



Metafer and HANABI

Integrated Cytogenetic Workflows

A Standardized Workflow

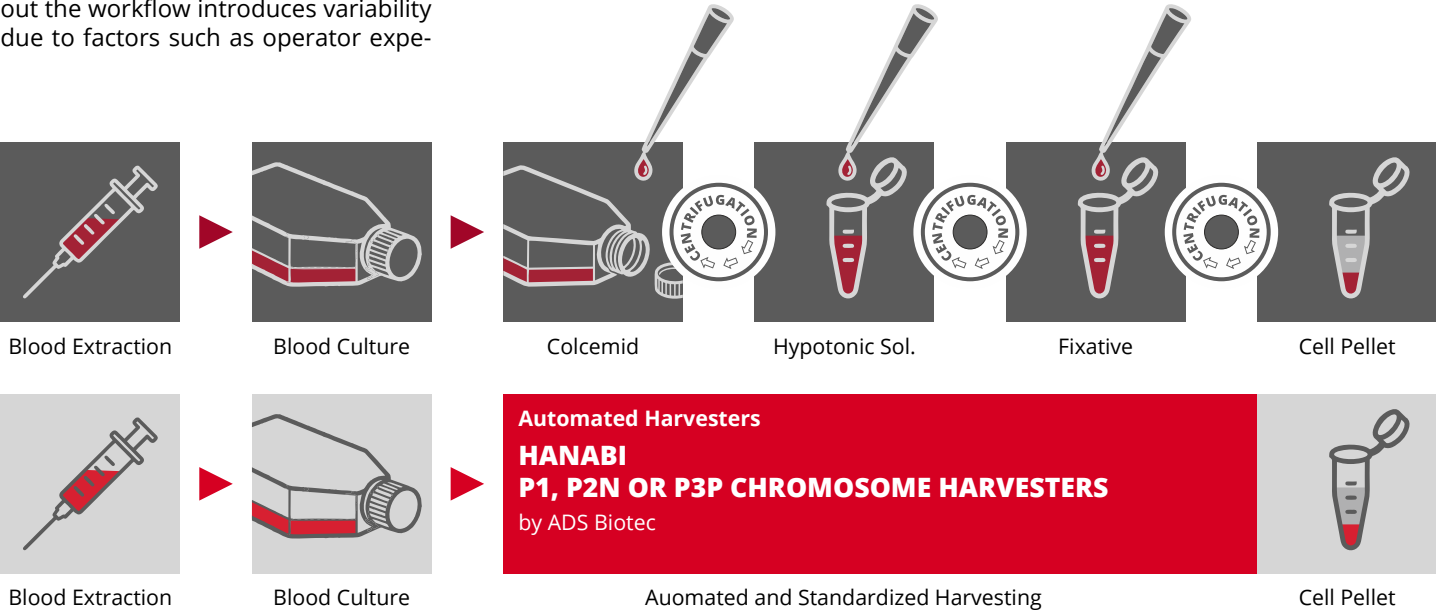
MetaSystems, a leader in automated microscopy solutions, and **ADS Biotec**, a specialist in automated cytogenetic sample preparation, have combined their expertise to deliver a fully integrated workflow for chromosome assessment. By linking ADS Biotec's automated Harvesters, Spreaders, and Stainer with MetaSystems' DNN-powered Metafer imaging platform and Ikaros karyotyping software, laboratories can standardize and accelerate the major steps of the cytogenetic process. Automated specimen preparation minimizes the impact of external variables, while intelligent image acquisition and processing support the rapid generation and evaluation of high-quality karyograms. Barcode-based workflow integration ensures sample tracking and streamlined case management, creating an efficient and highly reproducible solution for modern cytogenetic laboratories.

Manual Workflow

Accurate chromosome analysis depends on a complex series of preparation and evaluation steps, where even small variations can have a significant impact on result quality. Factors such as fixation conditions, slide preparation techniques, and environmental influences can affect chromosome spreading and staining outcomes. In addition, manual handling throughout the workflow introduces variability due to factors such as operator experience,

workload, and fatigue, particularly during the labor-intensive processes of microscopy and karyogram generation. As a result, traditional cytogenetic workflows can be time-consuming and challenging to standardize and reproduce consistently. By integrating HANABI automated chromosome Harvesters, Spreaders,

and Stainer with DNN-based imaging technology and automated karyogram creation software, laboratories can reduce manual intervention, improve standardization, and enhance reproducibility. Automation helps minimize potential sources of error, increases workflow efficiency, the delivery of high-quality, reliable cytogenetic results.



