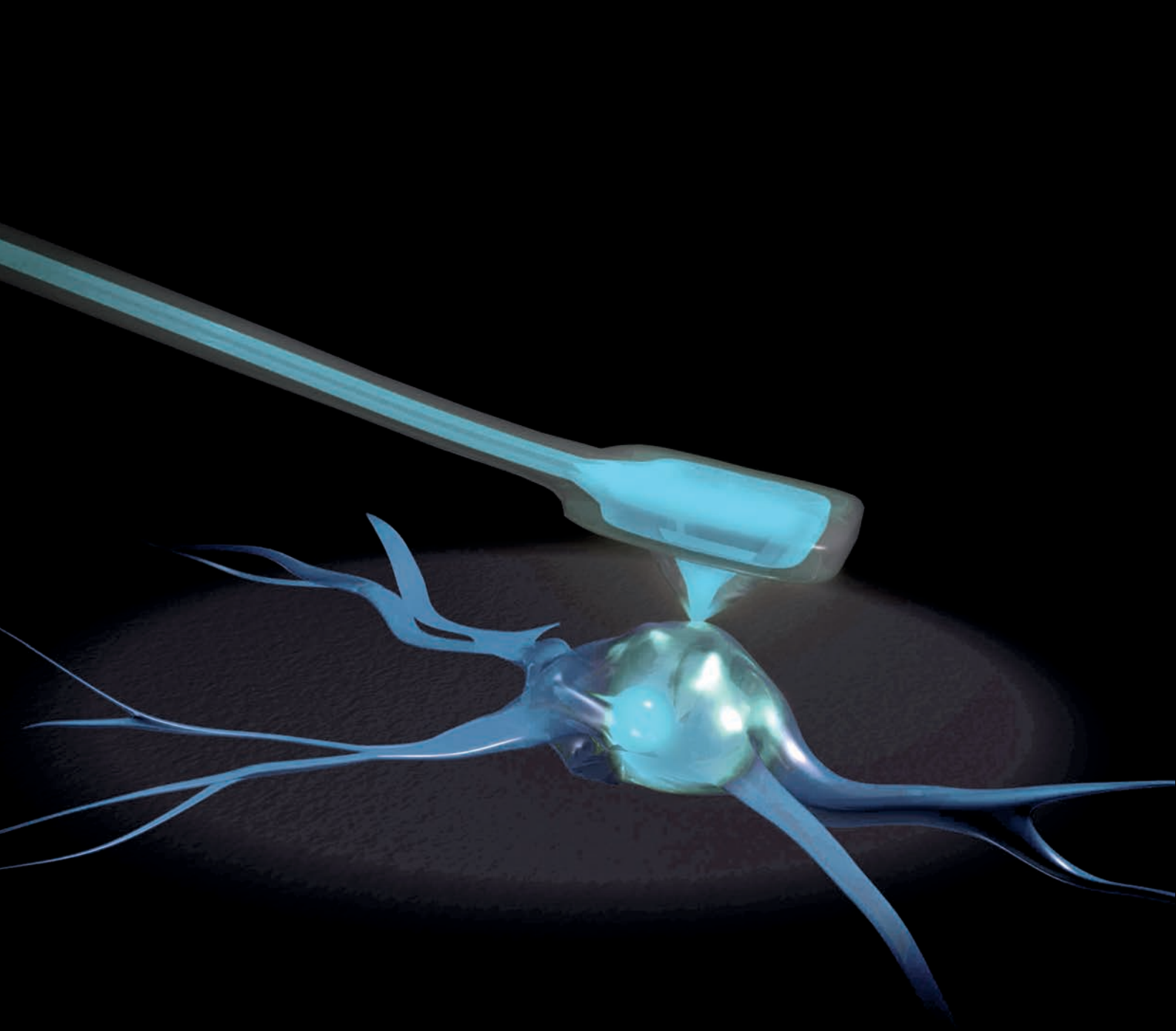
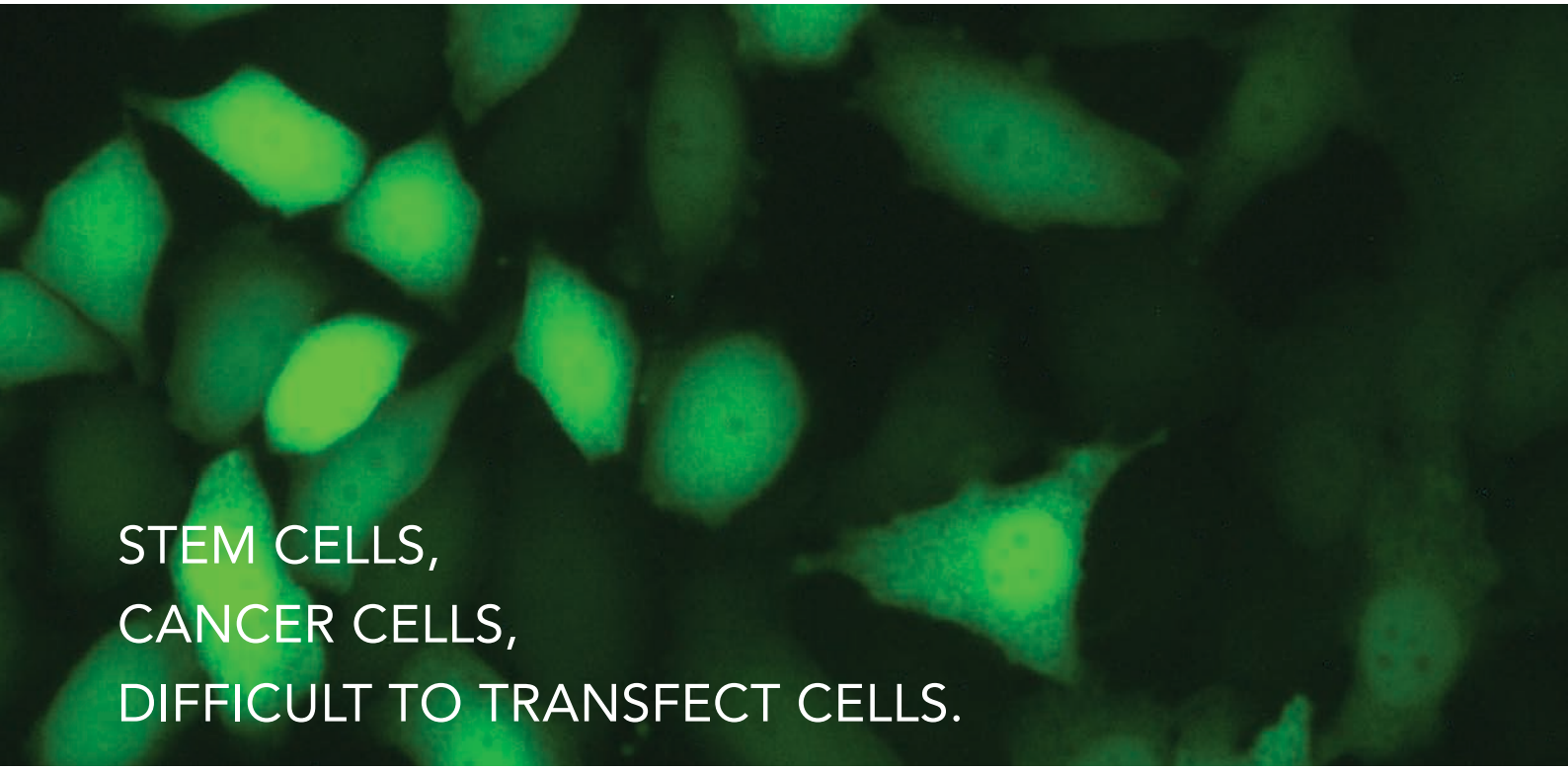
FluidFM® BOT FOR INJECTION INTO ADHERENT CELLS.

