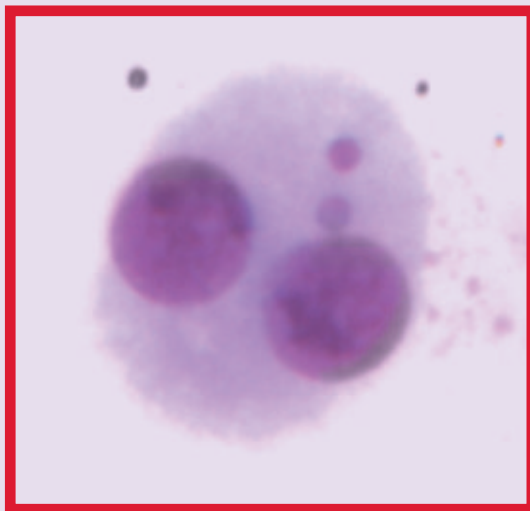


The background of the slide is a microscopic image of cells stained with a purple dye. Several cells are visible, some with multiple nuclei. A red square highlights a specific cell in the lower-left quadrant that contains two distinct, dark purple micronuclei within its cytoplasm.

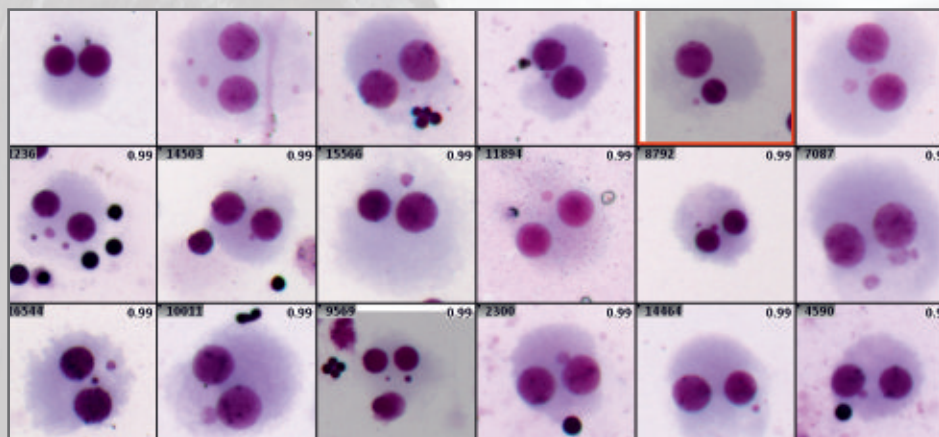
**AI Based  
In Vitro MN  
Detection**

Automated Analysis of  
the Cytokinesis Block  
Micronucleus Assay  
(CBMN)



**MICRONUCLEI**

# INTELLIGENT DETECTION OF MICRONUCLEATED CELLS



Gallery of detected binucleated cells with micronuclei

## Metafer for detection of MN cells supports:

- Full slide scan in **less than 20 minutes** (with the Cool Cube 4 digital camera<sup>1</sup>)
- **Up to 800** slides automated scan (with the SlideFeeder x80<sup>2</sup>)
- Easy review of results
- Fully **GLP - compliant documentation** (with the GLP upgrade package for Neon)

The analysis and quantification of micronuclei in vitro is a widely performed test for a fast detection of DNA damage in cells exposed to ionizing radiation or genotoxic chemical agents.

Giemsa is often used as a fast and cheap staining for this kind of preparations, however, manual and automated detection and analysis of Giemsa-stained micronucleated cells can be tedious and difficult due to the low "cleanliness" of the slides and to variations of the staining quality that lead to potential errors during the analysis, and make standardization of the results difficult.

MetaSystems has developed a new **Deep Neural Network** (DNN) algorithm, trained with thousands of pre-classified data, which brings the advantages of Artificial Intelligence to the detection of MN cells on Giemsa-stained slides.

