titian

{ APPLICATION NOTE }

Taking stock - going beyond the spreadsheet for accurate Cell Line Inventory Management

VERSION: 1.0. APRIL 2016

Mosaic Sample Management is Titian Software's comprehensive, customisable, modular software product to control and monitor all aspects of sample storage, preparation and delivery. From small biotech to global pharma, Mosaic helps to provide a seamless, error-free sample supply chain and audit trail. Mosaic Sample Management is a tailored solution for all sample management requirements, configured through expert consulting services.

Mosaic SampleBank and Mosaic FreezerManagement are Mosaic packages, optimised and pre-configured for rapid deployment:

- FreezerManagement keeps track of samples in freezers and provides a comprehensive audit trail as samples are accessed and aliquoted.
- SampleBank provides full inventory tracking capabilities coupled with sample ordering and workflow management in a simple package. It offers seamless start-up and ongoing performance for busy sample managers.

Mosaic's modular approach means that it is simple to upgrade or extend the software's functionality whenever it is needed.

Introduction

The tracking and management of cell lines is becoming ever more important in research and development organisations. Cell lines are increasingly used in research for purposes such as in-vitro drug screening, or to express proteins for the production of biopharmaceuticals. These cell lines may represent highly valuable assets, the tracking of which cannot just be trusted to a spreadsheet.

Key Requirements for Cell Line Tracking

Registration

- Ability to capture a wide range of metadata to properly characterise cell lines. Support controlled vocabularies, expiry dates etc.
- Automatically assign a unique ID to each lot/batch

Meaningful labware types and units

- Need to support a wide range of labware types used for cell line management, e.g.:
  - Flasks – any type e.g. T-75, T-175 etc.
  - Cryovials – 2 mL, 5 mL etc.
  - Concentrations expressed in units such as cells/mL: E6 cells/mL, E7 cells/mL

Management of new Passages

- Easy recording of a new cell line generation including assignment of a new lot/batch Id and Passage number
- Capture lineage between different lots and tubes/flasks

Ordering

- The means to easily request samples, track their progress, and arrange delivery.

Titian Software has worked with a number of its customers to extend the capability of its renowned Mosaic sample management software to include the management of cell lines. Mosaic provides the means to track cell line information, inventory and lineage from inception through passaging, storage, distribution and end-use. Additional benefits of trusting cell line tracking to such dedicated software include:

Intuitive web-based user interfaces

- Manage cell lines, depict the layouts of freezers accurately, pick and place with ease
- Zero footprint deployment

Audit trail

- Capture every action in a comprehensive audit trail. Important for regulated environments or metrics reporting

Bulk upload facility

- Tubes and batches may need to be edited or created in bulk, or it may be necessary to import of data from a legacy system. File import mechanisms are required for this.

Searching

- Easily find samples based on any parameters using flexible Inventory Search tools

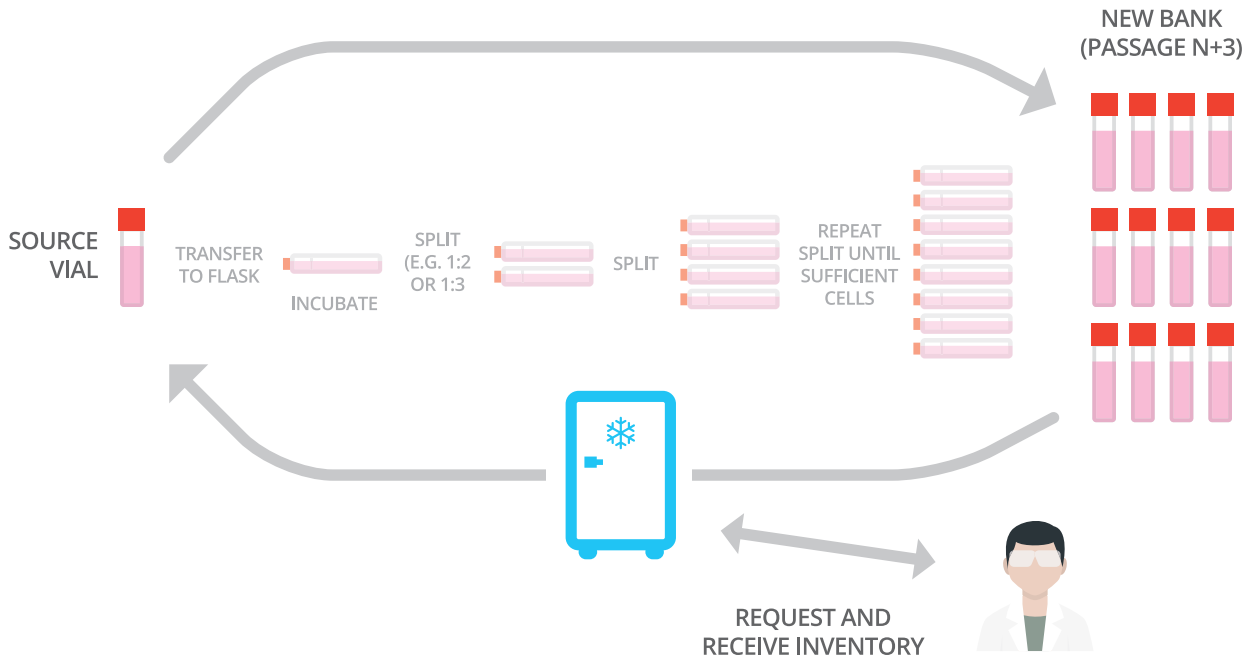
And more...

