A Novel RFID* and Barcode Sample Tracking System for Room Temperature and Ultra Low Temperature BioBank Samples

Huxford, K., Jones, K.C.
CSols Ltd, The Heath, Runcorn, Cheshire, WA7 4QX, UK, Tel: +44 (0)1928 513535
Fax: +44 (0)7006 061106 Web: www.csols.com  email: keith.huxford@csols.com

Overview

A scalable sample tracking system specifically designed for hierarchical storage of both room temperature and low temperature biobank specimens is described. The CSols RFTrackIT™ software system can be configured to precisely map any sampling/sub-sampling regimen, label type and storage locations. The system can be used with MS SQL Server or Oracle relational databases in a single or multi-user configuration for biobanks of different sizes.

Sample Trees for new donations and retrospective labelling

The registration of new and existing donations is made easy through the ability to create re-usable sample tree templates. These allow biobanks to map their unique sampling/dissection protocols and then use the preconfigured sample tree to automatically register all of the sub samples in their protocol in a single step. The software also ensures that all discrete sub samples are uniquely identified and linked with the primary donation.

Labelling

The sample tree also allows for the storage of biographical details such as the biobank donation identifier and label types (RFID/2D or 2D bar code) and label designs that have been assigned by default to specific sub samples types. The RFTrackIT™ software supports all types of label technologies including 2D bar coded and RFID based labels to ensure the right label type and right label size is used for the right storage / temperature combination.

All labels can be printed with both human readable text and barcoded information. All RFID unique tag identifiers are paired with generated sample identities and stored in the database to allow for the easy locating of stored materials.

Multipurpose RFID labels

In addition specially developed RFID labels can be supplied which will support a variety of uses and containers, including storage in Liquid Nitrogen, use with wax cassettes and labelling of plastic bags. The low temperature compatible labels feature an adhesive that supports storage in ultra low temperature freezers including -80°C, -120°C and Liquid Nitrogen. These special RFID labels can easily be used to over-label existing frost covered vials whilst still frozen. They have been used successfully to over-label sample vials on six continents and 60 year old vials held in Liquid Nitrogen freezers for long-term storage.

The RFID labels are partially white and clear and they can be overprinted with both barcodes and human readable text for failsafe operation.

Hardware

Standard off the shelf personal computer workstations, laser printers, RFID readers and high speed RFID label printers can be used to make the system cost effective, future-proof and compatible with existing infrastructure.

To support the use of RFID labels, workstations can consist of readers and, if required antennas, external to freezers. Collecting Sample IDs in this way is much faster than scanning barcodes and allows for the rapid scanning of boxes or plastic bags containing multiple samples. This helps support e.g., Human Tissue Act (HTA) audits, allowing for 100% inventory to be performed in just a few hours instead of months.

The ability to read RFID labels without having to handle containers means that inventory can be rapidly checked without removing material completely from the freezers thereby reducing thaw, freeze cycles. Specimens can also be more quickly located in storage once an external request has been made. An added bonus is a reduction in freezer electricity use due to faster sample handling capabilities.

Discussion & Conclusion

In combination with industry standard RFID scanners, printers and special labels, the RFTrackIT™ software solutions allow biobanks to freely use both 2D barcode and RFID labels for simple or complex dissection protocols on an extensive range of container types. Moreover the flexible design helps support both new and existing numbering and nomenclature systems to allow the system to be used in any type of biobank.

About CSols Ltd.

CSols is a well-established and successful company producing, delivering and supporting software solutions that dramatically improve costs, quality and compliance in laboratories. CSols clients include : University of Bristol / MRC UK Brain Banks, Central Manchester NHS Trust (Manchester Royal Infirmary MRI), Charing Cross Hospital, Fulan Hospital, Galway University Hospital, Heart of England NHS Trust (Heartlands Hospital), Imperial College Healthcare Trust (Charing Cross Hospital), Leeds Teaching Hospitals NHS Trust (St. James Hospital), Lund University Hospital & Oxford University Hospital Trust (John Radcliffe Hospital). Further Information:

CSols Ltd, The Heath, Runcorn, Cheshire, WA7 4QX, UK, Tel: +44 (0)1928 513535 Fax: +44 (0)7006 061106 Web: www.csols.com  Email: rftrackit@csols.com

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