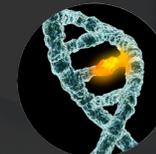




***In Vivo***  
**Micronucleus**  
Investigate DNA damage  
using animal models



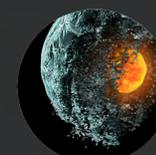
**Human**  
**Micronucleus**  
Study DNA damage  
in human subjects



***In Vivo***  
**Pig-a**  
**Gene Mutation**  
Measure mutation  
using animal models



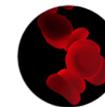
***In Vitro***  
**Micronucleus**  
Explore DNA damage  
using cells in culture



***In Vitro***  
**High**  
**Content Assays**  
Analyze multiple endpoints  
using cells in culture

# In Vivo Micronucleus Analysis

Measuring DNA Damage in Red Blood Cells



## The Micronucleus Test

Exposure to a test substance can result in damage to the chromosomes or spindle apparatus of cells. During routine cell division, this type of damage can create a smaller 'micro'-nucleus, apart from the main nucleus. When red blood cells mature the main nucleus is expelled. Micronuclei remain behind and can easily be seen in a cell with no other DNA. This makes red blood cells ideal for measuring this endpoint.

## MicroFlow Kits

*In Vivo* MicroFlow kits use flow cytometry to quickly and reproducibly measure micronuclei. Whether you prefer shipping samples to us, or analyzing them yourself with your own in-house flow cytometer, we have a solution for you.



### FEATURES

- **Gold Standard Method**  
A large number of chemicals has been evaluated with this internationally validated method.
- **Flow Cytometry**  
Fast, reproducible results that take advantage of laser-based technologies.
- **Includes Calibration Standards**  
Malaria Biostandards, with Positive and Negative Controls, ensure proper flow cytometric setup.
- **QC'd Kits, Unlimited Technical Support**  
Everything you need to successfully perform the method is included in the box or available for download!

### BENEFITS

- **Accepted by Regulatory Agencies**  
GLP studies can be performed either at your facility or using Litron's experienced scientists.
- **Complete More Studies in Less Time**  
Routinely score 20,000 cells per sample and analyze an entire study in one day!
- **Provides Reproducible Data**  
Calibration standards ensure confidence in your results across days and between laboratories.
- **Feel Confident**  
Speak with the scientists who developed this method. Send plots, email, or call with questions!

### SPECIES AND COMPARTMENTS

- Mouse or Rat
- Blood or Bone Marrow
- For others species, please inquire

### ADVANTAGES OF PERIPHERAL BLOOD

- Allows each subject to be sampled multiple times
- Easily integrates into existing toxicology studies
- Requires very low sample volumes
- Reduces the number of animals in your studies

# Human Micronucleus Analysis

Measuring DNA Damage in Red Blood Cells

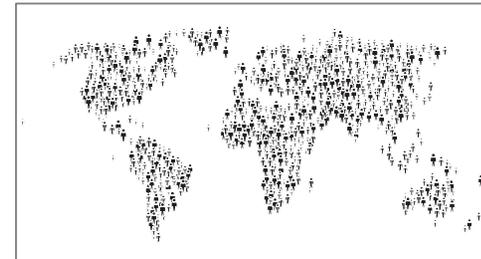


## The Micronucleus Test

Exposure to a test substance can result in damage to the chromosomes or spindle apparatus of cells. During routine cell division, this type of damage can create a smaller 'micro'-nucleus, apart from the main nucleus. When red blood cells mature the main nucleus is expelled. Micronuclei remain behind and can easily be seen in a cell with no other DNA. This makes red blood cells ideal for measuring this endpoint. In human blood, these 'micronuclei' are sometimes referred to as Howell-Jolly Bodies (HJB).

## Disclaimer

MicroFlow analysis of human blood is for Research Use Only (RUO) and has not been approved, cleared, validated or intended for clinical diagnostic use or to serve as a basis for individual patient management.



## FEATURES

- **Requires Minimal Amounts of Blood**  
Collect approximately 120 µl of blood per sample.
- **Takes Advantage of Magnetic Columns**  
Enrich samples by separating young and old RBCs.
- **Includes Calibration Standards**  
Malaria Biostandards ensure proper flow cytometric setup.
- **Analysis by Flow Cytometry**  
Automated scoring provides objective and reproducible data.

## BENEFITS

- **Easily Integrate with Existing Studies**  
Use with epidemiological studies or clinical trials.
- **Measure Very Rare Events**  
This the first time this endpoint has been available for routine use!
- **Provides Reproducible Data**  
Calibration standards ensure confidence in your results.
- **Fast Turn Around, Reliable Results**  
Get your data as soon as possible using laser-based technology.

## INVESTIGATE POPULATION TRENDS

- Clinical Research
- Environmental exposure
- Post-market surveillance
- Workplace safety
- Other epidemiological studies

## I WANT TO MEASURE MICRONUCLEI IN HUMAN BLOOD. CAN YOU HELP ME?

Yes. Blood samples can be shipped to us for flow cytometric analysis. For more information, please contact us.

