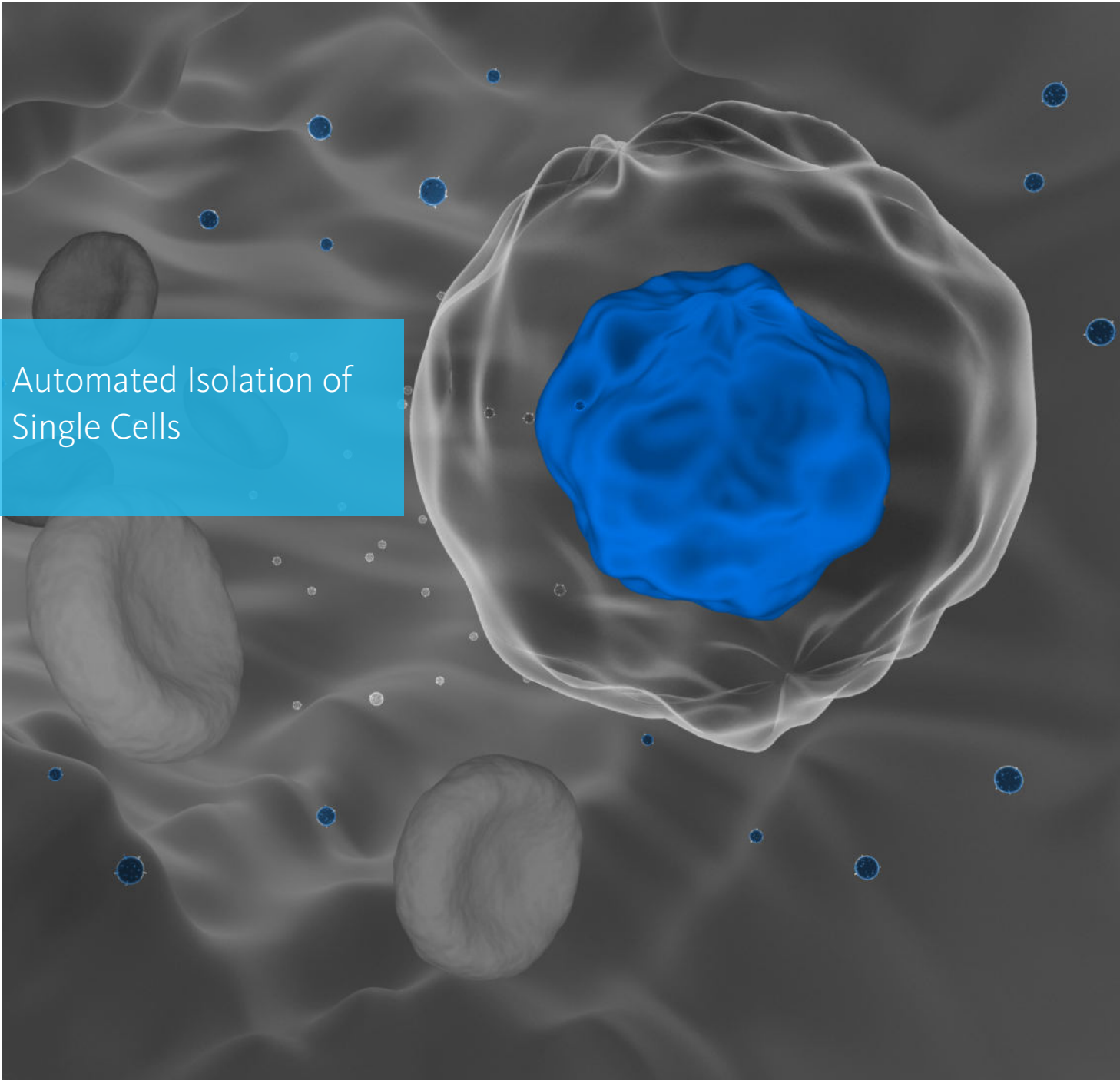


CellEctor

Cell Picking Like a Pro



Automated Isolation of
Single Cells

When Every Cell Counts

MMI CellEctor allows researchers to isolate and manipulate desired cells without the need for complex sorting techniques like Fluorescence-Activated Cell Sorting (FACS). While FACS is efficient for high-throughput sorting based on specific markers, it may not be suitable for certain applications where the target cells are rare or require more precise selection.

