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March 19, 2009

MetaMorph®

MetaMatters

NEW...MetaMorph® 7.6

The new release of MetaMorph ® software, which is compatible with MDS's line of cellular imaging products, features a new application module for three-dimensional motion tracking, support for enhanced deconvolutions with OptiGrid Structured Illumination Microscopy as well as automated slide handling.

Multidimensional Motion Analysis will allow users to easily select multiple objects, and track their position and velocity within the sample volume. Current competitive tracking requires users to manually identify the original set of objects for tracking and prevents automated tracking, a feature that is particularly useful with large numbers of similar objects.

The OptiGrid SIM is now fully controlled using MetaMorph® software via a USB connection, which allows for simple system integration. The structured illumination process returns a strong signal wherever focus is sharp and a weak signal where focus is soft. A series of optical sections taken through a sample (z-stack) can then be combined to create a haze-free ultra-sharp composite image.

Along with MetaMorph® 7.6 software, the Ludl Electronic Products slide handling system offers scientists an easily expandable system that provides a complete 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, which helps make the system ideally suited for low-volume repetitive analysis, and review applications.

Availability

MetaMorph® 7.6 software can be purchased through an MDS Analytical Technologies distribution partner. A listing of distributors is available at: www.moleculardevices.com/pages/distributors.

From the Desk of Chris Kier

Welcome to the first issue of *MetaMatters*, a bimonthly newsletter aimed at keeping you current on MetaMorph® software news and updates.

In future editions, we hope to include more tips and techniques from you, our customers. If you have a useful tip for MetaMorph® software let us know by contacting the editor, Mary David. If we publish it you will get a free 12 month software maintenance agreement. Further, any published 3-5 paragraph method description plus images will get you a free version upgrade or application module, your choice.

(con't. pg. 2)

Inside this issue:

MetaTool Tips:

- Click this button in the MetaMorph® program toolbar and you can close all open images at once!

- Click on this button in the toolbar to close all open windows!

From the Desk of Chris Kier (con't.)

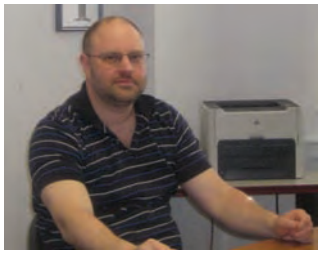
MetaMatters is only one step in providing you with current, useful information. In addition to the newsletter we are aggressively writing and revising focused application and technical notes describing the features and capabilities of MetaMorph® software. All documentation can be found on our website along with these other useful resources:

Product literature	http://www.moleculardevices.com/product_literature/
Technical and application notes	http://support.meta.moleculardevices.com/search
Reference search	http://www.meta.moleculardevices.com/references/
Software updates	http://www.meta.moleculardevices.com/updates/
Authorization codes	http://www.meta.moleculardevices.com/authorize/
Training courses	http://www.moleculardevices.com/pages/MM-new/meta_training

I hope you enjoy this inaugural issue of *MetaMatters*.
Thanks,

Chris Kier, Director of Marketing, MetaMorph ®

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



Chris Kier
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Introducing Mary David...

Mary David, the editor of this newsletter, is a member of the MetaMorph® software marketing team. She is responsible for putting together marketing material, preparing demonstration aids and running the cell culture lab in Downingtown, PA. Her background is in biology and she received her degree from the University of the Sciences in Philadelphia.
Mary expanded her marketing role here at Analytical Technologies within the past year. She has since helped out at various conferences and courses, handling marketing material, logistics and customer questions. When you next see her at a conference, course or training class, stop and say hello. Let her know how MetaMorph® has helped you in your research!

Mary David
Mary.David@moldev.com

Introducing Maria Daniels...

Maria Daniels is another hardworking member of the MetaMorph® software marketing team. She is the Marketing & Sales Business Coordinator for MetaMorph®. She has been with the MetaMorph® software group for eleven years in a variety of functions, all with the aim of providing the best possible service for you.
Many of you have probably spoken with her on the phone or communicated with her via email, getting to a positive resolution with your MetaMorph® system installation.
If you are ever in the Downingtown location, stop in her office by the front door to say "Hello!". You may just get a freshly baked brownie!