Automated Workflow

Automation offers a powerful way to accelerate and standardize the demanding steps involved in chromosome preparation and analysis. By combining ADS Biotec's HANABI automated chromosome Harvesters, Spreaders, and Stainer with Metafer's DNN-based image acquisition and karyogram generation technologies, a seamless end-to-end workflow is created in which all critical process stages are integrated and automated. This

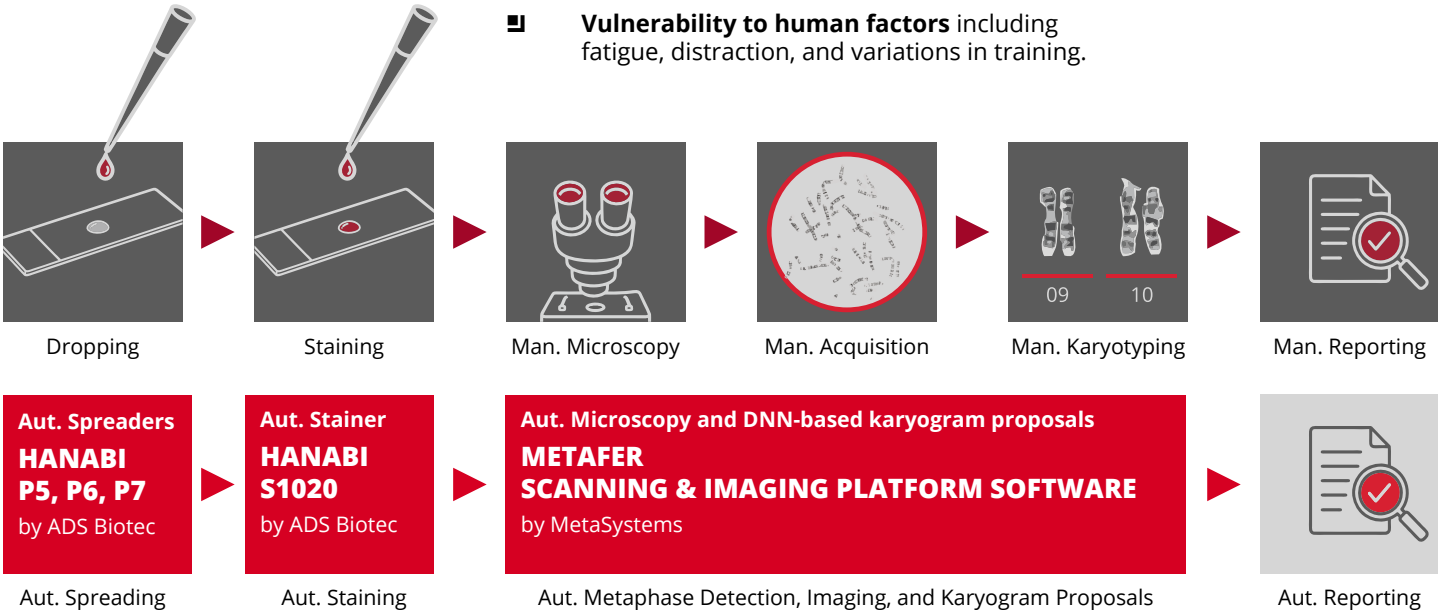
approach delivers a level of consistency, reproducibility, and process control that is difficult to achieve with conventional manual methods.

From cell culture processing through chromosome harvesting, slide preparation, staining, automated metaphase imaging, and karyogram generation, automation reduces reliance on repetitive and labor-intensive tasks. This allows laboratory personnel to focus on

higher-value activities while improving workflow efficiency and throughput. Centralized, barcode-driven sample tracking ensures secure data management and helps prevent errors resulting from sample misidentification. The result is a streamlined, highly standardized cytogenetic workflow that supports reliable, high-quality outcomes, leaving the final interpretation and expert review where it belongs: in the hands of the cytogenetic specialist.

