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MetaMatters

Automated Slide Handling

MetaMorph ® software, which is compatible with MDS Analytical Technologies line of cellular imaging products, now features automated slide handling using two cutting edge systems: Prior's PL-200 and Ludl Electronic Products Slide Handler.

The Prior Scientific PL-200 slide loader is an advanced system for automated microscope slide handling. The unit features a 200 slide capacity, enabling true walk away convenience. It is now possible to truly automate the digital imaging of microscopic specimens using the combination of precision scanning stage and automated loading and unloading of samples. It is possible to mount four removable racks at any one time. Once all slides within a rack are scanned, it is simple to remove and reload that rack while the loader continues processing slides in subsequent racks.

Prior's innovative design is capable of loading and unloading slides in less than 24 seconds. The PL-200 slide loader has been vigorously tested, successfully completing hundreds of thousands of slide loading and unloading operations. From conception, the slide loader has been designed to be compatible with the widest range of upright and inverted microscopes in routine use today. The slide loader can be interfaced with existing microscopes simply by adding the appropriate Prior Scientific scanning stage or by a simple field modification to an existing Prior Scientific stage is all that is required to enable them to be used in automated slide loading operations.

The Ludl Electronic Products slide handling system offers scientists an easily expandable, affordable system that provides a real solution for microscope automation. A single arm functions to pull the slide from the cassette to the stage and then return it with an opposite pushing motion. As the precision XY stage scans the slide, the transfer mechanism is completely clear of any interference with normal microscope function. The simplicity of the slide transfer mechanism provides efficient, reliable slide loading. Once the slide is transferred to the stage; it is located with a unique fixturing device for repeatable positioning and slide reloading in all axes.

Flexibility is guaranteed by the random access capability. Cassettes are configurable as input only, output only or input/output depending upon your specific requirements. This makes the system ideally suited for high volume screening, analysis, classification and review applications.

Availability

MetaMorph® software can be purchased through an MDS Analytical Technologies' distribution partner. A listing of distributors is available at: www.moleculardevices.com/pages/distributors.

Inside this issue:

MetaTool Tips:

Logging Shortcut Buttons

Introducing Audrey Boyd...

The next free MetaMorph® Basics training course is August 11 &12, 2009!

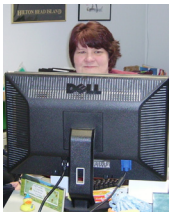
Audrey Boyd, coordinator extrodinaire, is a member of the MetaMorph® software administrative team. She is responsible for putting together material for training classes, preparing official documents, as well as a myriad of other things that keep the Downingtown office running smoothly. Some of you have previously spoken with her about training classes. She'd love to meet you if you are ever in Downingtown for training!

Audrey Boyd

Introducing Lynn Cowperthwaite...

Lynn Cowperthwaite is a hardworking member of the MetaMorph® software order management team. She is the Executive Sales Assistant/Quoting for Meta Imaging Series® products. She has been with the MetaMorph® software group for eleven years with the aim of providing the best possible customer service.

Many of you have communicated with her regarding your MetaMorph® software system order. If you are ever in the Downingtown location, stop by her office and say "Thanks!".



Lynn Cowperthwaite

MetaMorph® software is the backbone of the MDS Analytical Technologies High Content Imaging Platform

High Content Screening (HCS) has become a valuable discovery tool. Based largely on full 24/7 automation of fluorescence microscopy and image analysis, HCS relies on dedicated imaging systems and image analysis modules to get the job done. Typically everything is coordinated by a database to get the many thousands of images acquired from assays run on 96-, 384-, and 1536-well plates saved and analyzed for drug discovery and RNAi screening.

Full automation of microscopy and image analysis is complex and the MetaMorph® program was chosen as the backbone software for the MDS HCS instrument ImageXpress^{MICRO} and ImageXpress^{ULTRA}. To further automate the MetaMorph® program, database communication and turnkey image analysis modules for the most common assays were developed. This capability once loaded into the MetaMorph® program created MetaXpress® software for HCS. MetaXpress® software has every feature found in the MetaMorph® program, so users familiar with MetaMorph® software should be very familiar with MetaXpress® software.

