

# Ikaros and Isis

## Interactive Imaging Systems

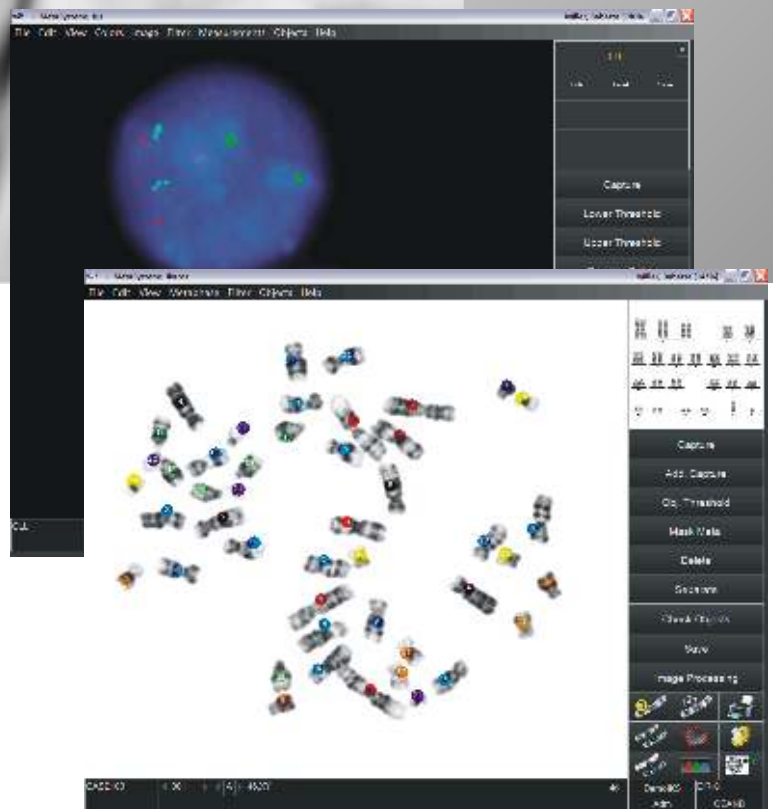
### Discover

*Learn how to increase your case turnover and the quality of your results with the outstanding imaging systems of MetaSystems.*



- ▶ *Discover*
- ▶ *Analyze*
- ▶ *Colorize*
- ▶ *Manage and Connect*
- ▶ *Evaluate*
- ▶ *Paint*

**Set it up!**



# Ikaros

## Karyotyping System

### Analyze

*Choose the world's easiest karyotyping system and complete your first karyogram after only a few minutes of training.*

### Speed

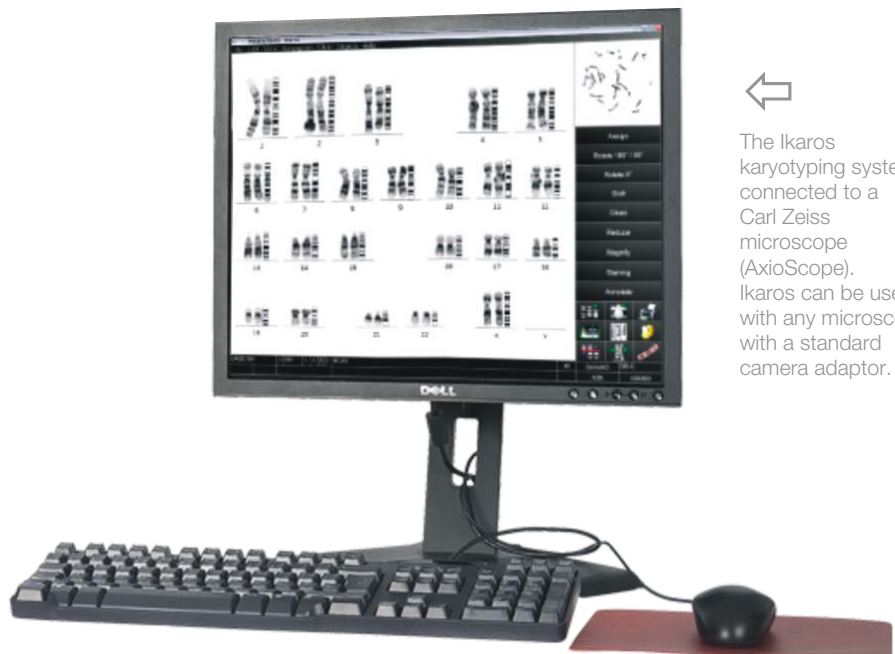
Time is a crucial factor for routine cytogenetic diagnostics, as there is a strong demand to shorten case turnover times; this is why we designed Ikaros to be the fastest karyotyping system available. To achieve this goal, we have created a remarkably streamlined software architecture, direct access to all functions with minimal user interaction, and unique image acquisition and enhancement tools.

