Metafer in Genetox

Genetic Toxicology Solutions for Pharmaceutical Labs
An Unrivaled Portfolio of Genetox Tests

Metafer supports:
- Full compliance with GLP regulations and OECD guidelines
- Standardization of scoring parameters providing reproducibility of results
- High sensitivity for detection even low-dose effects
- High speed automation
- Ultra-high resolution images and complete documentation of results
- Seamless connection to 21 CFR Part 11 compliant LIS/LIMS systems

With more than 30 years of experience in automated microscopic imaging, MetaSystems provides an unrivaled portfolio of applications for genetic toxicology.

In combination with our CoolCube digital camera and state-of-the-art analysis software, Metafer - our fully automated slide scanning system - is the perfect solution for pharmaceutical toxicology laboratories and affiliated Contract Research Organizations (CROs).

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Speed</th>
<th>OECD Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-vivo Micronucleus</td>
<td>~4 min/10,000 cells</td>
<td>OECD-474</td>
</tr>
<tr>
<td>In-vitro Micronucleus</td>
<td>~2.5 min/slide</td>
<td>OECD-487</td>
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<tr>
<td>Chromosome Aberration</td>
<td>Metaphase search in &lt; 30 sec/slide</td>
<td>OECD-473</td>
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<tr>
<td>Comet</td>
<td>~2 min/slide</td>
<td>OECD-489</td>
</tr>
<tr>
<td>Ames II /Ames MPF</td>
<td>&lt; 4 min/384-well plate</td>
<td>OECD-471</td>
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Note
For Research Use Only (RUO). Metafer for toxicology is not intended for diagnostic use.
The Rodent Erythrocyte *(in-vivo)* MN Test normally uses bone marrow or the peripheral blood of rodents exposed to test substances. Classifying red blood cells from the sample as polychromatic (PCE) or normochromatic (NCE) erythrocytes is tedious and time-consuming, and consequently, potentially error-prone. Automation of the *in-vivo* MN test with Metafer allows for unattended workflow in this process.

**Main Features**

- Classification of cells as PCEs or NCEs, based on color classification
- Calculation of the PCE/NCE ratio as a cytotoxicity index
- Counting of micronuclei within PCEs
- Approximately 4 min/10,000 cells

*Metafer scanning for micronuclei within the PCE population.*
In-vitro Micronucleus (MN) Test

The (cytokinesis block) micronucleus (in-vitro) MN test is widely used to quantify the DNA damage potential of chemical substances. MetaSystems also provides analysis of Cytokinesis-Block Proliferation Index (CBPI). CBPI is an OECD guideline-recommended complementary test which investigates the impact of test agents on cell proliferation. **Metafer** provides automated, rapid, and precise analysis for these assays.

**Main Features**
- Automated detection and classification of nucleated cells based on their nuclei number: (mono-, bi- and multi-nucleated cells)
- Automatic count of the MN in nucleated cells
- Easy-to-review, interactive, graphical results
- About 2.5 min/slide
The Chromosomal Aberration (CA) test is a time-consuming, labor-intensive study which is vital for the analysis of mutagenic and carcinogenic agents. MetaSystems Metafer is able to reduce the tediousness and time necessary for investigators by automatizing these tasks. This results in lower turnaround times and reduced error rates.

Metafer displaying metaphases found by automated scan.

Main Features
- Unattended metaphase detection in **less than 30 seconds** per slide
- Dedicated “Chromosome Aberration Tool” for classification and analysis of aberrations
- GLP-compliant data handling; interfaces with LIS/LIMS lab information systems

MetaSystems provides multicolor FISH probes for an easier and more detailed analysis of chromosomal aberrations. Our human 24xCyte mFISH and xCyte mBAND probes even allow for the visualization of difficult aberrations, which might be missed by traditional cytogenetics analyses. mFISH probes for Chinese hamster, mouse, and rat are also available [metasystems-probes.com](http://metasystems-probes.com)
The Comet assay is used for detecting DNA strand breaks in individual cells after treating them with chemicals of interest. The test has the advantage of being fast, relatively low-cost, and highly sensitive. However, it is still vulnerable to various factors that can affect the reproducibility of the results, especially during analysis. Therefore, standardization via automation is key. Automated comet scanning provides a solution for making the assay highly reliable and reproducible.

Main Features
- Head and tail lengths
- Background conditions
- Hedgehog comets
- About 2 min/slide
The **Ames** test is used to assess the mutagenic and toxic potential of compounds. It is usually performed in the early stages of R&D and clinical test phases. A positive test indicates that the compound might act as a carcinogen. The **Ames II/Ames MPF** assays are modernized versions of the original Ames test, using liquid culture instead of agar plates. The assays are done on 384-well plates and have a colorimetric read-out, which **Metafer** can automatically analyze.

**Ames II/MPF Assay**

![Metafer scanning and analyzing automatically a 384-multiwell.](image)

**Main Features**
- Automated reading of 384-multiwell plates and interpretation of each well as positive or negative, based on color change
- Customizable reports for documentation of results
- Ability to review data in the case of ambiguous results
- Less than 4 min/384-well plate