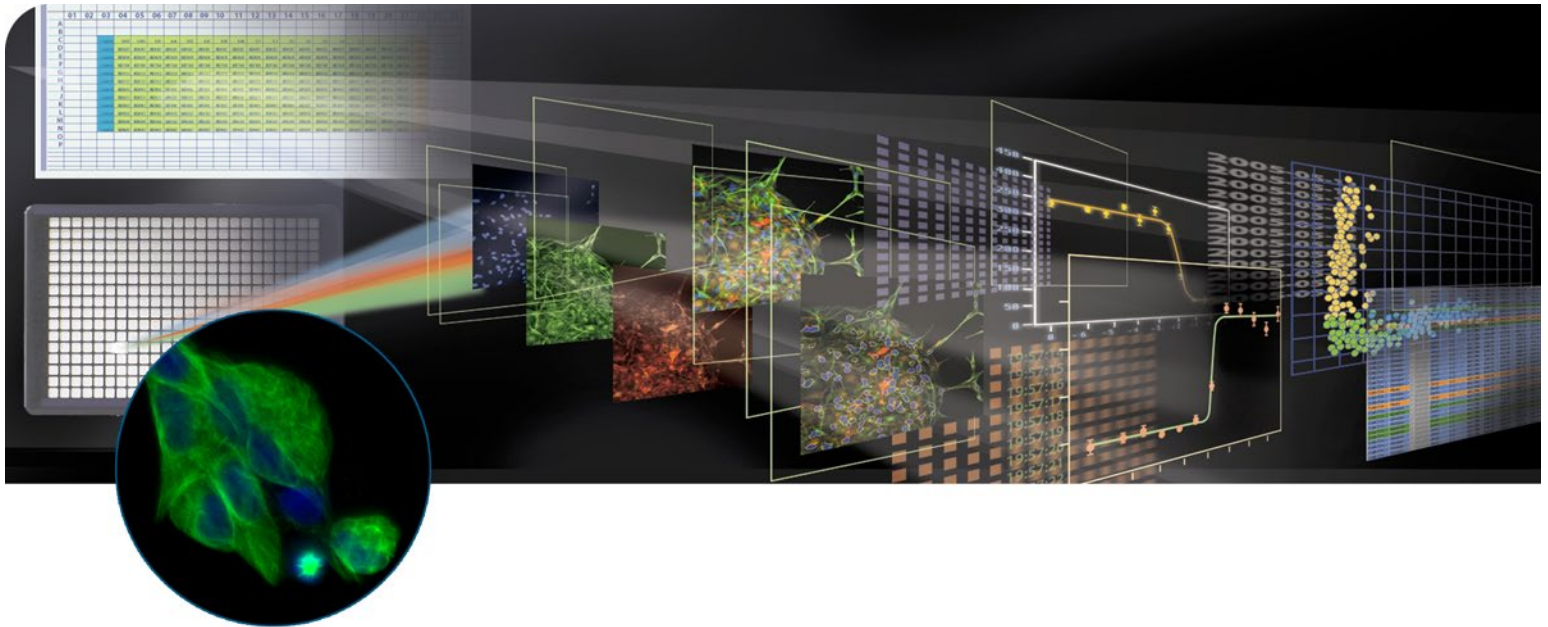


MetaXpress Software Monopole Detection Application Module

ANALYSIS SOFTWARE DROP-IN FOR METAXPRESS SOFTWARE



→ QUANTITATION OF MITOTIC CELLS WITH MONOPOLAR OR BIPOLAR SPINDLES

→ ADAPTIVE BACKGROUND CORRECTION FOR IMPROVED SEGMENTATION

→ FIELD AND CELL-BY-CELL DATA LOGGING

Proper formation of a bipolar spindle is vital for the segregation of chromosomes during mitosis. In some serious diseases where cells proliferate uncontrollably, such as cancer, progression through mitosis can be stopped by simply disrupting the normal bipolar spindle formation. Several classical chemotherapy drugs act on microtubules to disrupt the bipolar spindle formation. However, these treatments have side effects in interphase cells.

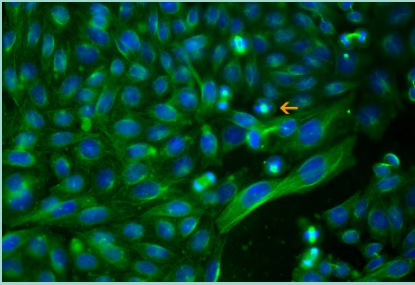
Recently, a new compound named monastrol was found to disrupt spindle formation by affecting centrosome separation. In comparison with microtubule drugs, this effect was specific to mitosis. When the two centrosomes fail to replicate or separate, a monopolar spindle forms instead of a normal bipolar spindle. Other compounds that can produce monopolar spindles are actively being investigated.

The Monopole Detection Application Module for MetaXpress® Software from Molecular Devices is designed for the quantitation of mitotic cells with monopolar or bipolar spindles where cells are labeled with a DNA stain and a second probe for microtubules.

The module utilizes Adaptive Background Correction (ABC) which adapts the detection algorithm to the local intensity ranges between and within cells to provide the most robust segmentation available in an image-based screening system. ABC enables probe detection even with highly variable background fluorescence within a single image.