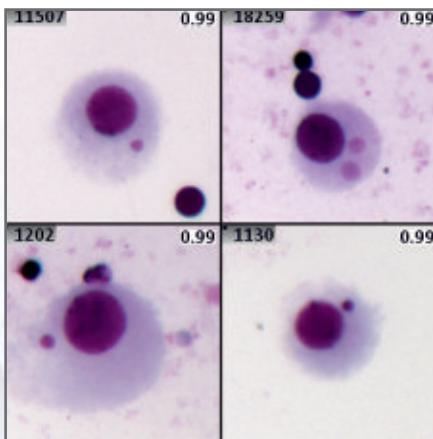
# MICRONUCLEI

# 5 DIFFERENT CLASSES IDENTIFIABLE

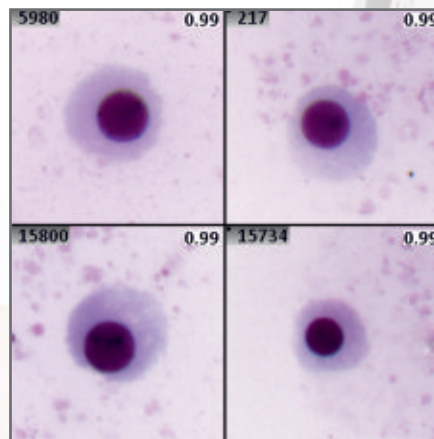
The DNN classifier is able to detect and sort the cells into 4 different classes based on the number of nuclei and presence or absence of micronuclei. An additional class is reserved for artifacts.

The classes available for the classification are:

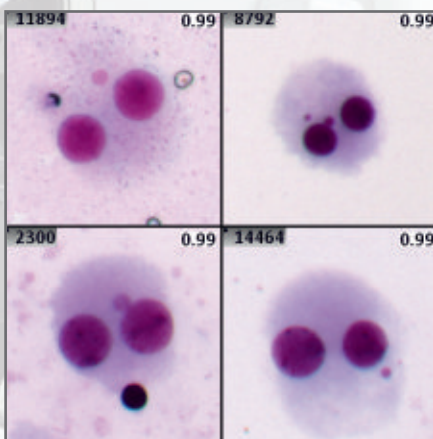
- Mononucleated cells with MN
- Mononucleated cells w/o MN
- Binucleated cells with MN
- Binucleated cells w/o MN
- Artifacts



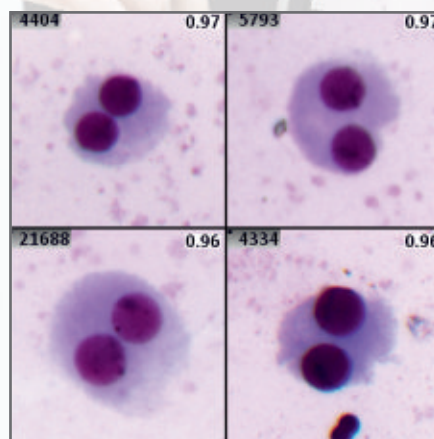
*Mononucleated cells with MN*



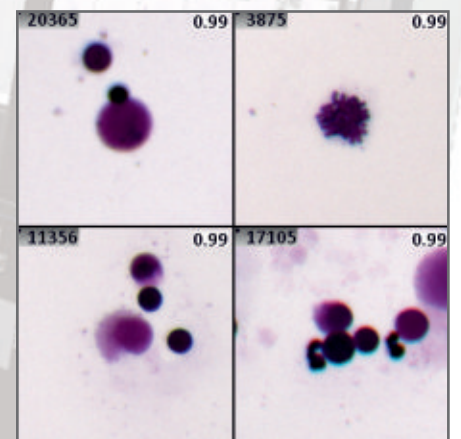
*Mononucleated cells without MN*



*Binucleated cells with MN*



*Binucleated cells without MN*



*Artifacts*



## RESULTS

Metafer automatically shows the relative percentages of mononucleated and binucleated cells with micronuclei as a fast parameter to determine the amount of DNA damage.



## GALLERY

Cells sorted into the different classes are shown in the gallery, with the possibility to switch easily between one class and another in one click.



## RAPIDSCORE

Users can easily score the gallery and classify the cells based on their number of micronuclei (1, 2 or more than 2 MNs). Results are shown separately for both mononucleated and binucleated cells.

The screenshot displays the Metafer 5 software interface. On the left, there are two microscopy images of cells with micronuclei. Below them is a 'Results Summary' panel showing:

- Percentage MonoNuc with Micronuclei: 3.1
- Percentage BiNuc with Micronuclei: 54.1

In the center, a 'Gallery' view shows a grid of 20 individual cell images, each with a numerical score below it. On the right, a 'RapidScore' panel shows two horizontal bar charts for 'Mono' and 'BiNuc' cells, with bars representing the number of cells in each micronucleus class (e.g., Mono 0, Mono 1, Mono 2, Mono >2).