FluidFM®
CELL+BIOSCIENCE



FluidFM®
SINGLE CELL EXPERIMENTS
REINVENTED.



STEM CELLS, CANCER CELLS, DIFFICULT TO TRANSFECT CELLS.

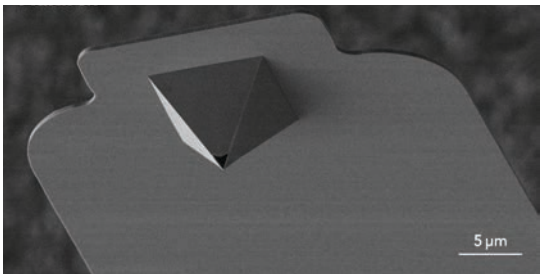
INJECT INTO ADHERENT CELL LINES. Ideal for stem cells, cancer cells and difficult to transfect cells.

A POWERFUL TOOL FOR SINGLE CELL BIOLOGY.

FluidFM® BOT FOR INJECTION

With the FluidFM BOT for Injection into single cells and the newly developed FluidFM nanosyringe, you can perform high-throughput injection of many compounds selectively into either cytoplasms or nuclei of adherent cell lines. This is achieved in a cell-context preserving and non-destructive manner.

Injection using the FluidFM technology is an incredible tool for biologists in cell line or drug development. Particularly, the FluidFM BOT for Injection has been designed specifically to address bottlenecks in the pipelines of drug development and genetic editing at the single cell level.



FluidFM nanosyringe. Newly developed FluidFM nanosyringe with pyramidal tip and nanometer sized aperture.

PRECISE	FAST	GENTLE	MEASURABLE
IN CYTOPLASM OR NUCLEUS	100+ CELLS / HOUR	95%+ CELL VIABILITY	FEMTOLITER INJECTED VOLUMES

ANSWERS TO YOUR RESEARCH QUESTIONS.

The introduction of soluble compounds into selected, single adherent cells through FluidFM injection now allows researchers to answer questions such as:

- How much of a drug is needed inside a cell for the desired effect to be activated (threshold concentration)?
- What is the cell membrane permeability of pharmaceutical compounds?
- How can I perform gene engineering on cells that are hard to transfect?

SELECTED RESEARCH AREAS.

The following research areas can greatly benefit from the unique features of the FluidFM BOT for Injection:

- Gene engineering
- Epigenetics
- Pharmaceutical drug development
- Toxicology
- Stem cell research
- Cancer cell research
- Cell line development

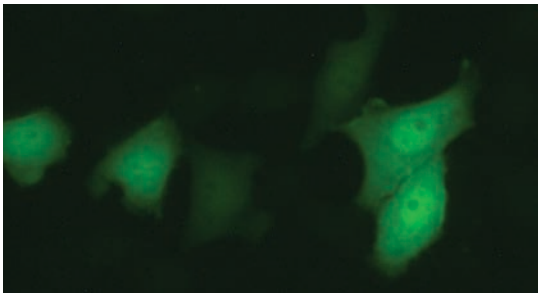
ANY SOLUBLE COMPOUNDS.

FluidFM® – RELIABLE MICROINJECTION

The FluidFM BOT is an unmatched tool to introduce a vast variety of materials of your choice into a cell, effortlessly.

From nanoparticles to proteins, CRISPR RNA, and plasmids, the FluidFM nanosyringe can be loaded with – and thus deliver – virtually any kind of liquid-based solution containing particles below 500 nm in diameter.

Efficiency of the microinjection using FluidFM technology has already been demonstrated in various kind of cell types such as human cervical cancer cells (HeLa), human embryonic kidney cells (HEK) or human induced pluripotent stem cells (hiPS).



INJECTED ADHERENT CELLS. Gentle and fast delivery of soluble compounds to your cells.

SELECTED PUBLICATIONS.

O. Guillaume-Gentil, E. Potthoff, D. Ossola, et al. Force-controlled fluidic injection into single cell nuclei. (2013) Small, 9(11), 1904 — 1907. doi:10.1002/smll.201202276

A. Meister, M. Gabi, P. Behr, et al. FluidFM: Combining atomic force microscopy and nanofluidics in a universal liquid delivery system for single cell applications and beyond. (2009) Nano Letters, 9(6), 2501-2507. doi:10.1021/nl901384x