### Ease of Use

It is more efficient to actually use a tool than to lose time learning how to handle it. Working with Ikaros is extremely easy, and therefore, training times can be reduced to an absolute minimum. Generally, it takes only a few minutes until the first karyogram is prepared, and the skills required to handle Ikaros can be easily shared among colleagues and new members of the workgroup.

### Quality

Metaphase images acquired with Ikaros excel in quality, which is due to the unique combination of a high-resolution CCD camera ([MetaSystems CoolCube 1m](#)) and a variety of dedicated software tools. The latter include automated contrast adjustment, a focusing aid to help find the best focus image, and a convenient, yet comprehensive banding enhancement filter, which is simply applied with the mouse.



The Ikaros karyotyping system, connected to a Carl Zeiss microscope (Axiolab). Ikaros can be used with any microscope with a standard camera adaptor.

# Ikaros Features

## Functionality

### Image Acquisition

- ▶ One-click image acquisition of G-, R-, Q-, and DAPI-banded metaphases, or of metaphases with other staining patterns
- ▶ Focusing aid for automated best focus acquisition

### Image Enhancement

- ▶ Powerful image filter tools for banding enhancement
- ▶ Unlimited undo, processing steps list, and any-time access to original image

### Chromosome Separation

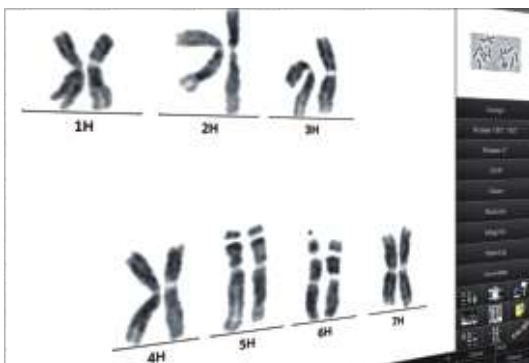
- ▶ Automated, semi-automated, and manual separation of chromosomes
- ▶ Separation of chromosome clusters with the chromosome brush tool
- ▶ Image zoom function on the mouse wheel

### Karyotyping

- ▶ Automated and manual assignment of chromosomes
- ▶ Classification of chromosomes in the metaphase
- ▶ Ideograms (ISCN 2009) with different resolutions, flexible annotation function, and karyogram form editor
- ▶ Karyogram comparison and partial karyograms with aberrant chromosomes

*Be part of a  
global community:*

*Labs in more than  
70 countries have  
chosen to karyotype  
with Ikaros systems.*



*Use Ikaros to karyotype and analyze chromosomes from any species.*



*Classify and annotate chromosomes in the metaphase.*

# Isis

## Fluorescence Imaging System

### Colorize

*Create extraordinary fluorescence images in no time with the Isis fluorescence imaging system.*

#### Control

Fluorescence imaging is more than just capturing an image. Each fluorochrome channel carries crucial information about the hybridization status of the DNA probe kit used for hybridization. This is why Isis always provides full user control over the image: each color channel can be visualized and enhanced individually with a few simple steps. Original images remain present at all times, and various color display modes offer the possibility to illustrate exactly the information that is required.

#### Flexibility

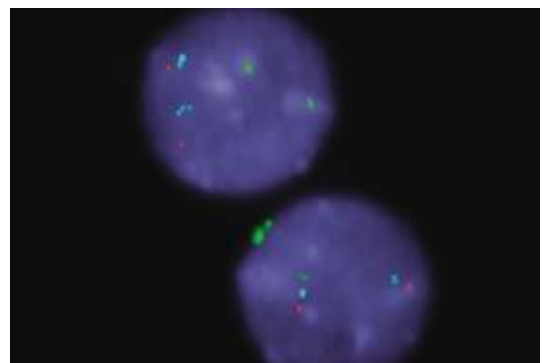
Isis supports up to 12 color channels and allows the user to easily switch between different fluorochrome combinations. Global settings files ('experiment types') contain all necessary parameters required to adjust the system to another sample - including the fluorochromes used, the automated image enhancement algorithms, the look-up tables for false color display, and more.