Cell picking with the MMI CellEctor provides a viable alternative, enabling researchers to manually choose and collect individual cells of interest. This picking process enables an extremely gentle cell transfer for the highest cell integrity and outgrowth rates after cell transfer.

CellEctor is the most flexible cell picker, compatible with nearly all inverted microscopes, objectives, and all imaging modes. Its modular design ensures compatibility with all MMI systems.

- Upgradeable with CellCut for laser microdissection, CellScan for capturing whole slide images, and CellDetector, an AI for automatic cell detection
- Compatible with various capillaries and with all common slide formats and well plates

Software

- User-friendly CellTools software
- Automatic collection and deposition of cells

High-Precision Stage

- Compatible with a broad range of slides and well-plate formats

Inverted Microscope

- Compatible with almost all inverted microscopes
- All common objectives and imaging modes (e.g. phase contrast and fluorescence)

Picking Module

- Single cell picking module
- Multiple capillaries with different diameters for all cell types



Figure 1:
The MMI CellEctor on the Olympus IX83 inverted microscope. The system is compatible with many microscope brands and models.

Identify | Pick | Deposit

CellEctor will do the rest

Cell picking with the MMI CellEctor gives the user complete control in manual and automated cell identification, acquisition and deposition. The cell picking process is contamination-free and supports a broad range of sample types. The high flexibility of the cell picker enables you to define your own workflow. Just select the wells for cell picking, deposition and rinsing using a wide range of slide-based platforms.

The MMI CellEctor is pre-configured with a broad range of slides and well-plate formats. You can sort cells evenly into a

96-well plate to maximize your throughput. In addition, there are multiple capillaries with different diameters available (from 10 µm – 160 µm). Just use the appropriate capillary for your rare cell type.

- Up to 100% picking transfer efficiency of living or fixed cells
- Isolation of all types of cells using multiple capillaries and all common slides and wells

