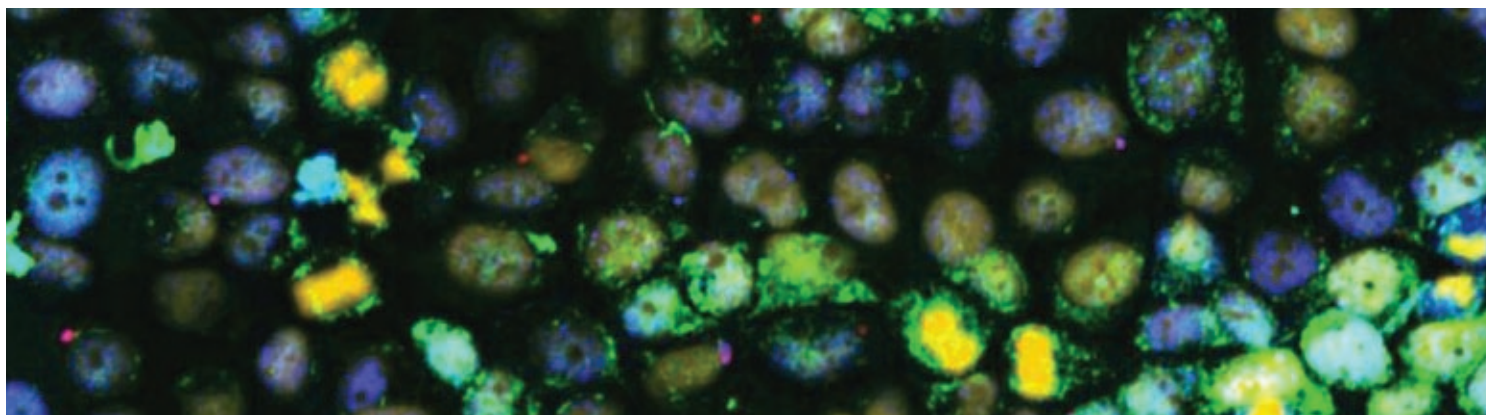# THE FLEXIBLE SOLUTION
FOR HIGH VOLUME IMAGE
STORAGE AND MANAGEMENT

Columbus
Image Data Management System

PerkinElmer®

For the Better

COLUMBUS –
SETTING THE STANDARD FOR IMAGE DATA MANAGEMENT

High Content Screening (HCS) is a vital tool for biological research, especially for drug discovery and development. A key challenge in HCS is that the technique produces large volumes of image data and associated metadata, which can be time and resource intensive to successfully manage.

Columbus™ solves the key problem of HCS data management by providing all the tools you require to archive, manage, retrieve and protect images and analyze results. Designed as a complementary product for the Opera™ platform, PerkinElmer's premier confocal microplate imaging reader, Columbus has the added benefit of full compatibility with a wide range of image file formats. Columbus can archive and manage images from confocal and standard research microscopes, acting as a convenient central repository for all your image-based data.

Columbus – image data management through open source

Columbus is ideally placed to become the industry standard for image data management. The system utilizes the OMERO server, developed by the Open Microscopy Environment (OME), and is based on an open protocol, so that it is able to operate with a wide variety of instruments and software, with support added for more products on a frequent basis.

Key Features

- Sets the industry standard for image data management – supports a wide range of file formats and utilizes OME technology

- Acts as a central repository for all image data – HCS, microscopy, medical images, etc.