The power of MetaXpress® software as a drug discovery tool is significantly increased by the new MetaXpress$^{PowerCore™}$ program, a separate software product that can integrated with MetaXpress® software and the database to run image analysis by the dedicates application modules in a scalable parallel processing environment. Depending on the processing throughput required, 4-32 processes can be employed to reduce image analysis time from 5-50 fold!

MetaXpress® software can be purchased through MDS Analytical Technologies.
www.moleculardevices.com/pages/distributors

FOCUS: Automated Slide Scanning with Acquire from Slide Loader and Scan Slide

by Doug Bowman, PhD , Molecular and Cellular Oncology, Millenium Pharmaceuticals in Cambridge, MA

Image-based assays are an important readout used throughout the drug discovery and development process, from understanding the mechanism of action of target inhibition in cells, driving medicinal chemistry effort, determining the pharmacodynamic relationship in preclinical models, to understanding target inhibition in humans. In cases of preclinical and clinical applications, chromagenic and immunofluorescence (IF) slide-based assays are commonly used. Whole tumor samples and biopsies are processed, sectioned, stained, and mounted on microscope slides. A typical preclinical experiment can result in upwards of 100 slides. The challenge of individually imaging 100 slides can be a daunting task, especially considering each slide may require multiple data points, multiple fluorescent channels, or even the collection of multiple optical sections. The ability to have walk-away operation is ideal, both for the vast quantity of slides and because each slide may take a long period of time (2-20 minutes) to acquire depending on the area to be scanned and number of fluorescence channels for an IF assay.

Our group has set up a fully-automated system capable of acquiring up to 200 slides of chromagenic or IF samples. The system (Figure 1) includes microscope automation (XYZ, excitation filter wheel, shutter, color camera, monochrome camera) and an automated slide loader + barcode reader (Prior Scientific) all controlled by MetaMorph® software. There is also a second barcode reader installed in case the first barcode reader fails.

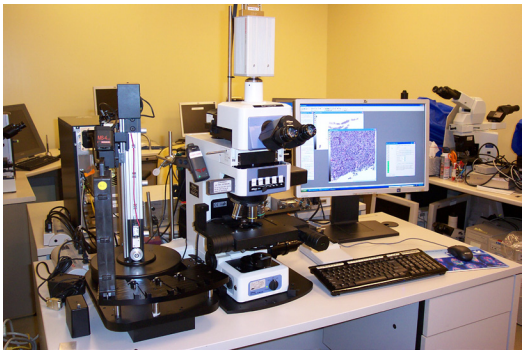


Fig 1: The system includes a Nikon E800 microscope with automated XY stage, motorized focus, motorized filter wheels, digital camera and slide loader.

Slide Loading and image acquisition are controlled by a combination of two drop-ins: Acquire from Slide Loader and Scan Slide. The Acquire from Slide Loader controls all slide loader functions including which cassettes are installed, which slots of each cassette contains slides, and what protocol is run after each slide is loaded on the microscope stage. A single tab is shown in Figure 2 where 2 cassettes (out of 4) are partially loaded with slides and once each slide is loaded, Scan Slide is run. The Scan Slide dialog (Figure 3) is configured as normal with a number of journals enabled. The first journal (GetBarCodeAndScanSlideInfo) gets the barcode value from