# In Vitro Micronucleus Analysis

Measuring DNA Damage in Cell Cultures

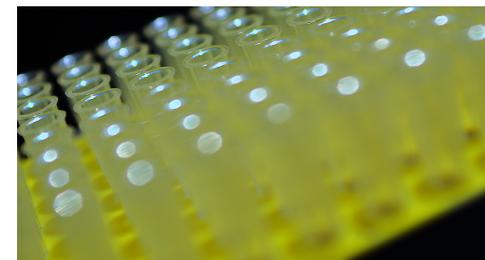


## The Micronucleus Test

Exposure to a test substance can result in damage to the chromosomes or spindle apparatus of cells. During routine cell division, this type of damage can create a smaller 'micro'-nucleus, apart from the main nucleus.

## MicroFlow Kits

*In Vitro* MicroFlow kits use flow cytometry to quickly and reproducibly measure micronuclei. The key element of this method is the sequential staining. One staining step identifies dead and dying cells. The second step lyses cells and stains DNA. This approach allows you to distinguish micronuclei from other events, such as apoptotic bodies.



### FEATURES

- **Automated Scoring by Flow Cytometry**  
Templates and example data are provided.
- **Compatible with Many Cell Lines**  
With CHO-K1 cells, obtain frequency of hypodiploid nuclei.
- **Miniaturized Format**  
Compatible with 96 well plates, as well as auto-samplers and robotics.
- **QC'd Kits, Unlimited Technical Support**  
Everything you need to successfully perform the method is included in the box or available for download!

### BENEFITS

- **Reliable and Reproducible Data**  
Reduce errors and get objective results you can trust.
- **Detects Multiple Modes of Action**  
Determine if your compounds are aneugenic or clastogenic.
- **Reduces Time & Compound Requirements**  
Hundreds of samples analyzed in a few hours. Eliminates tech time with "walk away" analysis.
- **Feel Confident**  
Speak with the scientists who developed this method. Send plots, email, or call with questions!

### ATTACHMENT OR SUSPENSION CELLS

- L5178Y
- CHO-K1
- TK6
- V79
- WIL-2
- HEPG2

### HIGH CONTENT ANALYSIS

- Mode of Action
- Cell cycle
- Relative Survival
- Membrane integrity

# In Vivo Mutation Analysis

Measuring DNA Damage at the *Pig-a* Locus

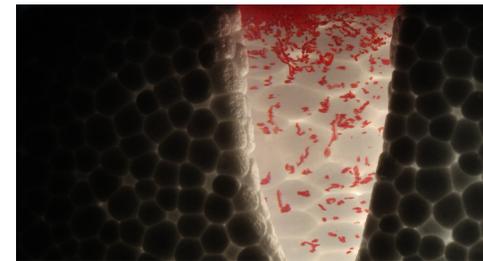
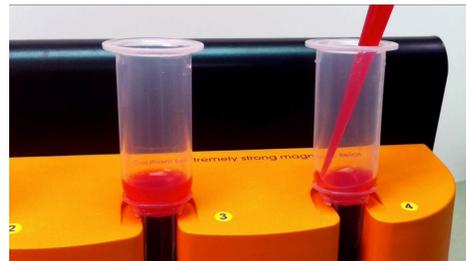


## The *In Vivo Pig-a* Gene Mutation Test

This test detects mutations at the *Pig-a* gene. These mutations prevent GPI anchors from forming. Without these anchors, specific markers on the exterior of cells will not be present. This assay measures the frequency of cells without these surface markers, also known as “*Pig-a* mutant cells”.

## MutaFlow Kits

*In Vivo* MutaFlow kits use flow cytometry to quickly and reproducibly measure *Pig-a* mutant cells. Samples may be shipped to Litron, or you can analyze them yourself with your own in-house flow cytometer.



### FEATURES

- **Use Any Mouse or Rat Strain**  
Mutation data are now easy to obtain and afford.
- **Magnetic Separation**  
Enrichment increases the number of RETs analyzed per sample.
- **Compatible With Most Flow Cytometers**  
May also be used with automated samplers.
- **QC'd Kits, Unlimited Technical Support**  
Everything you need to successfully perform the method is included in the box or available for download!

### BENEFITS

- **Routine Mutation Data Now Possible**  
No transgenic animals required. This is the first method that allows *in vivo* mutation to be routinely measured!
- **Acquire Information Quickly**  
Score several million RETs in just a few minutes, and obtain data from up to 50 samples in one day!
- **Establish Method In-House**  
Automated, walk-away analysis can significantly decrease time at the flow.
- **Feel Confident**  
Speak with the scientists who developed this method. Send plots, email, or call with questions!