- Forms the bridge between
    - Instruments
    - Image analysis software
    - Screening analysis software

- Can include a fast and flexible re-analysis tool for HCS data

- One installation of Columbus can serve an entire laboratory or department for a cost effective solution
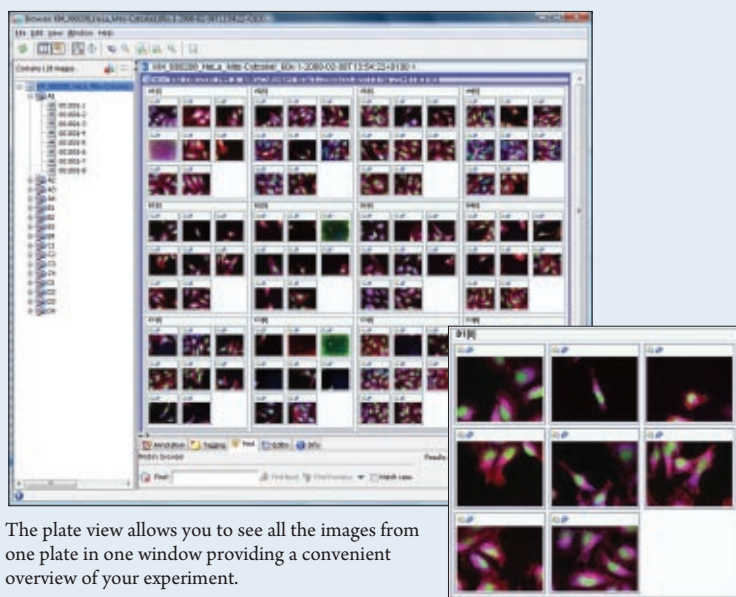
The plate view allows you to see all the images from one plate in one window providing a convenient overview of your experiment.

COLUMBUS – THE POWERFUL SOLUTION TO ALL YOUR HIGH CONTENT SCREENING IMAGE DATA CHALLENGES
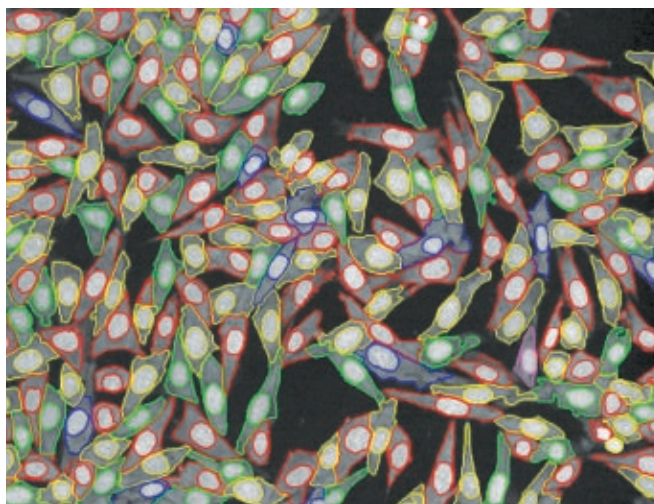
Flexible image data management

Columbus is a powerful and easy-to-use solution to store, manage and view your HCS data quickly and conveniently. The system has an interface with Accelrys® Pipeline Pilot and IDBS ActivityBase, and can export data to Excel®.

Scalable image storage

Columbus Gallery is the standard version of the system and acts as a database archive allowing complex HCS multi-channel images to be stored and accessed by multiple users from their own workstations. Images can be automatically transferred to Columbus from an associated Opera system along with metadata such as date, plate / barcode, well position, etc. The system can simultaneously accept data from any number of Opera systems and microscopy workstations for a complete data management solution that can serve any size unit, from an individual laboratory to an entire organization.

Acapella – flexible and powerful image analysis for HCS.

High speed image analysis

Columbus Conductor takes your data management system to a new level by combining Acapella™, PerkinElmer's image analysis software, with the Columbus Gallery functionality. Image data can be analyzed or re-analyzed using Acapella running on the server computer, which means that you can take advantage of the greater processing power to run batch processes and obtain results much more quickly. Acapella has been developed as a 64-bit multi-threading server application, utilizing MultiCore Processor technology from Intel®. Image analysis data is automatically archived along with the images. For convenience, development of Acapella's ready-made application solutions – known as 'Scripts' – is performed on a remote workstation, then sent to Columbus Conductor to implement on the server.

Your options

Columbus Gallery, provides a comprehensive data archiving, management and visualization solution.