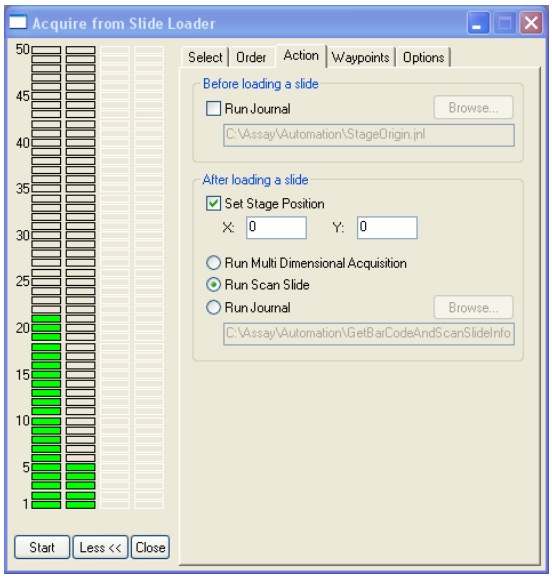


Fig 2: System scans to determine which slides are present. ScanSlide is run after each slide is loaded on to microscope stage.

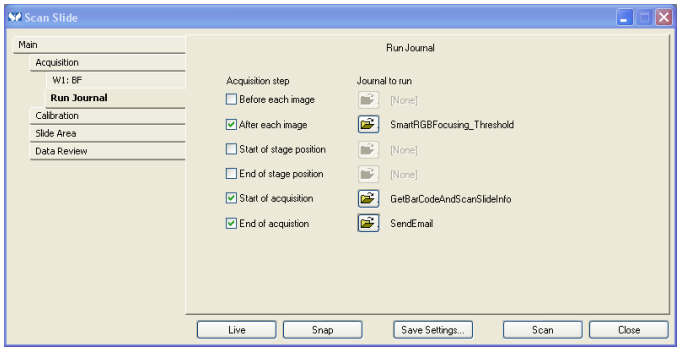


Fig 3: Barcode is scanned so image set can be appropriately named. An email is sent after each slide is acquired so user can remotely monitor progress.

ScanSlide.Barcode variable. This value is used to look up other sample metadata (patient #, dose, etc) using a custom-developed MetaMorph® Visual Basic script. The ScanSlideBaseName variable is then populated with a string based on the metadata (if it exists) or the raw barcode value so the images files are appropriately named.

```
7: ScanSlide.Directory = stDirectoryName
8: ScanSlide.BaseName = stBarCodeOrMetaData
```

A typical workflow: User first determines slide scanning area and defines in Slide Area tab of Scan Slide. User loads slides into cassettes and loads cassettes onto slide loader. Cassettes are scanned to determine which slots contain slides. Acquisition is started, images are automatically acquired with auto-focusing enabled, images named appropriated, and stored in user-specified folder. The user returns 8 hours later and all 100 slides are acquired!

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MetaMorph®...the gold standard in research imaging.

We're on the web!
MetaMorph.com

About MetaMorph® Software MetaMorph® software is the leading, world-class image acquisition and analysis software. Combining the most flexible and powerful tools for image acquisition, processing, and analysis, MetaMorph® software offers a complete solution for even the most demanding live-cell imaging needs.

About MDS Analytical Technologies

MDS Analytical Technologies, a business unit of MDS Inc., is focused on the research, design, manufacture and marketing of state-of-the-art tools for mass-spectrometry, drug discovery and bioresearch. MDS Analytical Technologies' products are designed to help accelerate the complex process of discovering and developing new drug compounds, and are sold to research scientists around the world. The mass-spectrometer product lines are also sold globally through joint ventures with two of the world's leading analytical instrumentation and life sciences companies, Applied Biosystems, Inc. and PerkinElmer, Inc. Find out more at www.mdssciex.com or www.moleculardevices.com.

About MDS Inc.

MDS Inc. (TSX: MDS; NYSE: MDZ) is a global life sciences company that provides market-leading products and services that our customers need for the development of drugs and diagnosis and treatment of disease. We are a leading global provider of pharmaceutical contract research, medical isotopes for molecular imaging, radiotherapeutics, and analytical instruments. MDS, Inc. has more than 5,500 highly skilled people in 29 countries. Find out more at www.mdsinc.com or by calling 1-888-MDS-7222, 24 hours a day.

SOURCE: MDS

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MetaMorph® products @ QFM, 2008