

CUSTOMER SUCCESS STORY

Improving hiPSC Colony Outgrowth: How the UP.SIGHT™ Supports High-Quality Stem Cell Lines at LUMC

CYTENA 

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Leiden University
Medical Center

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The Leiden hiPSC Centre supports biomedical research by offering a comprehensive range of human induced pluripotent cell (hiPSC) services to the scientific community. Committed to accelerate progress in human health, the Centre offers expert support in isolating and reprogramming of somatic cells to hiPSCs, genetic modification of hiPSCs with CRISPR/Cas9, project consultation and training. Its diverse collection of well-characterized hiPSC lines from healthy donors and genetically modified derivatives offers researchers a reliable platform to explore disease mechanisms, study human development and develop new therapies.

» Industry

University Medical Center/ Academia/
Non-profit service facility

» CYTENA Instruments in Use

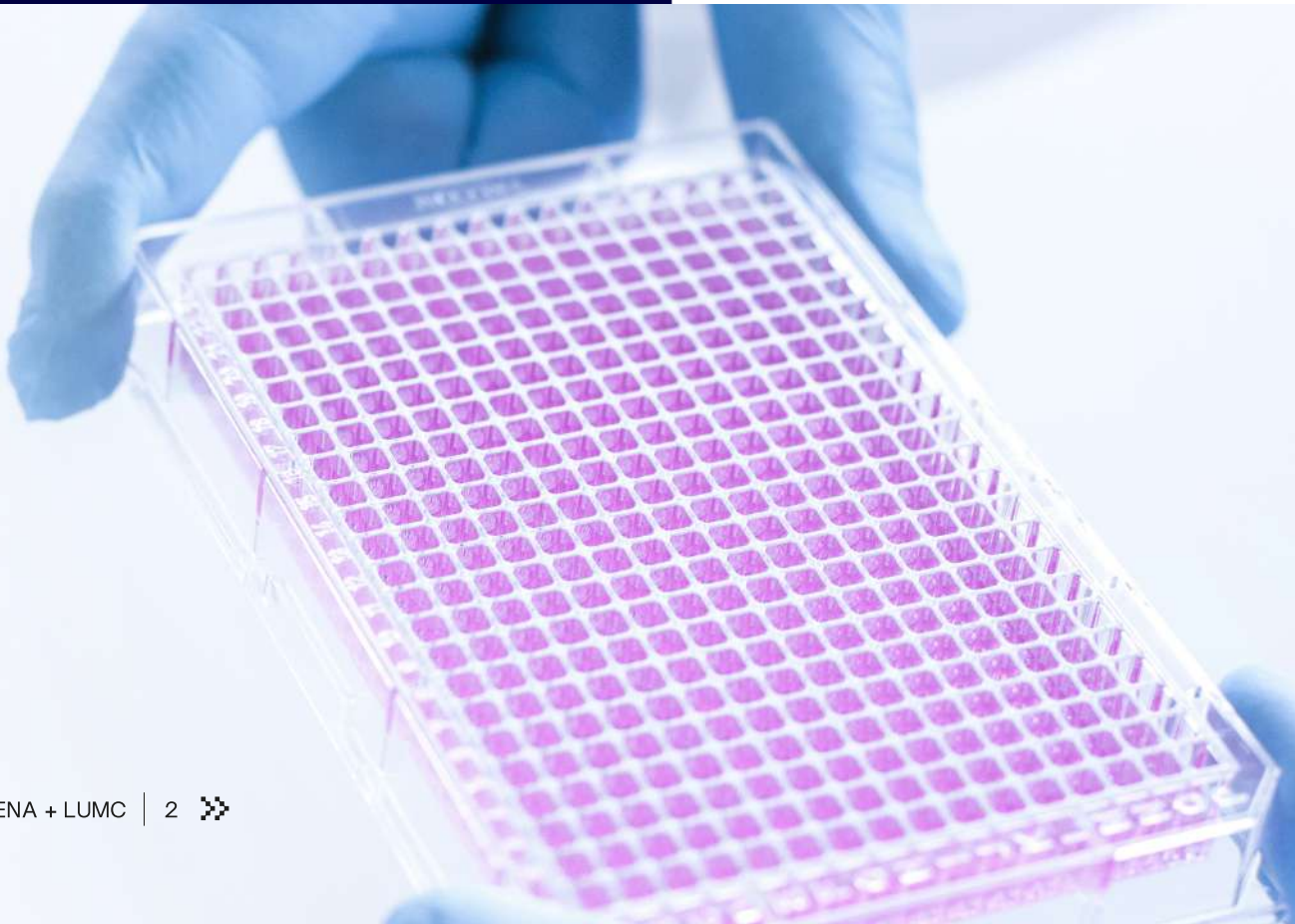
UP.SIGHT™

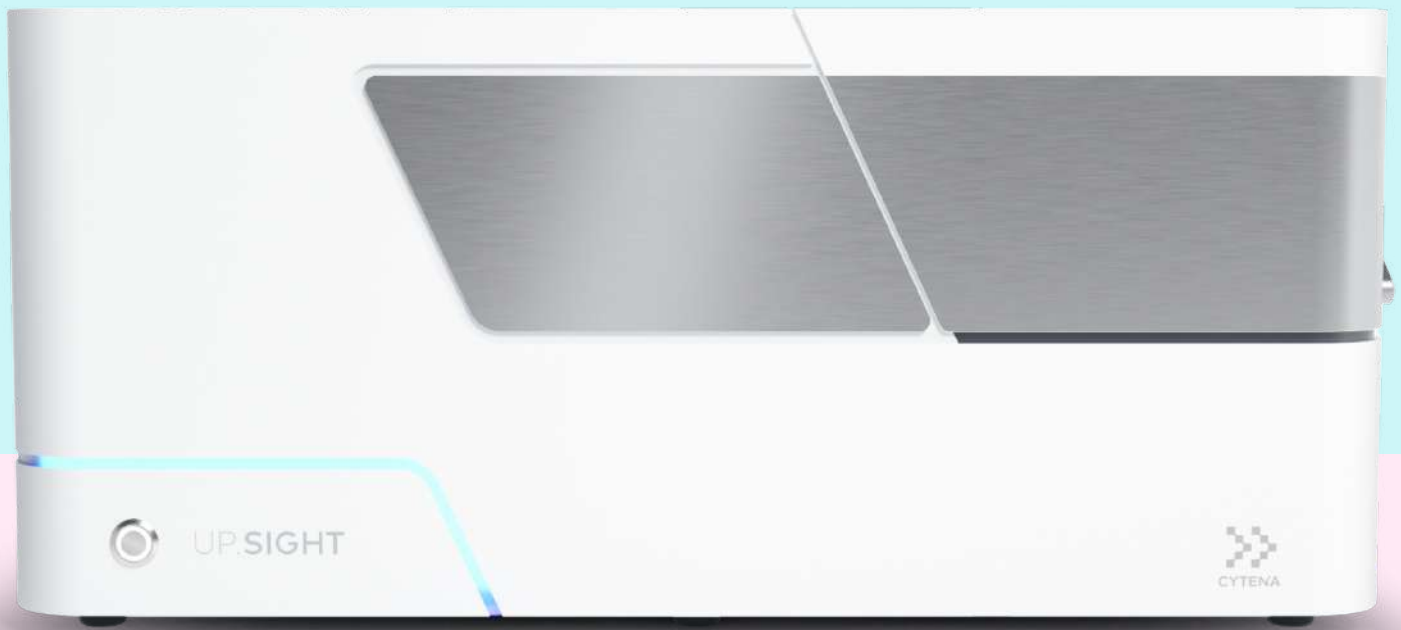
» Using CYTENA Products Since

2024

» Cell Types

iPSCs





Key Results

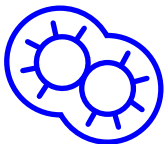


40-60%