Columbus Conductor, features all the functionality of Columbus Gallery plus the ability to analyze or re-analyze HCS data from image readers using the Acapella image analysis software. By running Acapella on the server computer alongside Columbus, you can achieve greater processing power to run batch processes and obtain results much more quickly.
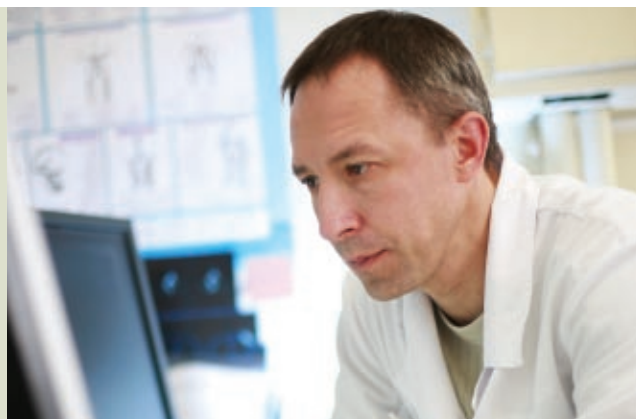
Intuitive data visualization

Data is accessed quickly and easily from Columbus by searching the database by barcode, wells, results and so on, or by browsing the files. Images and results are visualized using OMERO.insight Viewer, a freely available application that can be installed on multiple computers for user convenience and global access. OMERO.insight Viewer includes a range of tools to visualize data clearly and conveniently. Plate-related data, well-related data, and image-related data are available via user interfaces and third party software programs. The plate view allows you to see all the images from one plate in one window, providing an overview which can be useful for identifying wells that should be excluded from analysis. Images, wells and plates can be annotated. Multi-channel data can be explored by individual channel or as merged images. Time resolved data can be browsed by time point and multiple z-data can be browsed by z-stack. Interactive analysis tools such as intensity histograms are included. Images can be exported in standard file formats and analysis results exported as .xml files for use in other packages.
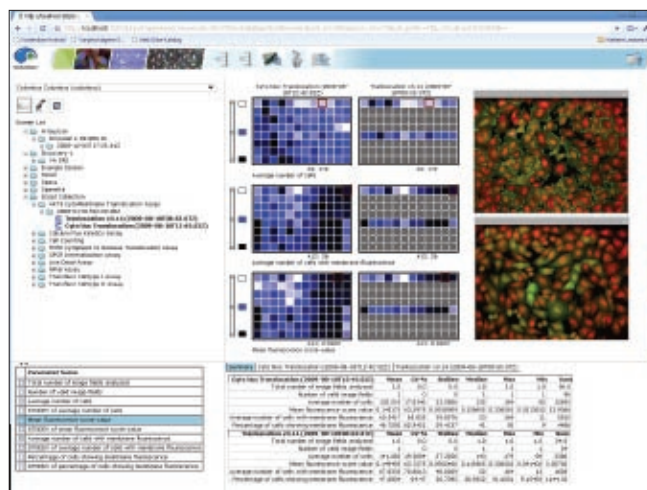
View the results of your imaging-based screens as heatmap representations of the various output parameters.
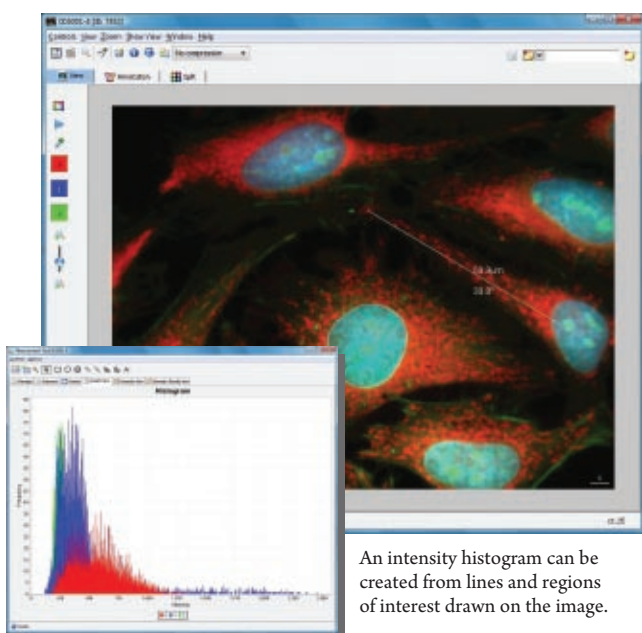
An intensity histogram can be created from lines and regions of interest drawn on the image.