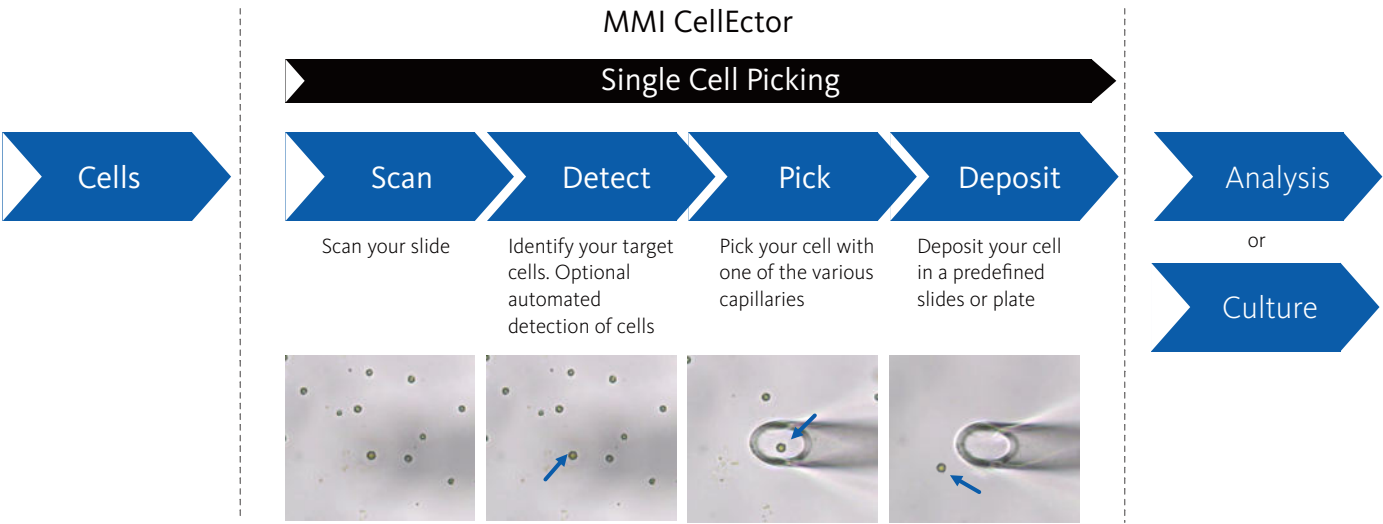
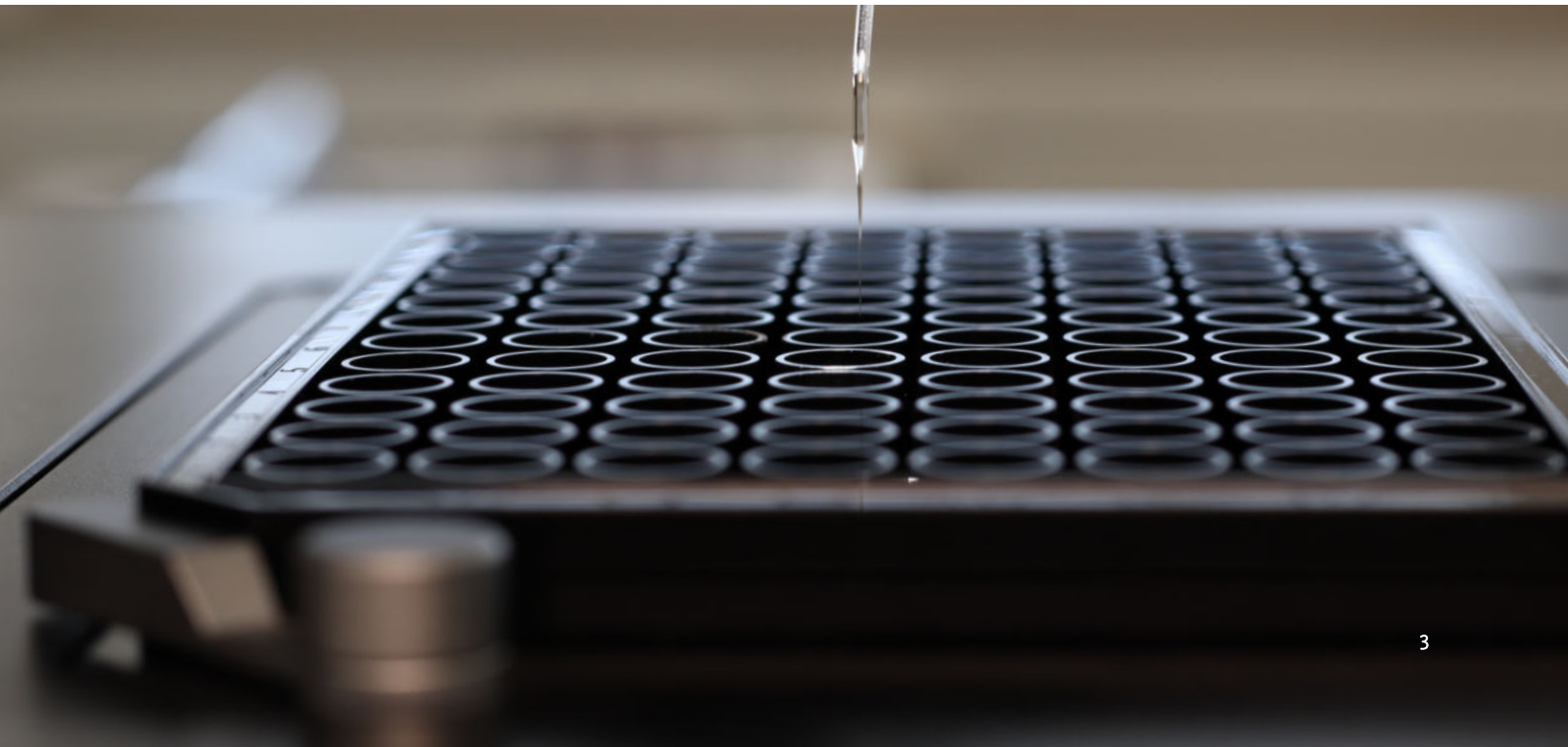