Business Processes

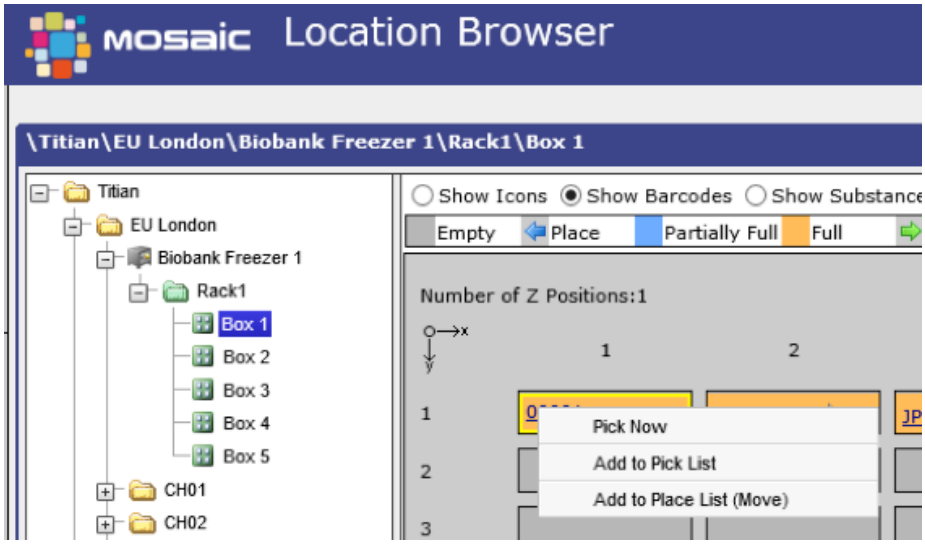
The benefits of using dedicated sample management software can be illustrated by outlining some common business processes of managing cell lines.

Maintain cell line banks: managing registration, labware and passages

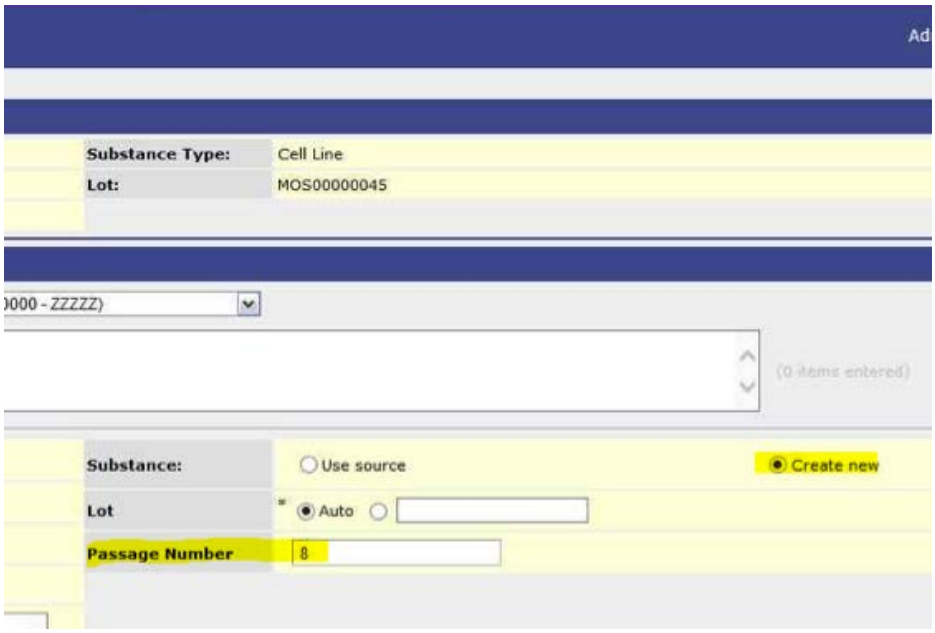
Titian's customers with large numbers of samples frequently prefer a centralised sample bank as the most efficient and secure way to manage and maintain stocks. Tracking and maintaining the inventory associated with passages of multiple cell lines is a specialist job, requiring specialist software. Scientists' requests for cell lines are fulfilled by this dedicated group.