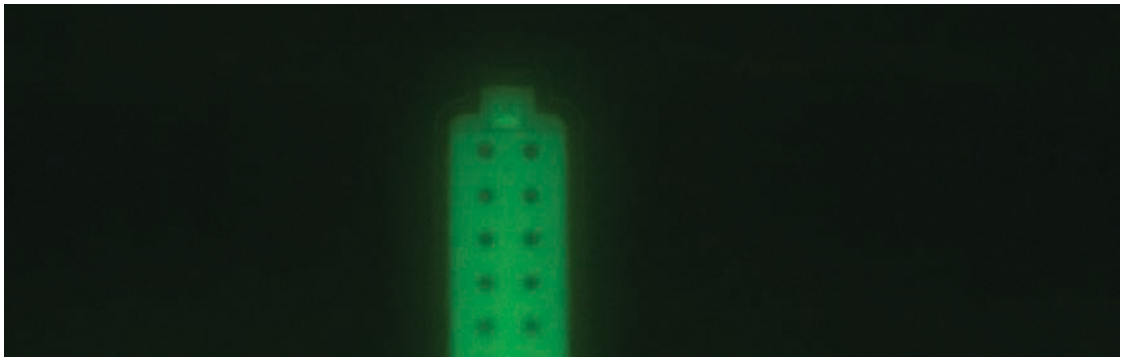
DRUGS
NANOPARTICLES < 500 nm

PROTEINS
ANTIBODIES, CHROMATIN REMODELERS,...

NUCLEIC ACIDS
DNA, RNA, PLASMIDS

DOWN TO FEMTOLITERS.

INJECTED VOLUME ESTIMATION



FluidFM nanosyringe. It gives you the reference volume.

Working with fluorescent compounds, the microfabricated FluidFM nanosyringe serves as a precise reference volume for fluorescence intensity.

Due to manufacturing precision, the constant dimension of the FluidFM nanosyringe allows an accurate estimation of the injected volume for each cell, by measuring the cells fluorescence intensity after injection in comparison with that of the FluidFM nanosyringe.

To facilitate the calculation of the injected volume, we provide an easy to use ImageJ macro. This volume information is key for many experiments, for example when determining a dose-response relationship.

RELIABLE
HIGH MANUFACTURING PRECISION

SIMPLE
IMAGEJ MACRO PROVIDED

PRECISE
FEMTOLITER SCALE

DIRECTLY INTO THE NUCLEUS.

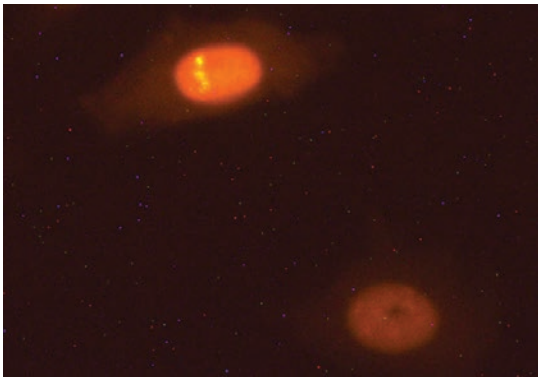
FluidFM® EMPOWERS CRISPR GENE EDITING

Perform fast injection of CRISPR-Cas complexes, even in cell lines difficult to modify with conventional CRISPR delivery methods.

Using the FluidFM BOT for Injection to deliver your CRISPR-Cas complex, you can selectively choose the cell you want to edit within a cell culture. This is performed without affecting the neighboring cells.

Injection time for the complex is only 2 seconds per cell with a gentle 75 mbar pressure corresponding to approximately 30 femtoliters of injected volume.

With FluidFM injection, deliver your CRISPR-Cas complex directly to where it is required: the nucleus.



CRISPR-CAS9 MICROINJECTION. Fluorescently labeled CRISPR-Cas9 ribonucleoprotein complex delivered into HeLa cells nuclei.

SIMPLE
EDIT DIFFICULT TO TRANSFECT CELLS

FAST
2 SECONDS PER CELL

PRECISE
SELECT WHICH CELL TO EDIT

FOR DIFFICULT TO TRANSFECT CELLS.

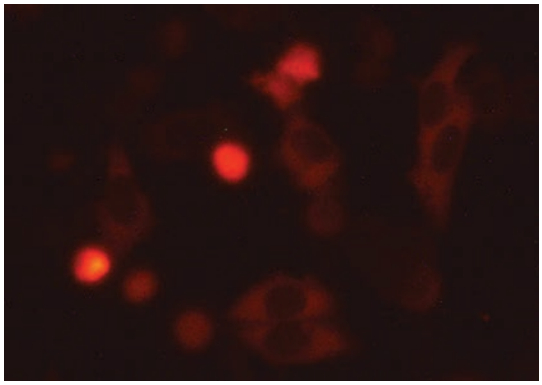
FluidFM® ENHANCES PLASMID TRANSFECTION

Transfection of plasmids through microinjection using FluidFM technology enables the delivery of genetic material even into difficult to transfect cells.