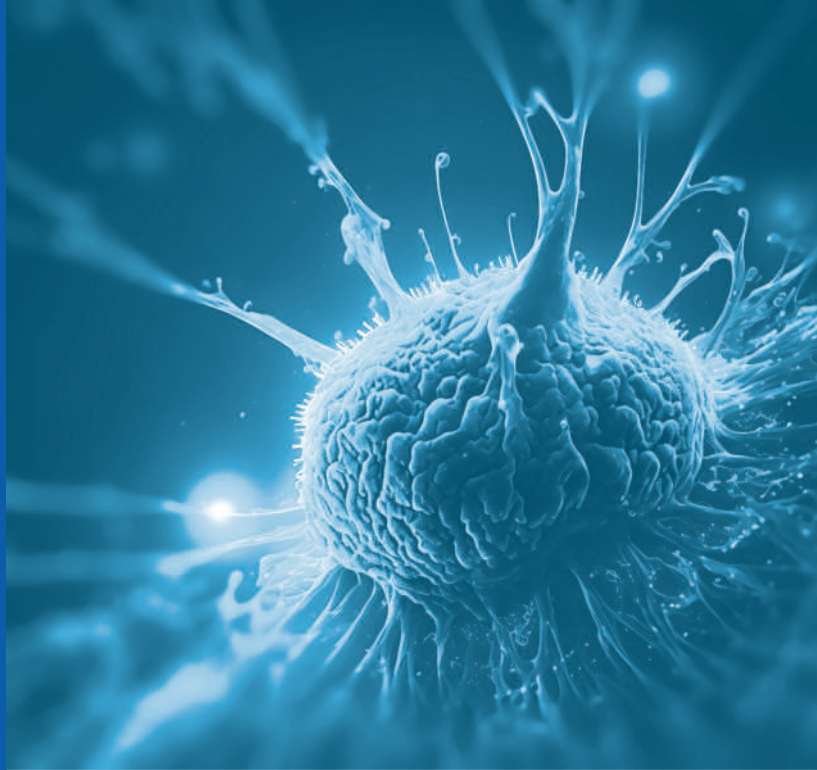
Figure 2: The MMI CellEctor cell picker offers a straightforward workflow, achieving optimal cell picking/transfer efficiency of up to 100% for both live and fixed cells. After picking, the cells can be further analyzed and recultivated.



Circulating Tumor Cells

Circulating tumor cells (CTCs) are cells that have shed into the vasculature or lymphatics from primary tumors and circulated throughout the bodies via the bloodstream. CTCs are believed to embody complete tumor heterogeneity and reflect the mutational burden present in cancerous tumors.

The CellEctor cell picker allows the precise selection of single CTCs for subsequent analysis. Thus, the MMI cell picking system contributes to the development of personalized medicine approaches and non-invasive monitoring of cancer patients.



Cutting-Edge Applications

Validated Applications

Detection and isolation of antibodies
Monitoring of drug response
Cell-to-cell interaction assay
Immune cell killing assay
Cell sorting on a wide range of biochips
Isolation of sedimentary materials
Single cell plasma B-cell screening
Spheroids generation and isolation
Single cell heterogeneity
Analysis of sedimentary particles

Plant material & Unicellular organism

Plant cells
Pollen
Protoplasts
Algae
Protozoa
Bacteria
Diatoms
Yeast

Single Cells

Rare cells
Circulating tumor cells (CTCs)
Epithelial tumor cells (CETCs)
Sperm cells
Stem cells
Beads and other small particles
Living adherent cells
Cells in suspension
Primary cell lines

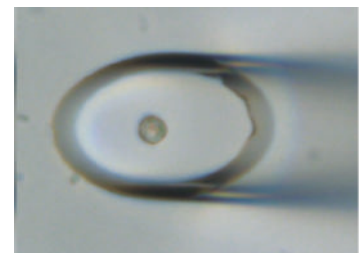
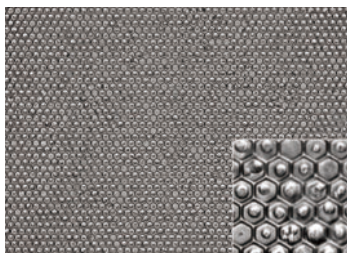


Figure 3:

Left: Generation of spheroid from A549 cells cultured in SIEVEWELL slide for subsequent isolation. Middle: Isolation of a pollen from marine sediment. Right: Isolation of a epCAM positive circulating epithelial tumor cell.

Automated Cell Detection

Update the CellEctor with the MMI CellDetector. CellDetector is an AI analysis software that automatically detects rare cells from any sample based on their color (fluorescence), morphology and relative size.

Automated cell detection with CellDetector eliminates the need for time-consuming manual searching and therefore ensures optimal work efficiency.

The image shows the detection of sperm cells from a vaginal swab for DNA profiling. This approach is of interest when considering multiple perpetrators.



Your Key Benefits – MMI CellEctor



Your defined Liquid Handling

Full optical control of your own workflow for single cell isolation in suspensions. Compatible with a wide range of slide-based platforms.



