an Active Sample Manager plate store (Hamilton) linked by a BioCel sample processing robot (Velocity11).

This facility allows chemists to deposit their samples and natural product extracts into Australia's only purpose-built small molecule repository. Biologists can select screening sets in their preferred microplate format from the unique suite of molecules on offer. This is a bonus for the screening group as a more pertinent set of compounds is accessed, and reagents and other consumables are conserved.

Summary

comPOUND® provides a reliable, efficient and flexible storage solution for biological samples with the following benefits:

- **Modular** – able to store 200,000 sample per module.
- **Scalable** – ability to link modules as required.
- **Speed** – ability to cherry-pick any sample on demand in around 5 seconds and present them in a user defined format.
- **Flexibility** – able to accommodate a wide range of sample types in inert conditions at a specified temperature from Ambient to -20°C.
- **Confidence** – each microtube is barcoded and tracked for full sample traceability.
- **Reliability** – based on a well proven yet simple technology.

comPOUND® stores are proven to be compatible with the storage requirements of purified DNA, RT-PCR primer-probe sets and biological samples

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