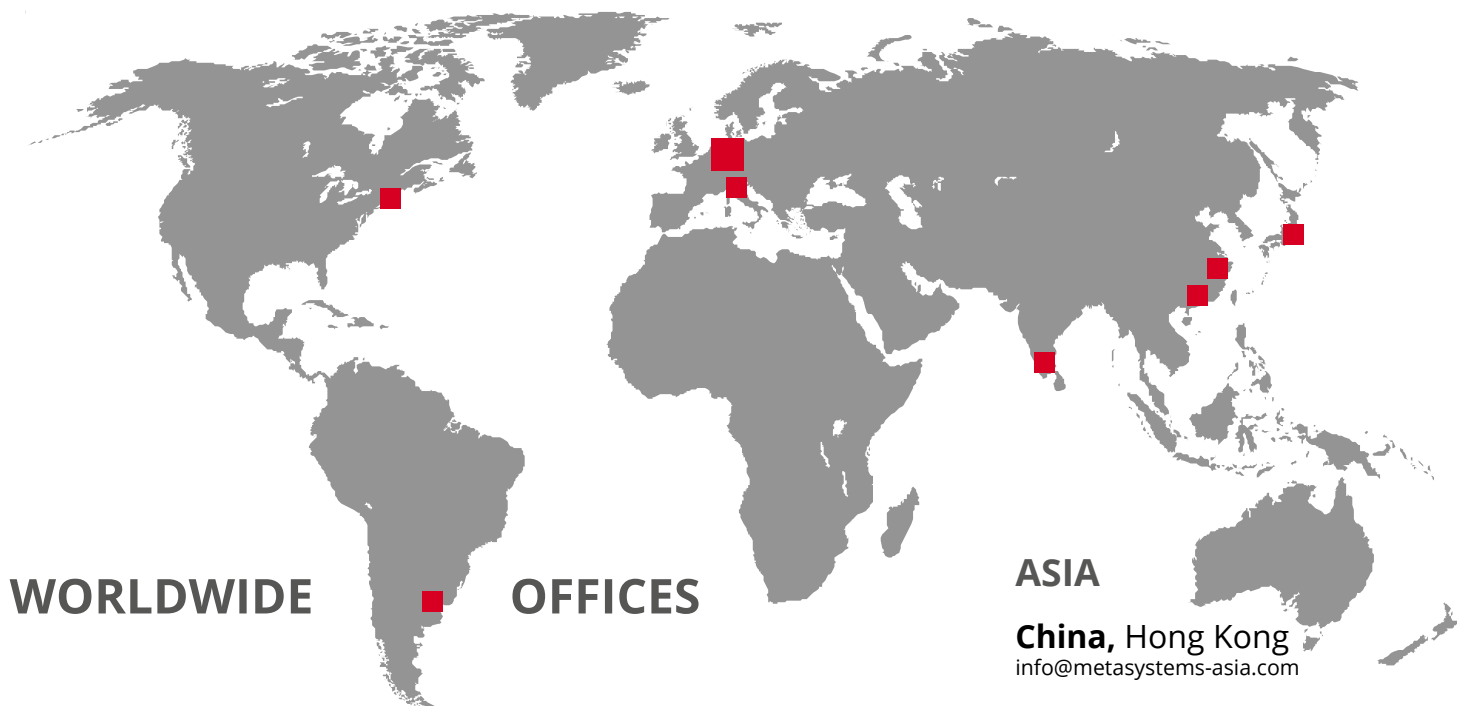
The Obstacles

- **Multiple interdependent manual steps** requiring consistent execution throughout the workflow.
- **Time-consuming and labor-intensive process**, often involving repetitive tasks.
- **Susceptibility to environmental influences** such as temperature, humidity, and other uncontrolled conditions.
- **High dependence on operator skill and experience** for obtaining reliable results.
- **Vulnerability to human factors** including fatigue, distraction, and variations in training.



The Solution

- **End-to-end workflow automation** across chromosome harvesting, spreading, staining, imaging, and karyogram generation.
- **Reduced hands-on time** by minimizing repetitive and labor-intensive manual tasks.
- **Improved standardization** of critical preparation and analysis steps.
- **Reduced influence of environmental and procedural variations** through controlled, automated processes.
- **Barcode-controlled sample and slide tracking** for secure and reliable process management.



WORLDWIDE

OFFICES

AMERICAS

USA, Medford

info@metasystems.org

Argentina, Buenos Aires

info@metasystems-latam.com

EUROPE

Germany, Altlussheim

info@metasystems-international.com

Italy, Milan

info@metasystems-italy.com

ASIA

China, Hong Kong

info@metasystems-asia.com

China, Taizhou

info@metasystems-china.com

India, Bangalore

info@metasystems-india.com

Japan, Tokyo

info@metasystems-japan.com

The described functions refer to the following software versions: Ikaros 6.3 | Metafer 4.3

☐  MetaSystems software and system products are classified as in vitro diagnostic medical devices (IVD) in the European Union in accordance with the Regulation (EU) 2017/746 or Directive 98/79/EC, respectively, and carry the CE label unless otherwise indicated. Use all MetaSystems IVD products only within the scope of their intended purpose.

MetaSystems products are used in many countries worldwide. Depending on the regulations of the respective country or region, some products may not be used for clinical diagnostics.

Some hardware components supplied by other manufacturers are not included in MetaSystems IVD products and are therefore not IVD medical devices.

MetaSystems software provides, among other functions, features to assist users with image processing. These include, but are not limited to, the use of machine and deep learning algorithms for pattern recognition. The output generated in this process should be regarded as preliminary suggestions and, in any case, mandatorily requires review and assessment by trained experts.

MetaSystems offers **Customization Packages** for application workflows that have been successfully implemented for customer labs using standard Metafer platform functionality. It is expected that they can be implemented for other customer labs using similar workflows and slide preparation procedures. If a Customization Package is purchased, MetaSystems product specialists will - based on their experience from other similar application cases - support the customer lab in adapting the Metafer software configuration to their needs. The performance of the solution will depend on the quality of the customer slides and the expertise of the users, MetaSystems cannot specify or guarantee any performance parameters. The validation of the solution for clinical use is the sole responsibility of the customer lab.

CONTACT US

OR YOUR LOCAL
MetaSystems
REPRESENTATIVE



metasystems-international.com

MetaSystems Hard & Software GmbH

Robert-Bosch-Str. 6

68804 Altlussheim | Germany

© 2026 by MetaSystems

Document No. LFL-MS-CytWorkflow-EN-2026-08-01