Unmatched Precision that boost your Downstream Success

Enhance your downstream success with a high-precision microfluidic cell-picking robot for gentle cell transfer, ensuring the highest cell integrity and growth rates after cell transfer. Up to 100% picking/transfer efficiency of living or fixed cells.



Increase your Efficiency with Automated Cell Detection and Picking

Use the optional MMI CellDetector AI analysis software to detect and isolate fully automated rare cells, based on size, shape and color (fluorescence). This enhances workflow efficiency, saving valuable time and resources.



Most Flexible Cell Picking System for all your Applications

Enjoy maximum flexibility for your application and use almost all inverted microscopes and objectives, along with all common imaging modes. Effective isolation of all types of cells using multiple capillaries.



Isolation of Single Cells like a Pro

With the intuitive and flexible MMI CellTools analysis software you achieve accurate and precise cell isolation and depositions. Cell picking was never so easy.



Modularity for Expanding Capabilities

CellEctor cell picker is expandable with all other MMI solutions: Laser microdissection (CellCut), whole slide imaging (CellScan), automated cell detection (CellDetector) and optical trapping (CellManipulator). This versatility enables customized configurations for your specific research needs.

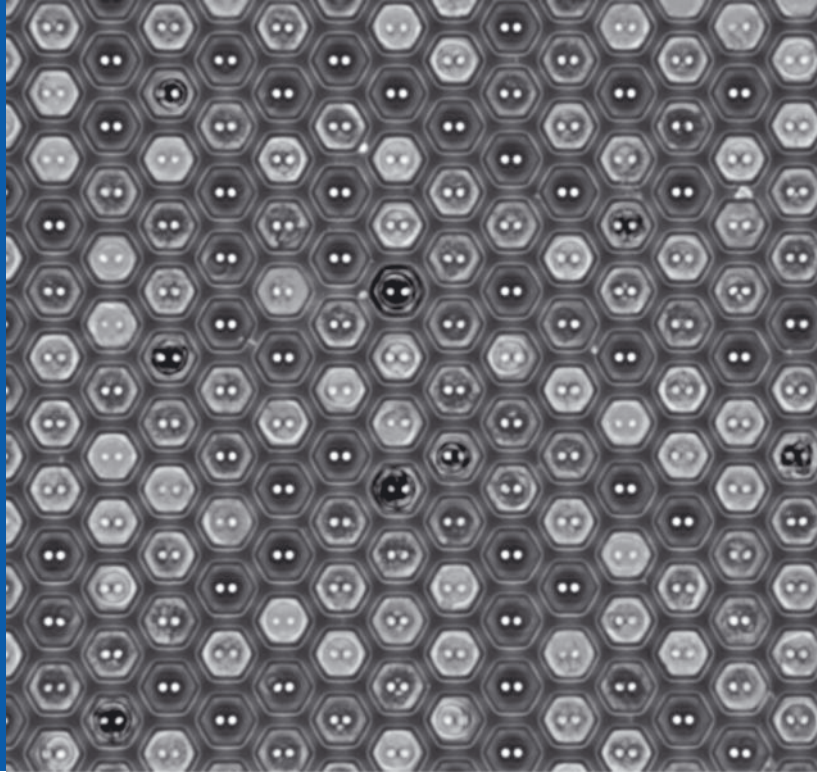


Cross-contamination Control

Effective cross-contamination control ensures no cellular carryover between wells and slides.