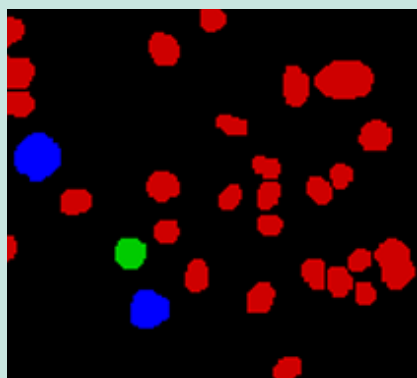
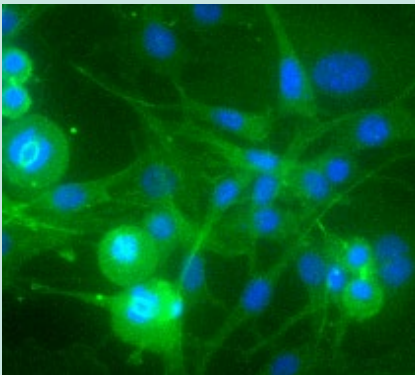
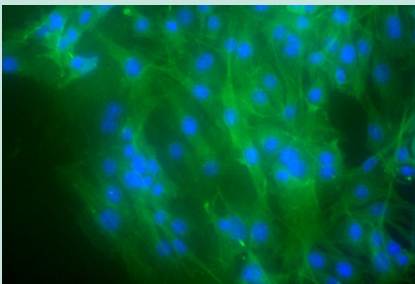
A simple interface minimizes setup efforts and analysis settings can be configured once and saved for future use or customized to fit your experiment.

Multiple Wavelength Acquisition



CHO-K1 cells treated with monastrol and stained with mouse anti-beta tubulin primary antibody detected with a FITC conjugated goat anti-mouse secondary antibody. Nuclei are stained with Hoeschst 33342. Cells were imaged on the Discovery-1™ System from Molecular Devices. Orange arrow shows monopole.

Robust Segmentation and Analysis



3T3-L1 mouse fibroblast cells treated with monastrol and stained with mouse anti-beta tubulin primary antibody detected with a FITC conjugated goat anti-mouse secondary antibody. Nuclei are stained with Hoeschst 33342. Top: control, middle: monastrol, bottom: segmented image shows interphase cells (red), bipolar spindles (blue) and monopole (green).

CONFIGURATION FOR ANALYSIS

1. Select the DNA stained image
2. Specify the size range of DNA-stained cells and intensity above local background
3. Select the microtubules image
4. Set cell classification limits based on DNA/microtubule staining correlation
5. Optionally set reporting parameters

INTERACTIVE DATA DISPLAY

Once the analysis is run, the Cellular Results table allows you to interactively view an individual cell's data. Clicking a cell in the image highlights the data for the selected cell in the table.

Cell Assigned Label #	Cell Classification	Cell Correlation Coefficient	Cell DNA Structure Area	Cell DNA Integrated Intensity	Cell DNA Average Intensity	Cell MT Integrated Intensity	Cell MT Average Intensity
1	Interphase	0.002062	32 01 25	1.20944	209 952	1.96169	554 074
2	Bipole	0.347527	124 414	666029	523 492	640388	502 859
3	Bipole	0.454184	168 948	799590	427 07	1 12778e+006	652 275
4	Monopole	0.620173	143 164	792015	541 074	894862	623 248
5	Monopole	0.647754	152 734	1 10762e+006	708 324	1 73608e+006	1110 6
6	Interphase	0.623088	93 9453	346184	203 893	494280	513 805
7	Monopole	0.641945	143 929	1 18333e+006	776 321	1 51277e+006	987 45
8	Monopole	0.753984	185 52	1 1487e+006	577 083	1 35122e+006	819 328
9	Interphase	0.342078	162 988	706894	423 424	974371	523 889
10	Monopole	0.673414	166 992	961917	562 525	1 20407e+006	704 136
11	Interphase	0.67734	128 516	591802	449 688	720865	556 889
12	Interphase	0.566282	187 5	961159	449 52	1 12111e+006	583 909
13	Monopole	0.527882	142 09	670179	598 061	1 25984e+006	865 871
14	Interphase	0.595228	190	589836	394 038	607695	525 043
15	Monopole	0.602884	176 172	962782	528 71	1 81954e+006	1089 34
16	Interphase	0.220735	317 773	1 18117e+006	362 99	2 50424e+006	769 587
17	Monopole	0.629845	295 254	1 1214e+006	485 503	2 26728e+006	941 17
18	Monopole	0.754597	219 043	1 0724e+006	451 314	1 74112e+006	776 248
19	Interphase	0.766382	267 871	1 07952e+006	391 913	1 53332e+006	558 984
20	Interphase	0.657192	282 031	1 04779e+006	262 883	1 75778e+006	608 513

CUSTOMIZATION THROUGH MACROS

MetaXpress Software is seamlessly integrated with the power and flexibility of MetaMorph® Software and its sophisticated and powerful macros, called journals, that record and perform a series of tasks without the need for a programming language.

VALIDATED DATA

Development of application modules includes research and testing with a library of in-house and third-party data sets.

POWERFUL DATA EXPORT CAPABILITIES

All measurements can be directly exported to ORACLE®, Microsoft® SQL™, text file, Microsoft® Excel® or SciMagix® SIMS™.

MULTI-PARAMETER ANALYSIS

The application module can generate a number of field or cell-by-cell parameters. Field measurements include:

- Count and percentage of monopoles, bipoles and interphase cells
- Area of DNA structures, monopolar, bipolar and interphase cells
- DNA and microtubule average intensities

Cell-by-cell measurements include:

- Cell classification
- Cell correlation coefficient (DNA versus microtubule staining)
- Cell DNA structures area
- Integrated and average intensities of DNA and microtubules

ORDERING INFORMATION

Monopole Detection Application Module for MetaXpress:

Part Number: 9500-0039

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- USA & Canada +1-800-635-5577
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