The FluidFM BOT for Injection allows to transfect up to 150 cells per hour, with a transfection efficiency over 80%.

In contrast to conventional transfection methods, no toxic compounds are necessary to allow the DNA vector to enter the cell.

FluidFM injection delivers the genetic material directly into the nucleus, leading to expression of the insert in around 15 hours.



PLASMID INJECTION. pmCherry-TRIM21 expression 16h post-injection.

FAST
UP TO 150 CELLS PER HOUR

RELIABLE
>80% TRANSFECTION EFFICIENCY

CELL FRIENDLY
NO TOXIC COMPOUNDS

AMAZINGLY EASY TO USE.

TOWARDS FULL AUTOMATION

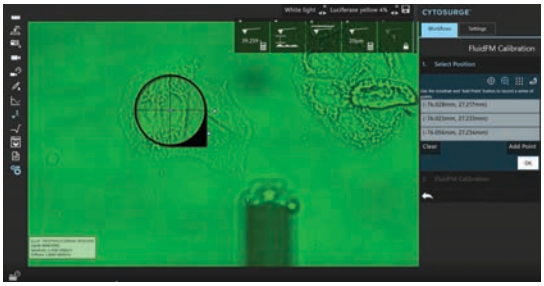
A high definition image of the cells appears on the screen. Simply click with the mouse on the cytoplasm or the nucleus of the targeted cells, and press "OK". It is as simple as that.

Simple preparation, extensive automation and our intuitive FluidFM ARYA operator software allows more or less any user to inject more than a hundred cells per hour. For the injection of Lucifer Yellow dye into HeLa cells, average rates of 100-300 cells per hour can easily be reached.

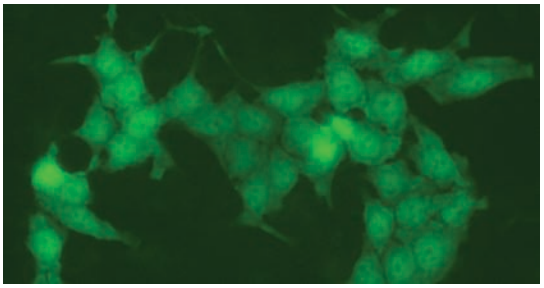
The software-empowered injection specific workflow allows all users to be in full control of their experimental parameters and eliminates worries on the operation of the instrument.

Due to the fully programmable FluidFM nanosyringe exchange and washing features, all experiments are executed in a clean and precise fashion reducing contamination risks and human error to a minimum.

The FluidFM BOT system boosts productivity by minimizing laborious sample swapping and manual intervention during measurements.



FluidFM ARYA OPERATOR SOFTWARE. Simple point and click cell selection.



AUTOMATION BOOSTS YOUR PRODUCTIVITY. Inject over 200 cells per hour.

EASY
INTUITIVE SOFTWARE & WORKFLOW

SIMPLE
POINT & CLICK TO INJECT

INTUITIVE
OPERATIONAL WITHIN HOURS

CELL-CONTEXT PRESERVING AND NON-DESTRUCTIVE.

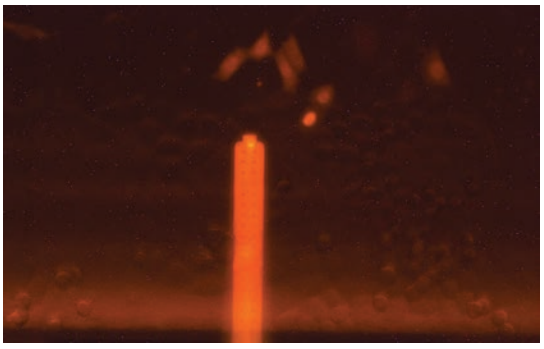
STATE-OF-THE-ART TECHNOLOGY

Conventional microinjection has its limits: these include limited cell viability, time-consuming experiments and difficulties in injecting into "small" adherent cells.