SIEVEWELL Nanowells

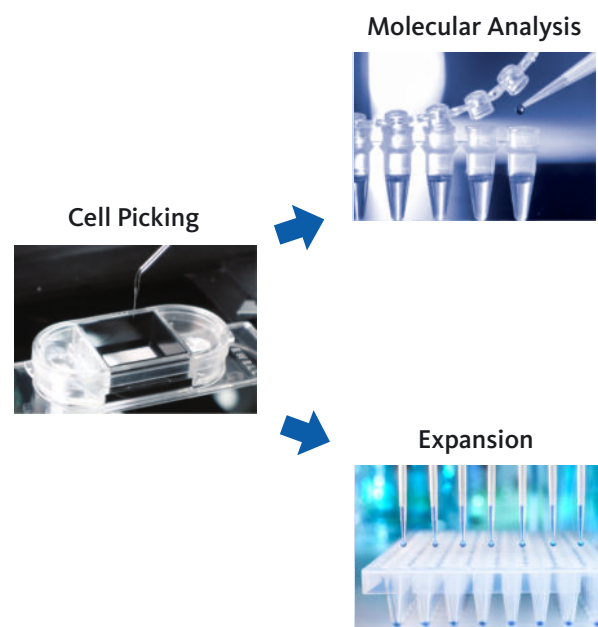
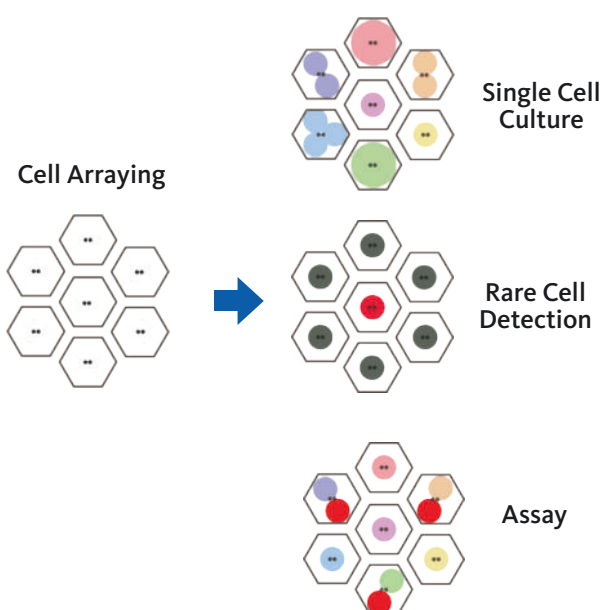
SIEVEWELL chips are a new generation of nanowell arrays. Each nanowell contains two micropores at the bottom, connected to a small liquid gap beneath. This design captures cells within the nanowells and creates a one-directional flow from the top of the liquid chamber, through the pores, into the liquid gap below. This allows for the separation and capture of single cells, as well as direct processing within the nanowells – such as antibody labelling, staining, and washing – without any cell loss. The SIEVEWELL nanowells ensures efficient handling of rare single-cell applications like isolating circulating tumor cells, fetal cells, and more.



Never lose a cell again

SIEVEWELL nanowells provide an ideal combination with the CellEctor cell picker, enhancing the precision and efficiency of cell selection processes. This synergy is not limited to the picking of single cells; it also extends to the collection of spheroids generated from single cells and cells of interest post-assay. The integration of SIEVEWELL nanowells with the CellEctor system facilitates meticulous handling and selection, making it a powerful tool for a variety of cell-based applications.

- 2x nanowell sizes: 20 μm (370,000 nanowells) and 50 μm (90,000 nanowells)
- Hexagonal configuration of the nanowells is perfectly suited for automated cell detection and counting
- Two pores are positioned at the bottom of the nanowell, ensuring that only a single cell can enter each nanowell



Arraying Cell at High-Density

Seeding cells at low density is a strategy to prevent cell overlap during single cell imaging. However, this approach necessitates additional glass slides, microplates, and reagents, as well as increased time for capturing and analyzing images to identify cells of interest. The SIEVEWELL nanowells are densely packed into a 17 x 17 mm area (equivalent to 1/3 of a standard glass slide). This design minimizes the need for numerous glass slides or microplates, thereby reducing the time required for image acquisition.

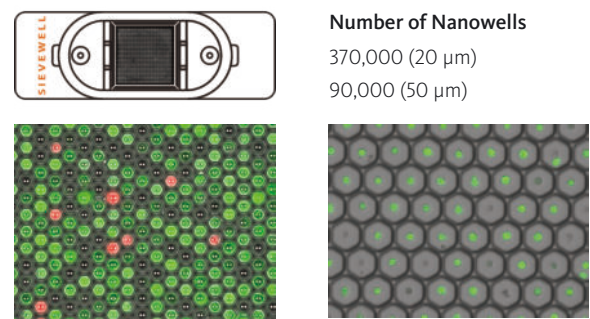


Figure 4:
Left: 20 µm nanowell. Right: 50 µm nanowell

On-Chip Staining

Cell staining is a common procedure used to observe cells and their components under a microscope. Traditional methods involve several steps of transferring or washing during staining, which can potentially lead to the loss of rare cell populations like circulating tumor cells. The SIEVEWELL pore size is smaller than typical mammalian cells, which helps minimize cell loss during on-chip staining processes such as fixation, permeabilization, blocking, incubation, and washing.