Fast and accurate location of samples means no time is lost searching through LN2 dewars. Easy recording of sample picking removal means inventory records are kept accurate:



Tracking the lineage between new passage and tubes and prior passage is essential to a good quality laboratory process. Here we show the automatic creation of a new lot and passage number as new tubes are added to the inventory:

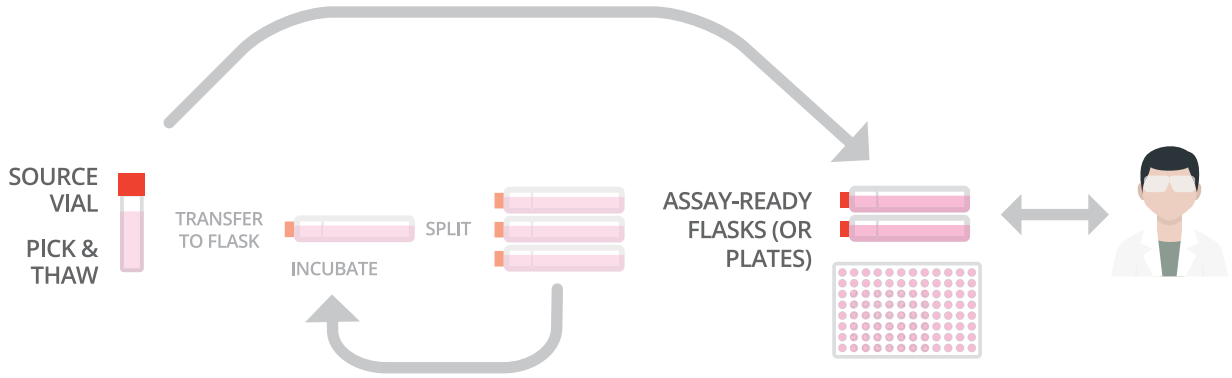


Managing one or more barcode ranges and ensuring their ongoing uniqueness is vital for efficient operation, but almost impossible when using a spreadsheet. The right software can do this, as well as accommodating pre-barcoded or even unbarcoded tubes.

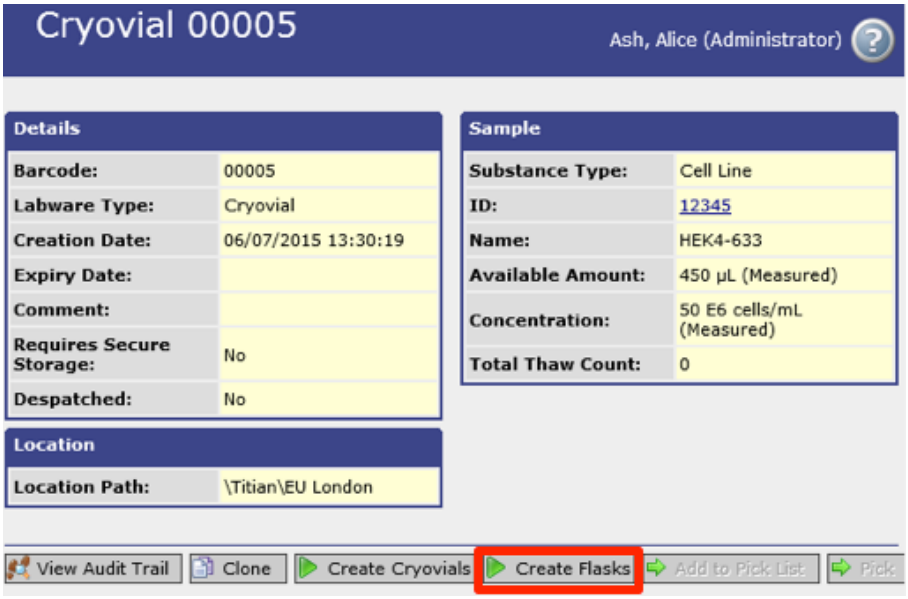
Scientists should to be able to search for and request cell lines themselves, and not rely on cell line custodians. Dedicated search and request tools make this easy:

Supply of in-culture cell lines for drug screening

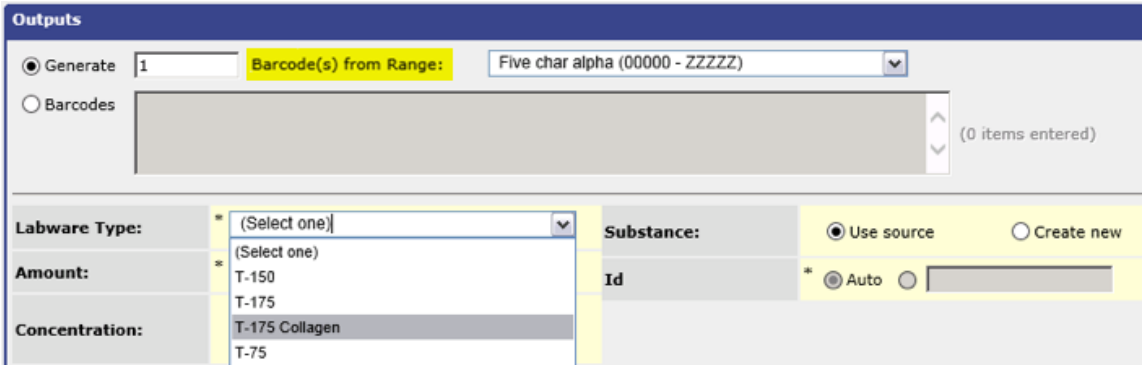
A screening campaign may require a regular supply of flasks of in-culture cells on a cycle for a period of time. Tracking the inventory and passaging requires care as it may be important to be able to relate a result to the provenance of the cells used and not exceed a given passage number. Some customers have seen the benefit of being able to easily report on counts of flasks used and distributed by projects, for example for cross-charging purposes.



It is important to track the flask lineage from the source cryovial or preceding flask:



Barcoding is vital to unambiguous identification of samples. Use pre-barcoded labware or let Mosaic manage one or many barcode ranges. Mosaic enforces uniqueness:



It may be a requirement to send out plates rather than flasks, and being able to create these in inventory ensures nothing goes untracked – right to down to the well level

Distribution of samples

Keeping on top of who has requested which sample can be a logistical challenge without software to manage requests and delivery

Sample Despatch Note

This despatch contains items for the following order:

Delivery Location	\Titian\London\Labs\GDA\Pickup
Order	291
Order Type	Despatch (by Barcode)
Recipient	Green, Gary (GeneralUser)
Comment	
Placed	19 January 2016 12:12
Delivered	19 January 2016 16:56
# Items in Order	1

Notifying the scientist their samples are ready for collection or in transit ensures samples are not overlooked or lost. Automated emails mean one less thing to do for busy sample bank operators:

This despatch contains the following tube:

Barcode	Substance	Amount	Conc
DTUBE010	MOS00000046	1 mL	50 E6 cells/mL

It must be simple to run reports on distribution or any other aspect of management of samples. Integrated inventory reporting tools are the key

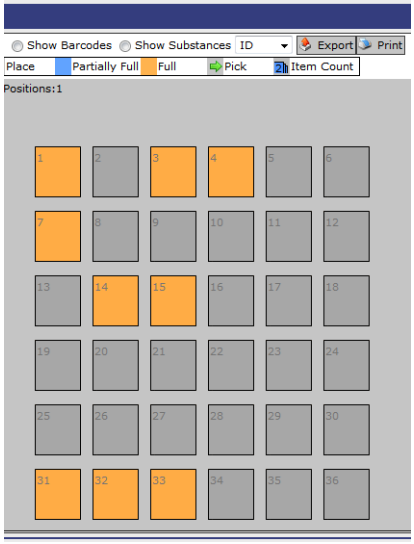
Query Results

Barcode	Type	Derived Lot	Location
00001	Cryovial		\Titian\EU London\Biobank Freezer 1
├ 0000G	Flask	MOS00000044	\Titian\EU London
├ 0000H	Flask	MOS00000044	\Titian\EU London
00004	Cryovial		\Titian\EU London\Biobank Freezer 1