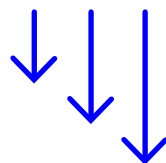
Colony outgrowth



Verified true
monoclonality
of hiPSC lines



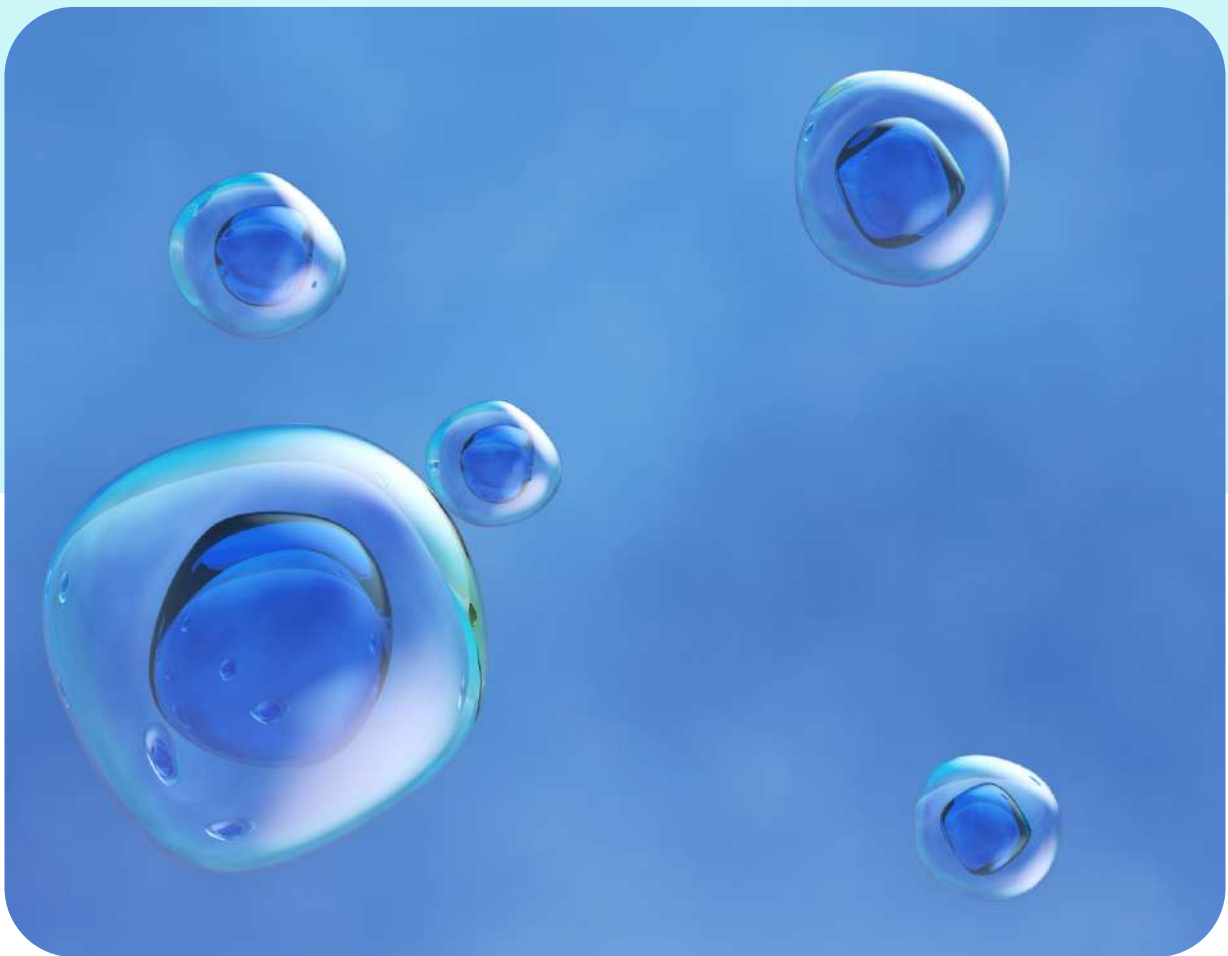
Improved survival
rates during and after
single-cell cloning



Reduced hands-on
time and lower
consumable usage

BACKGROUND

For researchers working with hiPSCs, ensuring the reliability of results is crucial especially in applications like disease modeling, drug testing, and therapy development. A key factor of this reliability comes from clonality, meaning the cell line must originate from a single, genetically uniform cell. Yet, achieving true monoclonality is no small feat.