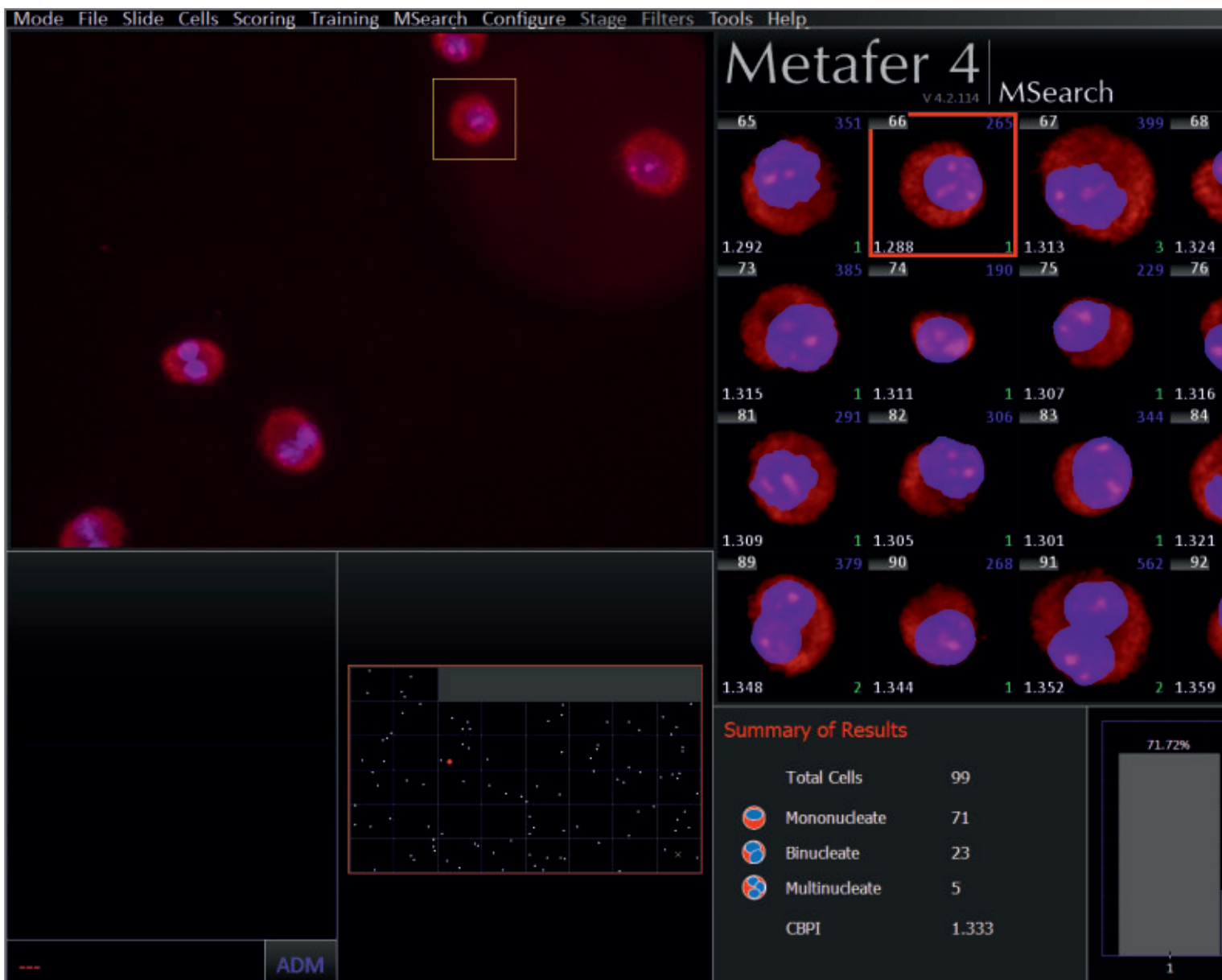
At the bottom, a navigation menu includes: Setup, Search, Gallery, Relocate, Ikaros, Mark Selected, and Field Review 2.

# MICRONUCLEI

# A FULL SOLUTION FOR THE CBMN ASSAY

When it comes to Genetic Toxicology, the cytokinesis block micronucleus assay (CBMN) is widely used to quantify the DNA damage potential of chemical substances.