Maria Daniels
Maria.Daniels@moldev.com

Shortcut

The collection and analysis of Multidimensional data (MD) is an integral and powerful tool in the MetaMorph® software package. Oftentimes, multidimensional data consists of many images of multiple stage positions from the same sample viewed over long periods of time, which must be constructed into stacks to choose the best field for analysis. However, manually building these stacks by selecting each sequential image simply to choose which fields to use can be quite tedious and time consuming. For this very reason, MetaMorph® software is equipped with a Review Multidimensional Data dialog under the Apps menu. After an MDA data set is collected, a file with the extension .ND is automatically generated in the same folder where the images are saved. By selecting this file in the review MD dialog, one can easily play through a movie of the collected images, select any stage position, see multiple wavelengths all at once, and even combine images into an overlay if necessary. This allows for a very fast review of the data without the need to create a separate stack for each stage position in advance. Once the necessary data is chosen, however, stacks can easily be made and then converted into movies to be played on any computer through the Make Movie dialog under the Stack menu.

FOCUS: Cell Scoring Application in MetaMorph® Software

by Edward Kalmykov, Department of Biochemistry, Dr. Bruce Nicholsons laboratory, University of Texas Health Science at San Antonio

The microscopic technique of immunofluorescence has long been used to study protein localization, levels, and interactions within various types of biological specimens ranging from subcellular organelles to whole tissues. However, due to the growing complexity of the protein signaling field, it is becoming more vital to provide quantitative measurements of these characteristics rather than just relying on visual interpretations. The Cell Scoring Application Module in the MetaMorph® software package allows just such quantitative measurements to be made by accurately identifying nuclear, cytoplasmic, and extracellular areas in immunofluorescent images in order to provide details on exactly where and how much a certain protein is expressed, and then quantitatively presenting the findings for statistical measurements.

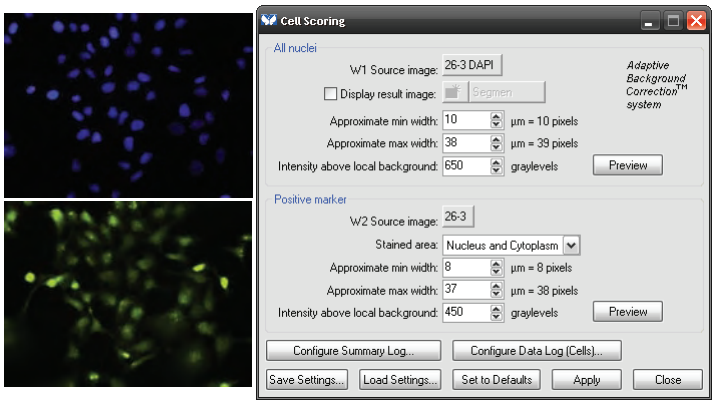

Fig 1: Once the images for each wavelength were acquired, they were loaded into the Cell Scoring app module and all the initial values in the fields were entered as described.

This module was successfully employed in our laboratory to study the localization and active levels of phospho-(activated) protein kinase A (PKA) in fixed HeLa cervical cancer cells. As a requisite for using this module, our cells were stained with a fluorophore-conjugated secondary antibody to visualize the kinase as well as a highly specific nuclear fluorescent stain called DAPI. An image of each field was then taken in the non-overlapping FITC and UV channels on an inverted Nikon epi-fluorescent microscope to visualize the kinase and nuclei, respectively. Upon loading the module from the Apps drop down menu, the UV image was selected as W1 and the FITC image was selected as the W2 positive marker (Fig. 1). The line tool was then used to gauge the maximum and minimum widths for nuclei and cytoplasm to be used during segmentation by finding the diameters of the smallest and largest cells. Also, the intensity above local background value was found by finding the pixel gray values of the dimmest areas to be included and then entering slightly lower values as the cutoff. After the appropriate numbers were entered in all the fields and the expected W1 and W2 images were separately previewed, the values were slightly adjusted to make the segmentation and cell parsing assignments more accurate. Once everything was adjusted satisfactorily, the Apply button was pressed and the module parsed the images to define individual cells and presented quantitative data for each in the form of a table (Fig. 2). The Configure Data Log window allowed us to choose which data to display from a list of possible choices, which in our case were only area and intensity. After logging the intensity data into a Microsoft Excel file, it was organized into pixel intensity ranges using the Histogram tool in the Data Analysis submenu found in the Tools drop down list, and then plotted to analyze the distribution characteristics of the protein kinase in the nucleus and cytoplasm of the cells. Using this application module, we discovered that the activated kinase was concentrated in the nucleus, where it is known to activate factors for transcription initiation (Fig. 3A). After connexin transfection to induce gap junction intercellular coupling, the nuclear signal was increased, and showed a wider distribution between cells (Fig. 3B).