Interface for image and metadata transfer between instruments and third party software

Access to data is supported by both traditional user interfaces and programming interfaces. The programming interfaces include:

– A full API used to access images from third party applications such as ImageJ and VisBio.

– Comprehensive web-based tools allowing upload and download of images, metadata and image analysis results from any third party application. Visualization of multi-channel, 2D, 3D and kinetic data is supported with powerful web applications.

Secure data storage

Data security is provided by user management functions, which allow you to view and modify your own data, and grant read / write access to your data to other users.

www.perkinelmer.com/columbus

Columbus supports a wide range of formats, creating a central repository for all your image data

CT SCANS

Opera™ HCS Reader

Acapella™

WIDE FIELD
IMAGING SYSTEMS

MRI

Volocity®

UltraVIEW Vox® 3D Live Cell Imaging System

CONFOCAL
IMAGING SYSTEMS

HCS READERS

Operetta™ HCS Reader

Harmony™

Columbus™

PIPELINE PILOT

ACTIVITYBASE XE

EXCEL®

Columbus utilizes the Open Microscopy Environment (OME), a multi-site collaborative project among academic laboratories and a number of commercial entities that produces open tools to support data management for biological light microscopy. A major goal of the OME project is the provision of common specifications for light microscopy file formats, so that critical image metadata is preserved during data migration. OME is an open-source software project and new tools and instrument support are added on an ongoing basis.

Feature comparison

Features	Columbus Gallery 2.0	Columbus Conductor 2.0
Central processor units	1x4 Core	2x4x2 Intel® Core™ (Nehalem)* 4x4 Intel® Core™ (Caneland) 4x6 Intel® Core™ (Dunnigton)
Storage capacity	**3 TB**	**3 – 24 TB**
Storage extendable	✔	✔
Comprehensive data archive, management and visualization system solution	✔	✔
Fully compatible with the Opera™ HCS system for automatic transfer of image data and results. Import, store and export Opera images as standard *.tiff complete with metadata	✔	✔
Connection to multiple HCA readers at the same time	✔	✔
Can be accessed by an unlimited number of users	✔	✔
Import and export a wide range of standard image file formats – use with all imaging device data for a total image management solution	✔	✔
True database functionality, retrieve and visualize data using the freely available OMERO.insight Viewer for global access	✔	✔
Web enabled user interfaces for image, result and metadata visualization	✔	✔
Web enabled user interfaces for automated image, result and metadata upload and download	✔	✔
Supports Windows®, Mac® and Linux® OS	✔	✔
Seamless interface to Volocity® 5.2	✔	✔
Interface to Accelrys® Pipeline Pilot, IDBS ActivityBase, export to Excel®	✔	✔
Display of plate-based and well-based results	✔	✔
Plate view – see all the images from one plate in one window	✔	✔
Heat map display for multiple plates / multiple analysis / multiple parameters	✔	✔
High speed data analysis or re-analysis using the Acapella™ image analysis software. Image data and results are automatically added to the database system	X	✔
Analyze or re-analyze data either on a workstation or use the powerful processing capability of the server computer	X	✔
Analysis of various HCS image data (e.g. INCell Analyzer 1000, Cellomics ArrayScan)	X	✔
Web enabled user interfaces for automated re-analysis	X	✔
Web enabled user interfaces for image analysis configuration	X	✔

* incl. Hyperthreading

PerkinElmer®

For a complete listing of our global offices, visit www.perkinelmer.com/ContactUs