With FluidFM, compounds can be repeatedly injected into the same cell in a cell-context preserving and non-destructive manner, with more than 95% of the injected cells surviving. The injected cells can also be cultivated and analyzed, and their evolution captured over time with the integrated time-lapse and video features.

Only 15 minutes are needed to prepare the cells, the well-plates and the nanosyringes before being able to perform the first series of injections.

The FluidFM nanosyringe is capable of successfully injecting adherent cells of around 10 µm in size, such as iPS cells.



GENTLE MICROINJECTION. Repeatedly inject into the same living cell.

GENTLE
95%+ CELL VIABILITY

TIME SAVING
15 MINUTES PREPARATION TIME

"SMALL"
INJECT INTO CELLS ~ 10 µm

FULLY INTEGRATED SYSTEM.

FluidFM® BOT FOR INJECTION

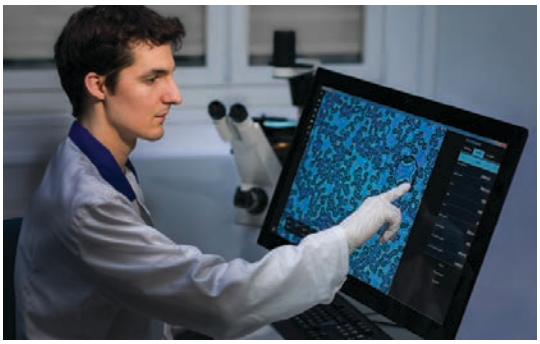
A high level of automation coupled with intuitive instrument operation have proven to be particularly important for injection into single cells.

The FluidFM BOT system takes FluidFM injection to the next level, thanks to the state-of-the-art long-range, high-precision XY-stage, extensive automation and microscope integration.

FluidFM BOT FOR INJECTION. Complete standalone system for microinjection (incubator not shown).

The accompanying FluidFM ARYA operator software has been designed with usability and integrability in mind: from system preparation, through experiment execution to data management.

The FluidFM BOT for Injection is a complete standalone system which includes elements such as a new state-of-the-art microfluidics controller, an inverted microscope, a made-to-measure incubator, an anti-vibration table and a set of FluidFM probes, including the FluidFM nanosyringe.



ARYA. Control your experiments.

STATE-OF-THE-ART
EXTENSIVE AUTOMATION

ARYA
FULL EXPERIMENTAL CONTROL

COMPLETE
STANDALONE SYSTEM

CUTTING EDGE & UNIQUE.

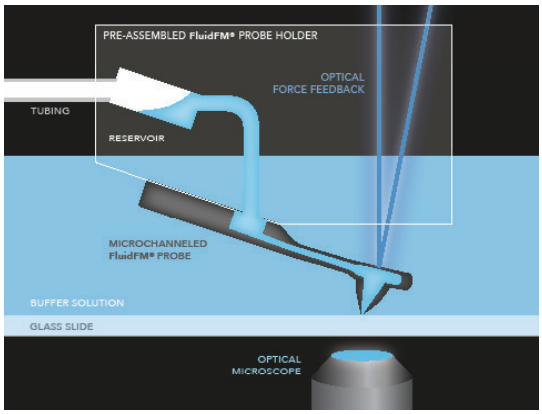
FluidFM® TECHNOLOGY

FluidFM unites the best features of microfluidics and force microscopy by introducing microscopic channels into force sensitive FluidFM probes, such as the FluidFM nanosyringe.

These microfabricated FluidFM probes are at the heart of the patented FluidFM technology. Through the microfluidic channel inside the probes, soluble molecules can be dispensed through a sub-micrometer aperture at the tip.

These apertures can be as small as 300 nm, enabling femtoliter volumes to be handled by accurately controlling positive or negative pressures with 0.2 mbar precision through the probe.

FluidFM technology elevates the application scope of traditional glass micropipettes to new levels.



THE UNIQUE FluidFM® TECHNOLOGY. Synergy of microfluidics and force microscopy.

HIGH QUALITY
MICROFABRICATION

PRECISE
FEMTOLITER LIQUID VOLUMES

VERSATILE
12+ APPLICATIONS

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