

Leica MM Monopole Detection

powered by MetaMorph®

Analysis Software Drop-in for Leica MM AF

- Quantitation of mitotic cells with monopolar or bipolar spindles
- Adaptive background correction for improved segmentation
- Field and Cell-by-Cell data logging

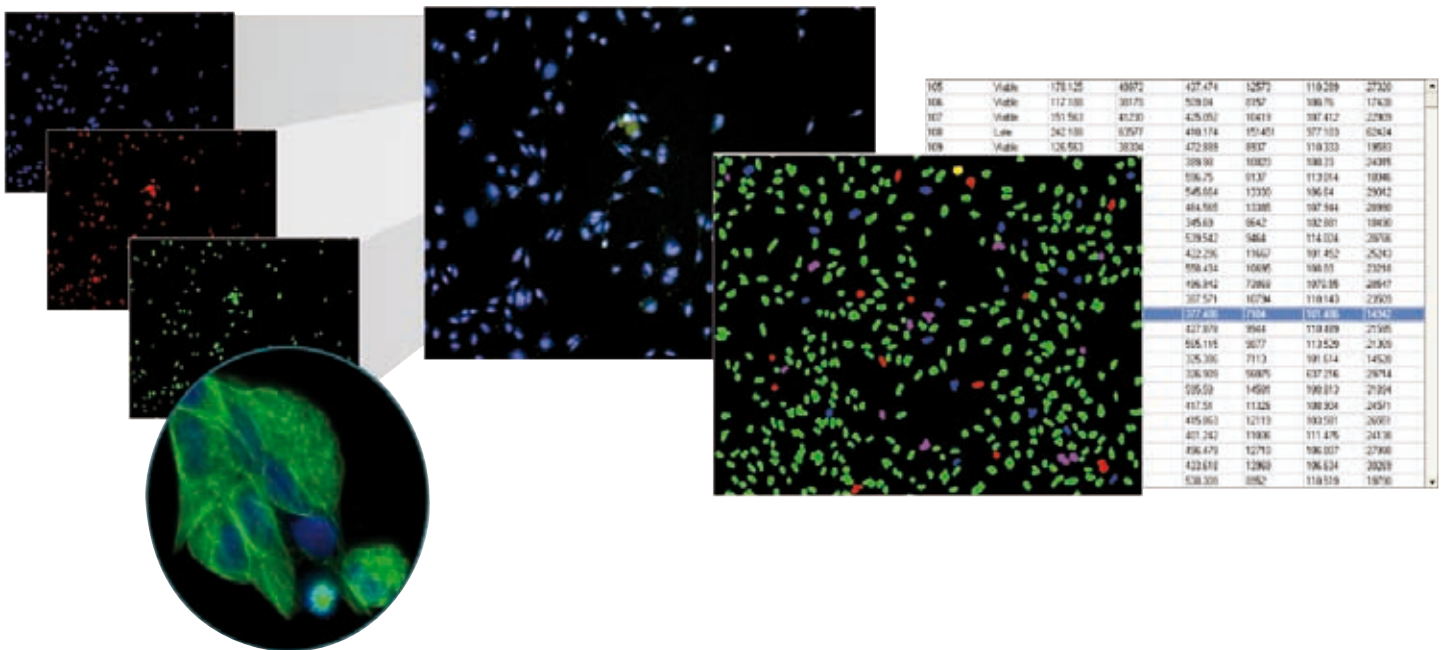
Proper formation of a bipolar spindle is vital for the segregation of chromosomes during mitosis. In some serious diseases where cells proliferate uncontrollably, such as cancer, progression through mitosis can be stopped by simply disrupting the normal bipolar spindle formation. Several classical chemotherapy 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.

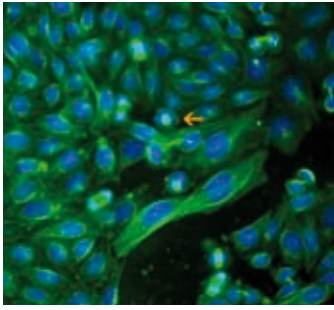
The Leica MM Monopole Detection for Leica MM AF software is designed for the quantitation of mitotic cells with monopolar or bipolar spindles where cells are labeled with a DNA stain and a second probe for microtubules.

The module utilizes Adaptive Background Correction adapting the cell detection algorithm to the local intensity ranges between and within cells to provide the most robust segmentation available. This technique enables probe detection even with highly variable background fluorescence within a single image.

The simple interface minimizes setup efforts and at the same time enables users to customize the settings and measurements to obtain the best possible results specific to the type of cells used in the experiments.

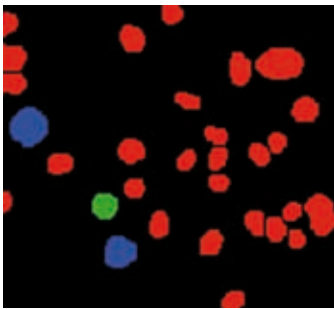
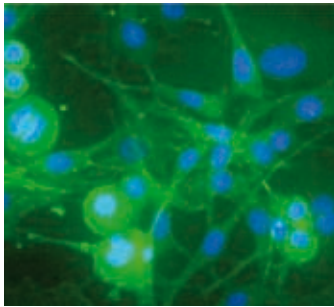
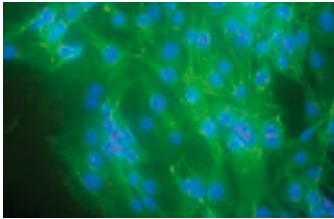


Living up to Life



Multiple wavelength acquisition

CHO-K1 cells treated with monastrol and stained with mouse anti-beta tubulin primary antibody detected with a FITC conjugated goat antimouse secondary antibody. Nuclei are stained with Hoeschst 33342. 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 antimouse 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 individual cells' data. Clicking one or multiple cells in the image highlights the data for the selected cell(s) in the table.

Customization through journaling

Journals are sophisticated and powerful macros that record and perform a series of tasks without the need for a programming language. The modules can be incorporated into a Leica MM AF journal to increase the customization and automation of your analysis.

Powerful data export capabilities

All measurements can be directly exported to a text file or Microsoft® Excel® for further analysis.

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

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