#### Automation

Image acquisition is particularly simple with Isis. Each color channel is acquired with automated, dynamic integration time adjustment, thus providing the best signal conditions at anytime. Isis supports many motorized microscopes, enabling effortless acquisition of even complex images with many color channels. And extended focus images are of course automatically created from focus stacks.



*Various color display modes based on user-specified look-up tables are available.*



*Images from interphase nuclei or other 3D specimen can be acquired as focus stacks and transformed to an extended focus image.*

## Isis Features

### Functionality

#### Image Acquisition

- ▶ One-click image acquisition of fluorescence images with up to 12 color channels based on automated integration time adjustment
- ▶ Support of many motorized microscopes and filter wheels
- ▶ Extended focus imaging (microscopes with motorized focus are supported)

#### Image Enhancement

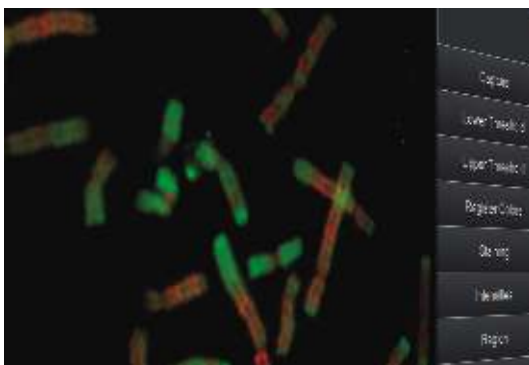
- ▶ Easy automated, or semi-automated, enhancement of images, individually for each color channel, and with unlimited undo functionality
- ▶ Local thresholding to generate homogeneously stained images
- ▶ Powerful chromosome banding and signal enhancement filters
- ▶ Full karyotyping functionality for FISH stained chromosomes (optional)

#### Color Display Modes

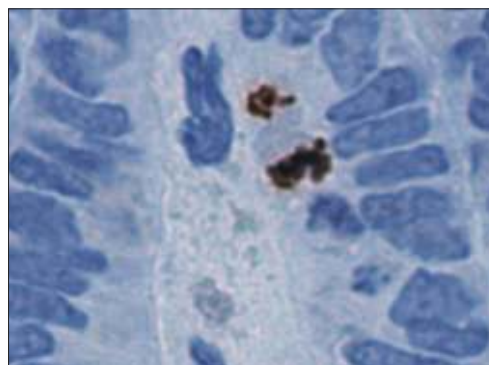
- ▶ Single color channel display as color, grayscale, or inverted grayscale image
- ▶ Various pseudo color display modes (modified color mode, merged color mode, primary false color mode) with editable look-up tables
- ▶ Comprehensive image annotation with unlimited colors and fonts
- ▶ Various measurement functions including fluorochrome profile evaluation

*Do you need help in choosing the appropriate fluorescence filter set for your assay?*

*Ask MetaSystems: based on our experience with FISH, mFISH, and mBAND we can offer competent advice and expertise.*



*With just one click of the mouse a new experiment type can be selected, and Isis is ready to acquire an image with different color channels.*



*If equipped with a color LED lightsource, Isis can also be used to acquire and enhance Brightfield color images.*

# Patient and Case Data Administration

## Manage

Use Ikaros and Isis to store and maintain patient data, and take advantage of the unrivaled concept of data organization.

### Patient Data Sheet and Print Formats

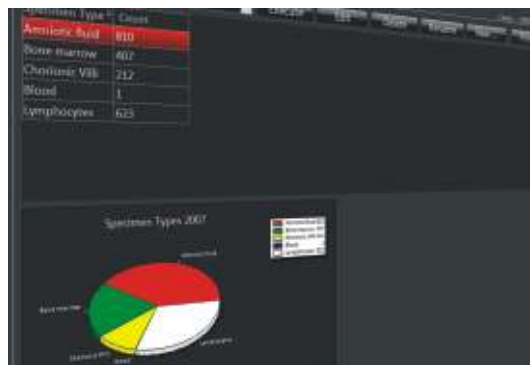
*Adapt the system to your requirements*

Part of any Ikaros or Isis system is the patient datasheet, with which it is possible to enter and retrieve details of the patient, the case, and the results. The datasheet is fully customizable, and the information entered is automatically stored together with the images. Any data entry can be used for reporting, and report templates can be freely composed of text and images. A flexible importing and exporting function allows for exchanging images and data with external databases or other third-party software.