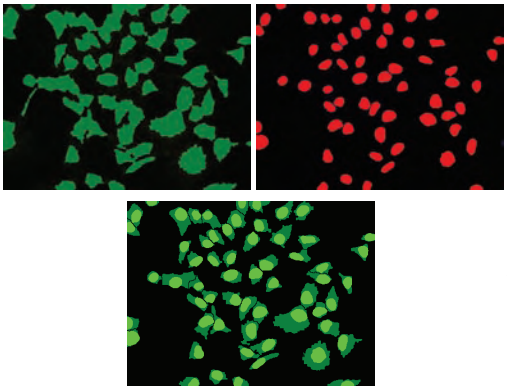

Fig 2: After previewing the segmentation images (cytoplasm - upper left, nuclei - upper right), all of the parameters were adjusted accordingly, and then the images were parsed into individual cells (bottom).

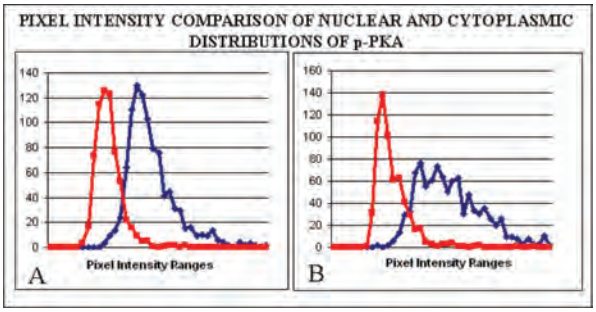

Fig 3 (A): Plots of the frequency (Y axis) of different pixel intensities from nuclear (blue) and cytoplasmic (red) domains shows that P-PKA is two-fold more concentrated in the nuclear than the cytoplasmic regions of HeLa cells in 1% serum (left figure). The total levels of p-PKA in each compartment are similar, however, as the average surface area of cytoplasm is twice that of the nucleus. (B): Upon transfection of HeLa cells with gap junction genes, a shift in distribution of p-PKA in the nuclei was observed, along with a net increase in intensity.

The accuracy and speed of this module made it a very favorable tool for us to use in the processing of our immunofluorescent data, reducing our analysis to a single image processing event that saved great amounts of time and provided non-biased quantitative measurements. Although some of the nuclear intensity data could have been acquired manually through image thresh-holding and region transfer methods, the tasks would have been laborious and the results much less descriptive.

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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

Upcoming Training, Courses and Conferences

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Fundamentals of MetaFluor®
Downingtown, PA

August 11 – 12, 2009
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Downingtown, PA

September 15, 2009
Fundamentals of MetaFluor®
Downingtown, PA

October 27 – 28, 2009
Fundamentals of MetaMorph®
Downingtown, PA

October 29 – 30, 2009
Advanced MetaMorph®
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May 6 – 15, 2009
AQLM
Woods Hole, MA

May 30 – June 6, 2009
QFM
Bar Harbor, ME

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Cold Spring Harbor

October 17 – 21, 2009
Society for Neuroscience
Chicago, IL

December 5 – 9, 2009
ASCB
San Diego, CA

MetaMorph® products @ QFM, 2008