Metafer is also able to calculate the **Cytokinesis-Block Proliferation Index (CBPI)**, providing a solution that is compliant with the **OECD 487 guideline** (Organization for Economic Co-operation and Development).





## MAGAZINES

Slide frame magazines hold 16 frames with 5 slides each (80 slides in total). A fully equipped SlideFeeder x80<sup>2</sup> hosts 10 magazines plus one bar code reader.

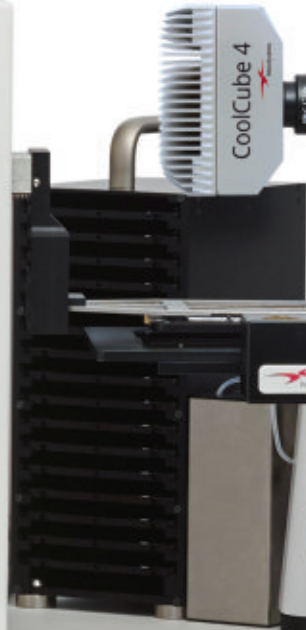
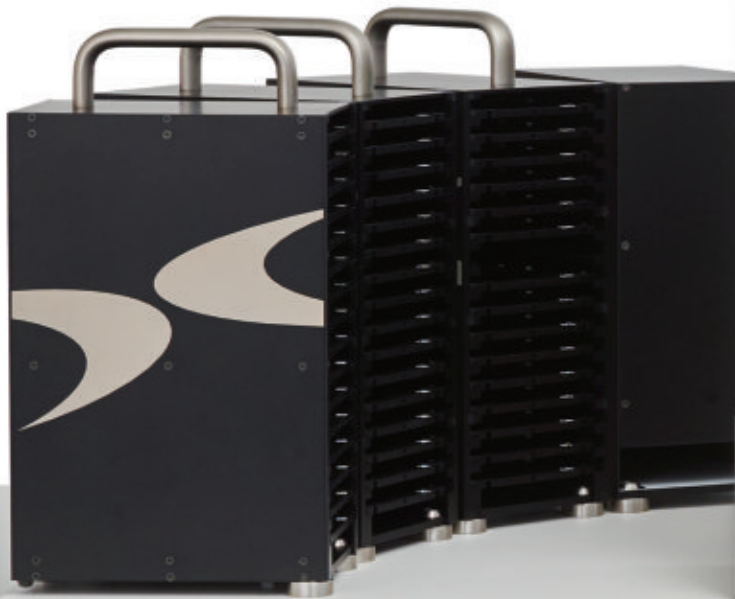
Each magazine is portable and can easily be taken to the workbench for loading.



## FEEDER MODULE

The rotating module of the SlideFeeder x80<sup>2</sup> delivers the slide frames to the motorized stage.

The device runs unattended and is prepared for 24/7 operation - including intelligent priority sample handling.



## CAMERAS

The Cool Cube cameras<sup>1</sup> are designed with excellent imaging and automation in mind.

These provide seamless automated integration with Metafer enabling optimal performance.

## MICROSCOPE

The high precision research grade fully motorized microscope equipped with a stepping motor stage enables found objects to be precisely recorded and relocated.

**Objective:** 10x

**Light:** Transmitted Light

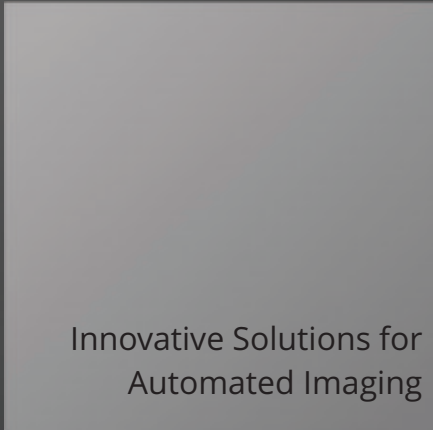
## SOFTWARE

The PC based Metafer software controls the scanning hardware and provides a convenient user interface prepared for all-day, routine use. Thanks to the exceptional classifier concept each Metafer provides the optimal balance between flexibility and standardization.





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**Notes**

*For Research Use Only (RUO).  
Metafer for the in vitro Micronucleus Test is not  
intended for diagnostic use.*

<sup>1</sup> *Cool Cube 4 is a product from ABS GmbH, Germany*

<sup>2</sup> *SlideFeeder x80 is a product from IML, Germany*



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