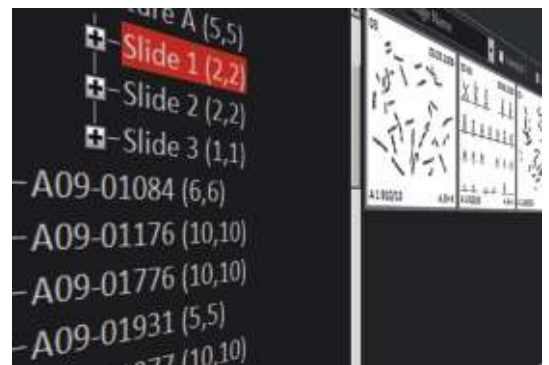
### MetaServer and MetaClient

*Evaluate, archive, and summarize your results*

MetaClient is the dashboard of any Ikaros and Isis installation. Here, not only can you get an easy overview of the cases in the network, but you can also sort and filter data to generate comprehensive statistic reports. MetaClient is connected to MetaServer, a small piece of software that does the background indexing of all data created by any Ikaros or Isis system. Hence, MetaServer will also provide the information required for the convenient and automated archiving of data to secure changeable storage media.



*Patient and case data are entered into the integrated case datasheet, and summarized in statistical reports.*



*In the MetaClient software, cases are organized, images are selected, and case data queries are edited and executed.*

## Networking and Automation

### Multuser Workspaces

*Let your Ikaros and Isis installation grow with demand*

Ikaros and Isis systems are designed to be connected together. In a network, each system provides full access to any case stored on the central server system; thereby the intelligent user management automatically tracks all cases which have been created or modified by a given user.

The flexible and modular architecture of Ikaros and Isis systems allows for the tailoring of a multiuser workspace to fit any given workflow. Workstations can be installed as complete systems with camera and analysis functionality, but can also be configured as analysis systems without camera, as basic image acquisition systems, or as image and case review stations.

### Connection to a Metafer System

*Extend Ikaros and Isis to a fully automated installation*

All Ikaros and Isis systems are ready to be connected to a **Metafer** slide scanning platform, e.g. to the **MSearch** metaphase finder. The combination of the analysis strengths of Ikaros and Isis with the convenient Metafer scanning system provides an unrivaled degree of imaging automation and quality.

### Connect

*Integrate your Ikaros & Isis systems in a network and experience the advantages of data sharing and workflow optimization.*



*The Metafer slide scanning platform integrates seamlessly into any Ikaros or Isis installation. With Metafer the detection of*

*metaphases and even the acquisition of images for karyotyping, FISH, and mFISH can be fully automated.*

# Isis

## Color Karyotyping and CGH

### Evaluate

Use the Isis upgrades for color karyotyping and for CGH and evaluate your sample with the highest precision.

### CGH

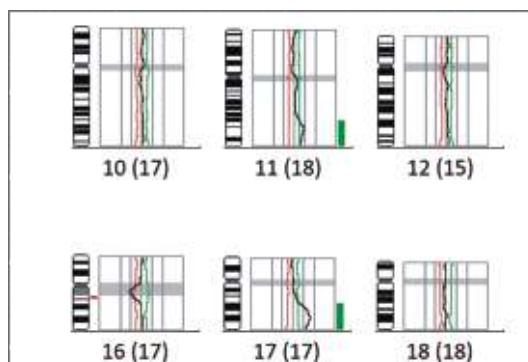
Analyze comparative genomic hybridization samples with Isis

With the Isis CGH upgrade, fluorochrome profile analyses can be conducted with ease and precision. Isis not only generates average profiles from all metaphases in a given case, but it also offers full access to the single profiles from each chromosome. Profiles' limits are generated based on statistical methods, thus taking the variations between experiments and between metaphases into account. With this approach, Isis CGH allows for the detection of extremely small deviations, even without the requirement to run extensive control experiments with each study.