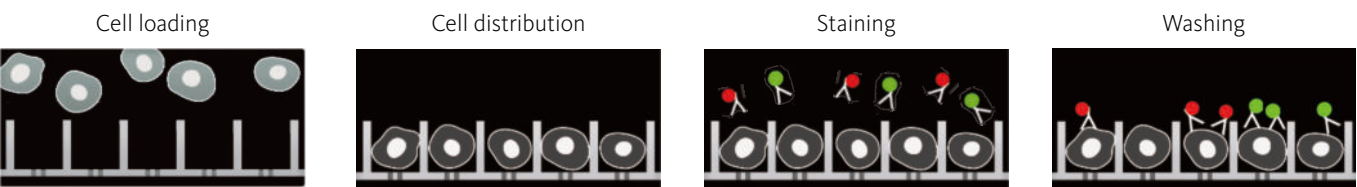
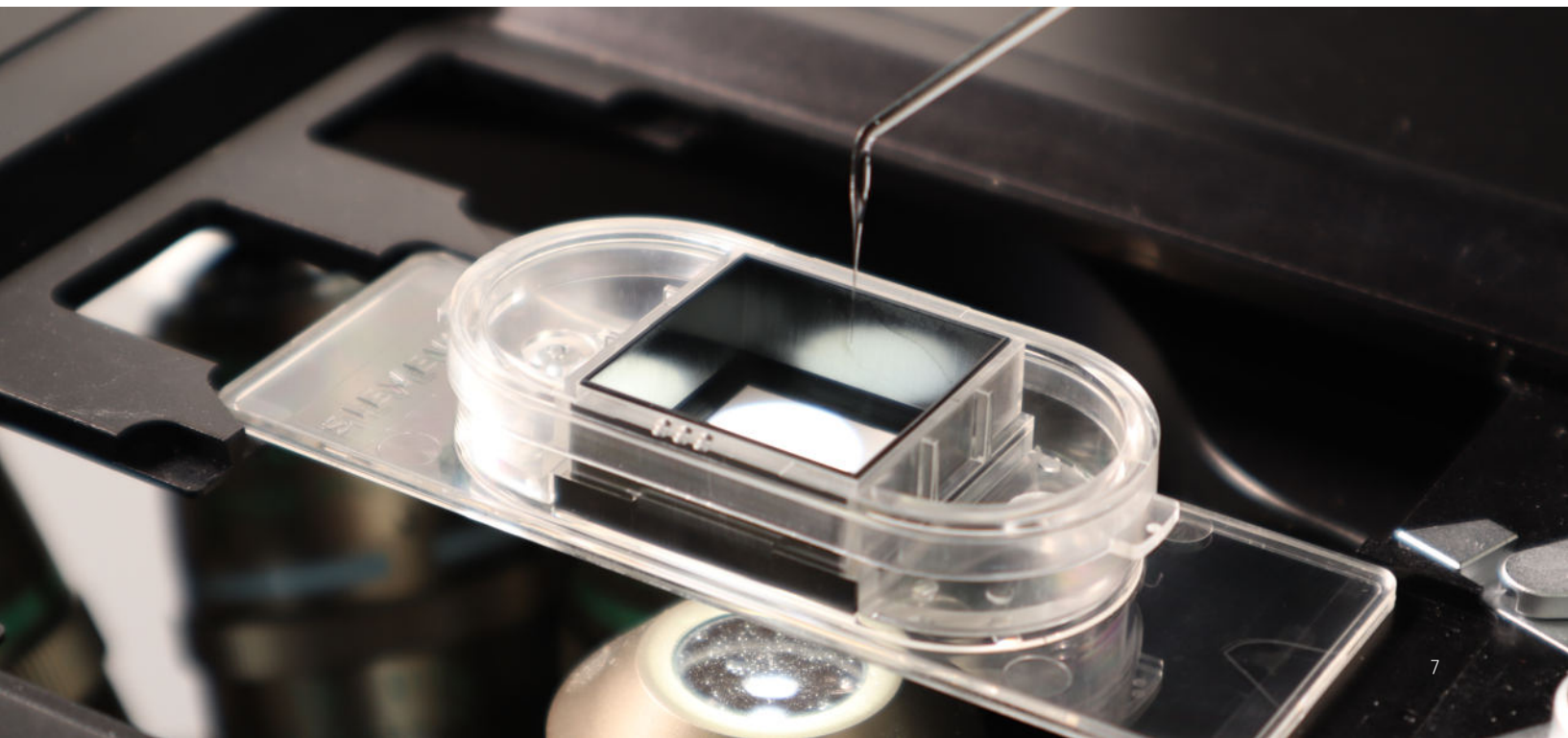
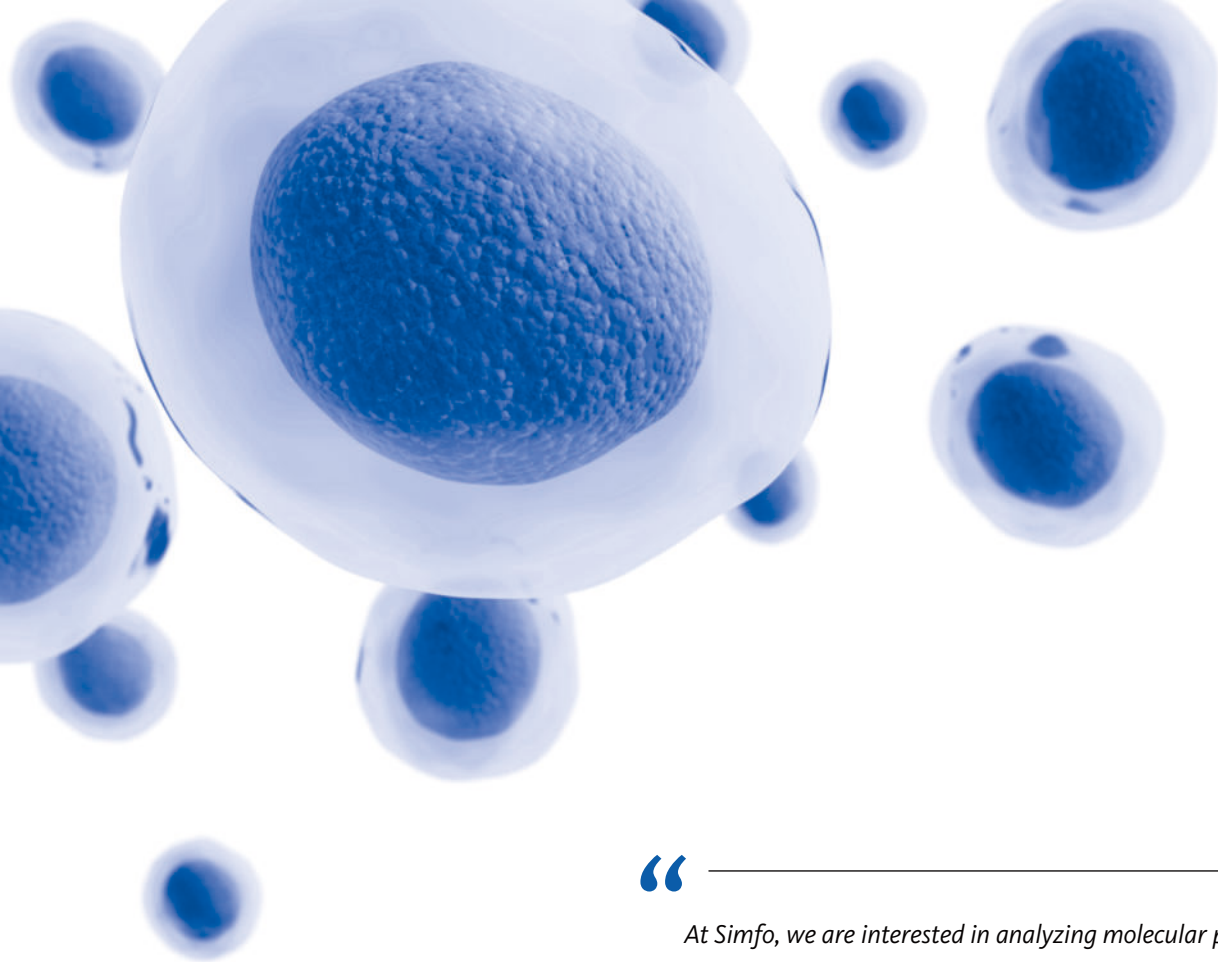


Figure 5:
Workflow for On-Chip Staining with SIEVEWELL nanowells





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At Simfo, we are interested in analyzing molecular profile of circulating tumor cells (CTCs).

The MMI CellEctor cell picker instrument allows us to precisely select single CTCs from patient samples in order to individually analyze their genomic integrity – an important pre-requisite for our research.

Well done MMI!



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