### SPECIES AND COMPARTMENTS

- Rat blood
- Mouse blood
- For other species, please inquire

### ADVANTAGES OF PERIPHERAL BLOOD

- Allows each subject to be sampled multiple times
- Easily integrates into existing toxicology studies
- Requires very low sample volumes
- Reduces the number of animals in your studies

# In Vitro High Content Assays

Measuring Multiple Endpoints in One Step

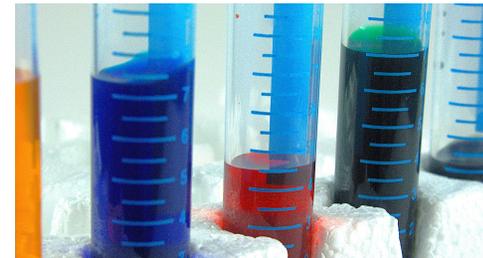
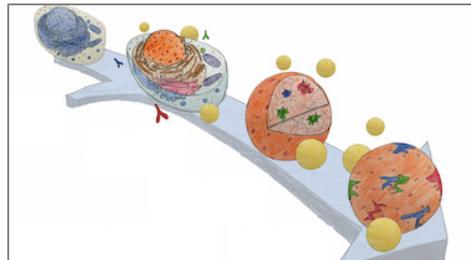


## High Content Analyses

Exposure to a test substance can cause toxicity such as DNA damage and apoptosis. Study multiple endpoints associated with this type of damage, including:  $\gamma$ H2AX as a measure of DNA double strand breaks, phospho-histone H3 to label mitotic cells, cleaved PARP as an apoptosis marker, and p53 as an indicator of genotoxic stress.

## The MultiFlow<sup>®</sup> Family of Kits

The MultiFlow family of kits were developed from the ground up to be simple and efficient. With this method, you can now liberate nuclei, stain nucleic acids, and label nuclear epitopes all in the same step. After a brief incubation period, samples are ready for flow cytometric analysis.



### FEATURES

- **One Step, Multiple Endpoints**  
Flexible method addresses different pathways and events.
- **Low Compound Requirements**  
Perform analyses in 96-well plates.
- **No Washes Required**  
Add-and-read format lyses cells and stains nuclei in one step.
- **QC'd Kits, Unlimited Technical Support**  
Everything you need to successfully perform the method is included in the box or available for download!

### BENEFITS

- **Easy to Use Multiplexed Assay**  
High information content yields Mode of Action data.
- **Place Anywhere In Your Pipeline**  
Use as a screening tool or a follow up to a positive result.
- **Fast Results, Reliable Data**  
Speed up your work with efficient, rapid processing and analysis.
- **Feel Confident**  
Speak with the scientists who developed this method. Send plots, email, or call with questions!

### AVAILABLE KITS

Every MultiFlow kit provides cell density, proliferation and cytotoxicity information.

#### Single Antibody Kits also measure:

- Double-strand DNA breaks using  $\gamma$ H2AX
- Genotoxic stress using nuclear p53
- Mitotic cells using phospho-histone H3
- Apoptosis using cleaved-PARP
- More kits under development

#### Multiple Antibody Kits also measure:

- p53,  $\gamma$ H2AX, and phospho-histone H3 (for detection of nuclear p53, double-strand DNA breaks, and mitotic cells)
- Cleaved-PARP,  $\gamma$ H2AX and phospho-histone H3 (for detection of apoptosis, double-strand DNA breaks, and mitotic cells)
- p53,  $\gamma$ H2AX, phospho-histone H3, and Cleaved-PARP (for detection of nuclear p53, double-strand DNA breaks, mitotic cells, and apoptosis)

## We want you to succeed!

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Our overriding goal is for you to have a great experience with our kits. For this reason, we offer unlimited technical support and access to the same scientists who developed these methods!

### Discuss Your Study Design

Whether you are selecting appropriate doses, working through logistics, or deciding on the best experimental design, our scientists are always here to give you feedback and help ensure your study goes well.

### Send Us Your Plots

It can be extremely useful to have experienced eyes looking at your flow cytometer plots. Our scientists have more experience with these methods than anyone in the world and are always willing to help resolve any questions you may have.

### Consider Training

Our experts travel around the world, training scientists on the most effective way to use these methods. Whether you come to our lab, or we come to you, we are available to help you one-on-one.

## About Litron

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Litron has spent the last 40 years providing critical data to pharmaceutical, medical device, government and contract research organizations around the world. With a laser focus on DNA damage and other toxic effects, we develop state-of-the-art flow cytometric methods to solve challenging problems for the toxicology industry.

### Vision

Our vision is to transform the toxicology industry by developing the most advanced testing methods in the world. We focus on innovation to help our clients ensure the safety of their products.

### Mission

Our mission is to protect human health by creating the best research tools available for evaluating the effects of toxic compounds.

### Values

#### OUR CLIENTS

deserve quality products that help them achieve their goals.

#### OUR TEAM

is made up of talented, motivated individuals who are given the opportunity to innovate and make a difference in the world.

#### OUR MANAGEMENT

takes a long-term view of opportunities and invests for the future.

#### OUR WORKPLACE

focuses on exceptional results while at the same time achieving a healthy work-life balance.



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