### Telomere Analysis

Quantifying telomere signals

Telomere length is an indicator of cell senescence, and is of interest in cancer research and ageing studies. The Isis telomere analysis software provides the tools required for a fast and reliable quantification of fluorescent telomere signals. Results are stored in a clearly arranged table, and a reference signal can be used to cope with variations in hybridization (either inter-experimental or inter-individual). Images as well as results data can be easily exported to standard file formats.



CGH profiles limits are set based on statistical parameters. Heterochromatic regions can be excluded from the measurement.



Telomere data for all metaphases of an experiment can be conveniently displayed on screen.



# Multicolor FISH (mFISH) and Multicolor Chromosome Banding (mBAND)

## Multicolor FISH (mFISH) and Multicolor Banding (mBAND)

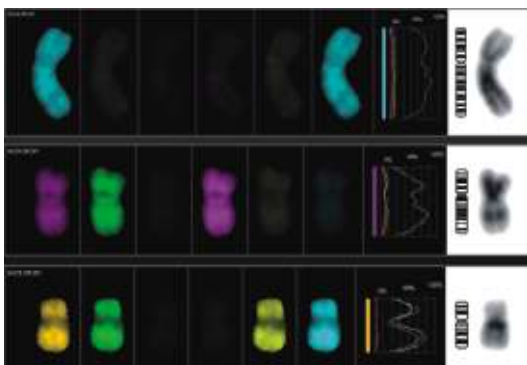
*Gain peerless insight to chromosomes and metaphases*

The **multicolor FISH** analysis software upgrade adds substantial functionality to Isis. Based on the combinatorial analysis of five (standard mFISH) or six (arm-specific mFISH) fluorochromes, mFISH provides precise identification of any chromosome or chromosome part within the metaphase. The Isis mFISH/mBAND software offers a variety of tools to perform an accurate analysis. Detection algorithms are trainable, and, in contrast to other methods, the user can always check the original color channel images to verify the findings. The final examination is most easily done with the outstanding single color gallery, which displays the images of all color channels side by side with the inverted DAPI image and a fluorochrome profile.

**Multicolor banding (mBAND)**, a proprietary MetaSystems method, is based on combinatorial labeling. A high-resolution pseudo-color banding pattern, generated by quantitative spectral analysis, detects subtle intra-chromosomal rearrangements. The mBAND pattern is independent of chromosome condensation, and can of course be analyzed with the same tools used for mFISH analysis. MetaSystems offers a variety of **probe kits** for mFISH and mBAND. Among others, mFISH probe kits for chromosomes of humans, mice, and rats are available. Please refer to our probe kits catalogue for details.

## Paint

*Add art to science with the multicolor FISH applications of Isis, and get amazing results from your samples.*



*The single color gallery provides deep insight into the chromosomes of an mFISH hybridization.*



*Iso-chromosome X labeled with the XCyte X mBAND probe kit. mBAND is particularly useful to detect intra-chromosomal rearrangements and to identify breakpoints.*

# Ikaros and Isis

## Options and Upgrades

### Set it up!

Choose from many options to create a customized multi-user workspace that perfectly matches your demands.

### The Ikaros and Isis Construction Kit

*Pick from a wide variety of options and build your own personalized installation*

All MetaSystems products use modularity to provide maximum flexibility for installation architecture and workflow. We will assist you in designing installations which grow with demand, and which can provide any degree of imaging automation.

#### Basic Installations

- ▶ Use Ikaros or Isis (or both) as stand-alone systems, and add satellite systems if you want to establish additional workplaces.

#### Distributed Multi-User Workplaces

- ▶ Separate different tasks from each other to gain additional efficiency. Integrate additional stations into your LAN or your VPN, enter patient data at the receiving desk, acquire images in the microscope room, and do the analysis in your office. With a VPN connection you may even check cases remotely from home, or when you are traveling.

#### Fully Automated High-Throughput Installations

- ▶ Use Metafer to further streamline your workflow. Let the automated system acquire the images, and do the analysis on remote analysis stations. Store your data on a central server, and use the MetaServer / MetaClient software bundle to maintain the database, generate reports, and do statistics.



