

Centralised sample tracking and management

The Blizard Institute of Cell and Molecular Science is the largest institute of Barts and the London School of Medicine and Dentistry (part of Queen Mary University of London) and aims to deliver excellence in all aspects of research, teaching and clinical service. The Institute is housed in the Blizard Building in Whitechapel, which has 9,250 m³ of laboratory space and opened in 2005. It brought together 8 different research centres, and has core facilities in flow cytometry, imaging, global siRNA screening and transgenics.

One major challenge for the four lab managers in the new Institute was ultra-cold sample storage. The centres brought forty liquid nitrogen Dewars into the building, with an average of 1000 to 2000 samples in each, and different methods of storing and recording. Many Dewars were old and inefficient, and the mixture made it difficult to demonstrate compliance with the 2004 Human Tissue Act. The Institute therefore commissioned a centralised vapour phase nitrogen store. This has four containers (three operational, and one back up), each holding 21,000 samples in standard aluminium frames containing 1,100 samples. Each frame can be removed independently, i.e. no others have to be removed for access.

The Institute also used the *ItemTracker* software programme to create a user friendly tracking system which meshes with existing work procedures. Researchers inserted their data into a simple spreadsheet, and this was then imported into *ItemTracker*. The system involves coding all sample tubes with a hand held bar coder. Their ownership, sample type, and location (frame and position within it) is then recorded. This is supported by specially developed labels which can be attached to frozen samples, even at -180°C.

Researchers have generally adapted well to the system, with the 'carrot' of faster working, and the 'stick' of removing unlabelled samples (see over).

The system has proved so beneficial that it has been extended to -80°C freezers, with the same combination of labelling, location tracking and standardised storage containers.



Chris Pelling, Institute Laboratory Manager

Key Points

- The Institute greatly reduced the number of frozen samples – by 50% in the case of those stored in liquid nitrogen – through better inventory management, and disposal of those which were unclaimed.
- Standardised containers enable much more efficient use of space in cold storage facilities and – when combined with location tracking - make sample retrieval quicker and easier.
- The effective capacity of -80 freezers has been increased by up to 50%.
- Labelling and location tracking makes it easier to comply with existing requirements, e.g. the Human Tissue Act, and to respond to new ones.
- The system uses handheld barcode scanners and specially developed labels.

S-Lab Case 4 – Improved Sample Tracking

Key Benefits

More efficient storage – The system makes it easier to identify and remove samples which are no longer required. More than 50% of the samples stored in the Dewars were discarded at the time of consolidation, generally because they belonged to researchers who had left the Institute, often many years before. This was the case with several whole Dewars. Only a few unlabelled samples have been removed since the new system was started but a major audit programme is being planned now that the system has been bedded in. This is expected to highlight many more samples that have become surplus even since the new system was installed. The same combination of removing unclaimed samples (many of which were frozen together in plastic carrier bags), and use of standardised containers, has also freed up about 50% of the space within -80 freezers.

Reduced energy consumption – The new storage facility is much more energy efficient than the Dewars it replaced. Better tracking, and the ability to access all samples through the frame system, also means that less time is needed to insert or retrieve samples in both Dewars and -80 freezers, so that less 'coldth' is lost. Sample management can also be done via the *Itemtracker* system, rather than physically. In addition, minimising the number of samples stored lowers energy consumption per sample.

Researcher time - The number of samples, and the inaccessibility of many, in the old Dewars and -80s meant that locating a specific sample could take up an hour, and be very uncomfortable. The need to take samples at the front out and put them on the floor to access those at the back or floor also created the risk of defrosting and degradation.

Improved compliance and security – The system means that the nature and location of every sample is known. Hence, compliance with existing regulations are easier to ensure. It is also much easier to respond to any new regulations or other changing requirements, e.g. expiry of consent which requires samples to be destroyed. Confidentiality can also be protected by setting access permissions for individuals and groups within *ItemTracker*.



Sample retrieval from previous Dewar

Views

“The scale of our sample clear out in 2009 shows how much money and energy can be wasted in creating perfect conditions for useless material. To make matters worse, doing this in the traditional way can actually jeopardise the quality of the samples that we do want to keep. Our new system gives us better control, saves money and time, and has less environmental impact.”

Chris Pelling

Itemtracker enables us to maintain a detailed database of the location, quantity and history of each of our 44,000 different chemical siRNAs. We can manage samples more effectively, and rapidly remove specific ones. This saves time and reduces our freezer energy consumption.

Dr Cleo Bishop

Blizzard Institute Genetic Screening Facility

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Disclaimer – This case reports information provided by the Institute. Every effort has been made to ensure accuracy, but readers should verify this as we do not provide professional advice.