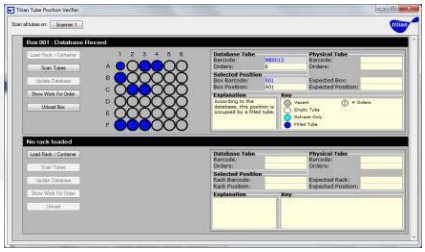
Manage Manual Inventory in 3 Easy Steps - 2D Barcode Rack Scanner Integration

One of the most accurate and efficient way to manage the inventory of tubes in manual freezers or dewars is to use 2D-barcoding technology and a dedicated rack scanner. Mosaic's Tube Position Verifier (TPV) application provides the interface to both the inventory data and the rack scanner to provide seamless reconciliation of physical tube positions and their record in inventory. This allows you to pick, place or rearray tubes with incredible accuracy.

The illustration below shows how simple it is to re-array a box of 2D-barcoded tubes using Mosaic's TPV and a rack scanner.

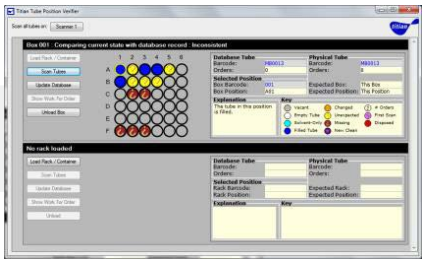


1 **Scan freezer-container using TPV application**



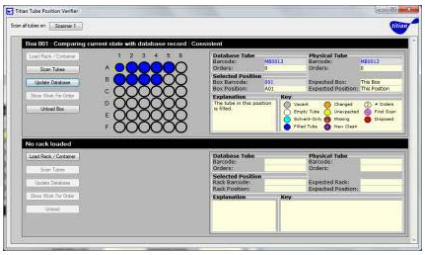
Tubes are read and displayed in their current positions

2 **Re-arrange tubes and re-scan**



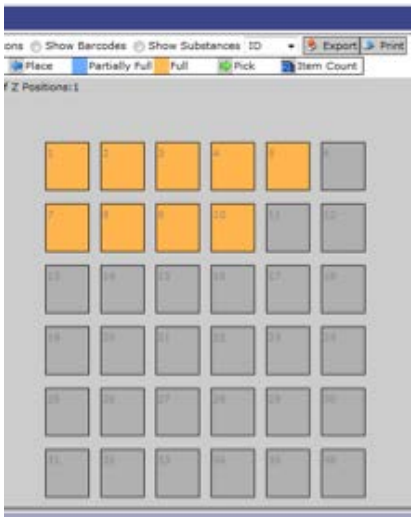
Conflicts between scan and inventory record are displayed

3 **Click to update database**



Inventory record and scan now agree

Here 2D Rack Scanner integration can is used to rearrange 2D barcoded tubes in a freezer box. It is also used to Pick or Place items to/from stores and racks – all at the click of a button



Summary

This application note illustrates many of the benefits of using robust sample tracking focussing on cell line samples, including managing registration, labware, passages, ordering, tracking, delivery and search.

The same principles can also be applied to samples of other types, be they biologicals, compounds or reagents. The solutions described are fully scalable and equally suited to small or enterprise-level sample banks. Efficiency gains are realised at every step of the cell lines' lifecycle, through identification of samples, management of picking, placing and distribution, as well as secure barcode management and 2D rack-scanner integration.

Titian Software continues to work with customers and industry partners to explore future enhancements, such as integration with the Sartorius (TAP) SelecT/CompacT cell culture robotics systems, ultra-low temperature automated storage, and to integrate with new technologies such as the latest p-Chip labware identification systems.

Notes

Notes

Titian Software Ltd

2 Newhams Row,
London SE1 3UZ
UK

Tel: +44 20 7367 6869
Fax: +44 20 7367 6868

1500 West Park Drive,
Westborough MA 01581
USA

Tel: +1 508 366 2234
Fax: +1 508 366 2744

info@titian.co.uk
www.titian.co.uk