Software Upgrade:  
**Ikaros licence for Isis Systems**

*Adds full Ikaros functionality to any Isis FISH imaging system. Also available as analysis licence.*



Software Upgrade:  
**Isis licence for Ikaros Systems**

*Adds full Isis functionality to any Ikaros karyotyping system. Also available as analysis licence.*

*Any Ikaros or Isis system can be upgraded with Isis or Ikaros licences, respectively.*



**Ikaros / Isis First System**

- ▶ Ikaros / Isis licence
- ▶ Capture hardware
- ▶ Analysis functionality
- ▶ Color laser printer
- ▶ Archiving of cases and images

*The first system in any installation is configured as a complete system with printer and secure data archiving software.*

# System Platform Architecture



## Ikaros / Isis Analysis Systems

› Ikaros or Isis analysis licences

Analysis systems are used for remote analysis of Ikaros and Isis images. There is no upper limit for the number of analysis systems installed.



## Ikaros / Isis Capture Systems

› Ikaros or Isis capture licences

› Capture hardware

Capture systems can be used for image acquisition. The images are then analyzed on networked analysis systems.

*Add Metafer to your Ikaros and Isis installation and gain an unmatched degree of automation.*



## Metafer Slide Scanning Platform

Metafer adds full automation to your Ikaros / Isis installation. The **MSearch** metaphase finder for example generates high quality Ikaros or Isis metaphase images - 24 hours a day, seven days a week.



## MetaServer/MetaClient

Software for convenient data display and case management.

There are a number of software licences for image, data, and case management available.

They can be installed on any system that connects to the Ikaros and Isis network.

## Case Review Software

Software for reviewing images and cases.

## Image Viewer Software

Software to display Ikaros or Isis images.



## Ikaros / Isis Satellite System

› Ikaros / Isis licence

› Capture hardware

› Analysis functionality

Software Upgrade:  
**Isis Color Karyotyping\***

Software Upgrade:  
**Isis CGH Analysis**

Software Upgrade:  
**Isis mFISH and mBAND**

Software Upgrade:  
**Isis Telomere Analysis**

Any consecutive full Ikaros or Isis system is configured as a satellite system.

Dedicated Isis upgrades for different applications.

\*The color karyotyping upgrade adds full karyotyping functionality to Isis systems and is required for all other upgrades.

# MetaSystems

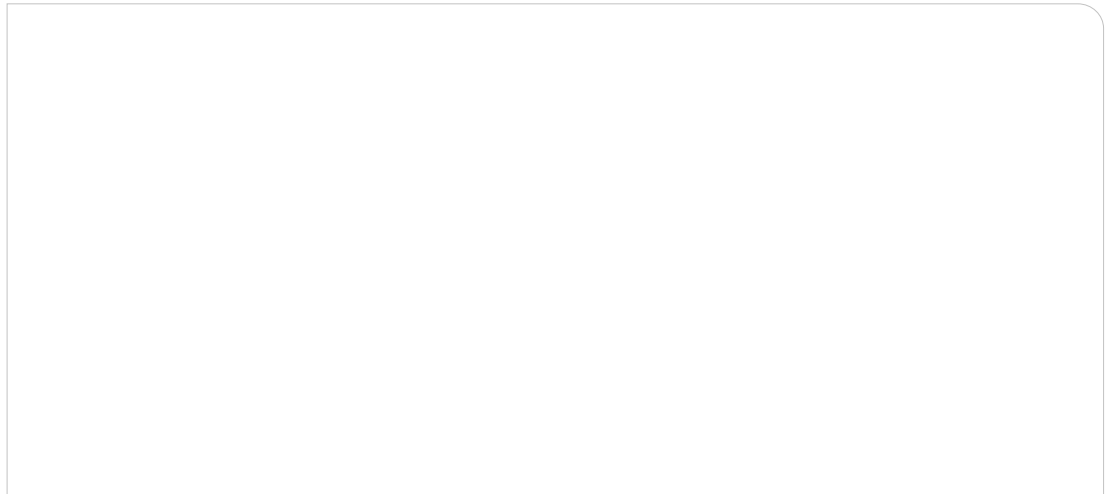
## Imaging Automation



### More Products

MetaSystems is a leading manufacturer of imaging systems and DNA probe kits worldwide. Please contact MetaSystems if you would like to receive information about the following other product lines of MetaSystems:

- ▶ Metafer MSearch Metaphase Finder
- ▶ Metafer MetaCyte for Automated Cell Analysis
- ▶ SlideFeeder, Bar Code Reader and Automated Immersion Oil Application
- ▶ High Quality DNA Probe Kits for Chromosomes and Interphase Nuclei



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