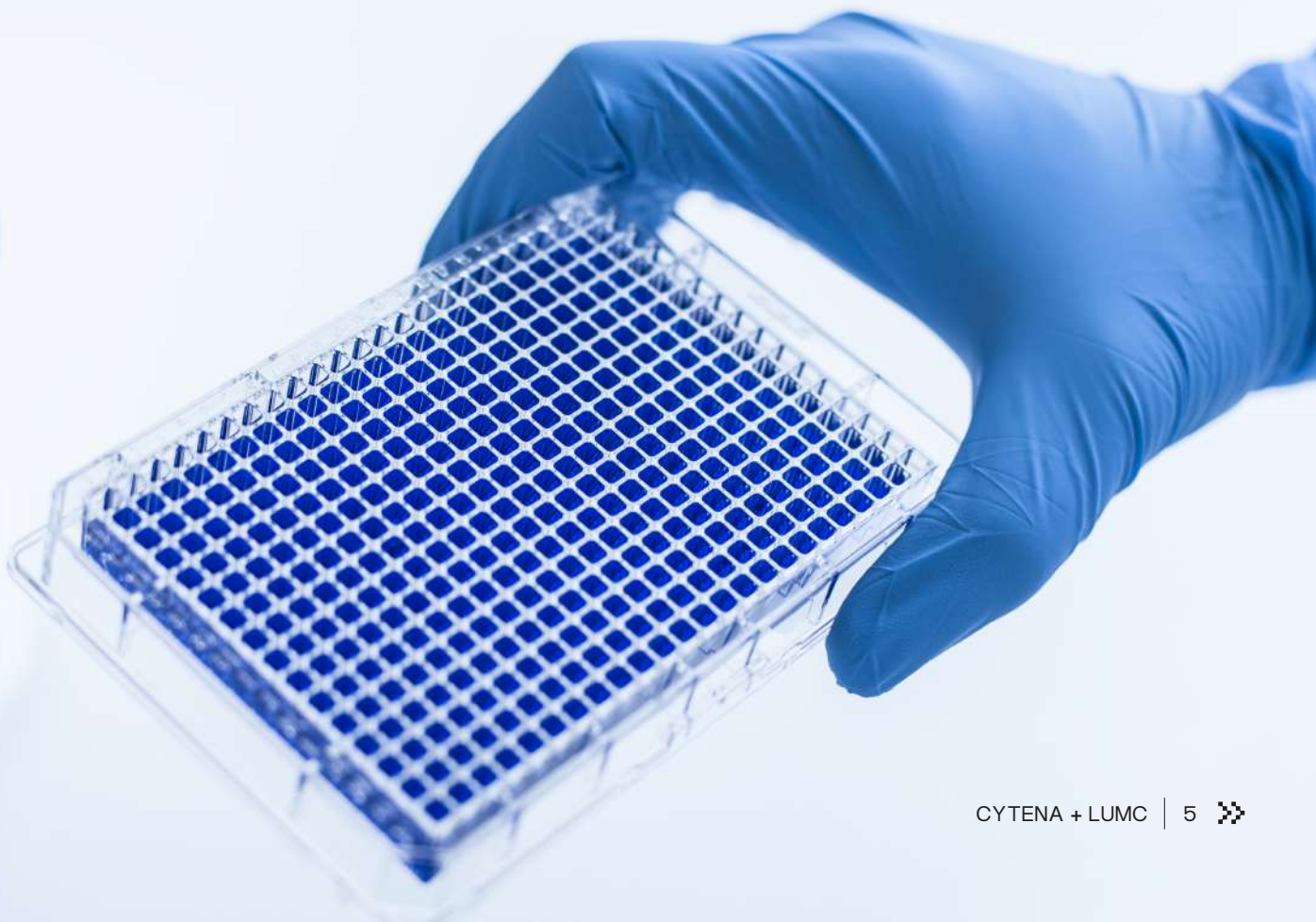
Traditional methods like limiting dilution are time-consuming, labor-intensive, and often fail to guarantee clonality. This can lead to mixed populations and could compromise the reproducibility and accuracy of downstream experiments. Moreover, hiPSCs are highly sensitive to environmental stress, making them difficult to handle and prone to low survival rates during cloning. Overcoming these challenges is vital for producing reliable, high-quality cell lines that can support robust scientific discoveries and therapeutic advancements.

CHALLENGE

At the Leiden hiPSC Centre, these challenges were all too familiar. The team frequently encountered a limited number of clones available for downstream analysis, which restricted their ability to identify successful edits. Even when clones were obtained, ensuring true monoclonality proved difficult. In some cases, concerns were raised about the purity of the population.

Originally, manual cloning using 10 cm dishes or 96-well plates was performed. While generally this produced sufficient clones, clonality could not be guaranteed and the procedure was quite labour intensive. Alternative methods such as Fluorescence-Activated Cell sorting (FACS) proved logistically challenging and required cell culture in a quarantine lab post sort. Alternative single-cell dispensers were tested, but they proved difficult to operate and still failed to yield a sufficient number of viable clones.

The team knew a better solution was needed, but it was not until they received a grant for Large Scale Research Infrastructure from the Dutch Research Council (NWO) that they were able to act.



SOLUTION

After a thorough evaluation of five different single-cell cloning systems, the Leiden hiPSC Centre selected the UP.SIGHT™ for its unique combination of precise single-cell dispensing and dual imaging technology. This enables both efficient isolation of individual cells and confident verification of clonality.



SOLUTION

The UP.SIGHT™'s sterile, single-use cartridges eliminate cross-contamination risks, while features like fluorescent sorting and cell focusing technology reduces cell loss. The integrated C.STUDIO software provides real-time data tracking and streamlines decision-making. The ability to integrate the instrument into a fully automated cell culture setup was also a key factor in the decision.

Since its installation, the UP.SIGHT™ has become an indispensable component of the lab's workflow. Following CRISPR/Cas9 treatment, cells are cloned using the device, resulting in hiPSC lines with true monoclonality and high survival rates.

- ✓ High-confidence verification of monoclonality through dual imaging
- ✓ Minimized cell loss thanks to fluorescent sorting and cell focusing
- ✓ Streamlined decision-making with real-time data tracking in C.STUDIO
- ✓ Improved survival rates of hiPSCs during cloning
- ✓ Seamless integration into automated cell culture workflows



IMPACT

After integrating the UP.SIGHT™ into the workflow, the team sees a significant increase in colony outgrowth, with rates rising to 40-60%, compared to just 30% with previous methods like flow cytometry.

With C.STUDIO's real time tracking of colony confluency, the team is able to make faster and more precise decisions about which clones to expand, saving time and consumables.

The intuitive interface and minimal training requirements also mean that the UP.SIGHT™ can be used by researchers of other departments, who similarly reported improved survival rates and great confidence in clonality.

Reflecting on the impact, Christiaan Arendzen, shared his experience:

"Cloning your hiPSC lines after gene-editing (and potentially after reprogramming) should be standard practice. We would recommend the UP.SIGHT™. With its automation and precision, the system has the potential to become the benchmark for single-cell cloning."

— Christiaan Arendzen, Senior Technician, Leiden hiPSC Centre

GET STARTED

Connect with our experts to
learn more about the UP.SIGHT™.



Book a demo

Check Out The
UP.SIGHT™ 2nd Generation



We create the future of health.



CYTENA, A BICO COMPANY

CYTENA is a leading provider of high-precision instruments for isolating, dispensing, imaging, analyzing and handling biological cells. The company continues to build on the success of the single-cell dispensing technology it patented as a spin-off from the University of Freiburg, Germany, in 2014. Today, as part of BICO, the world's leading bio convergence company, CYTENA's award-winning devices are still manufactured in Germany and used at prestigious academic and pharmaceutical labs around the world to automate workflows in numerous application areas, including stable cell line development, single-cell omics, high-throughput screening and drug discovery. CYTENA's breakthrough innovations for the lab combine advanced automation, state-of-the-art software engineering and the latest insights in cell biology to maximize efficiencies in the life sciences and create the future of health. Learn more at www.cytena.com