Working with scientists to advance single cell research
Introduction
Why choose Nadia?

Nadia Instrument
Nadia Instrument features
Why use high throughput single cell profiling?
Working with single cell profiling
Nadia technology highlights

Nadia Innovate
Nadia Innovate features
Why choose Nadia?

Nadia enables more accessible single cell research, with an easy-to-use, automated, flexible solution - see Nadia Technology Highlights on page 12.

With Nadia Innovate, we hope to nurture a community of customers that will develop and share their newest protocols for single cell research.” Dr Juliane Fischer, Technical Application Specialist
Nadia Instrument
A fully automated, cost-effective high throughput solution for more accessible single cell research.

Nadia Innovate
An open configurable development system for rapid protocol development and optimization.
The Nadia Instrument is an automated, microfluidic droplet-based platform for single cell research that encapsulates up to 8 samples, in parallel, in under 20 mins. Over 50,000 single cells can be captured per cartridge in a run.

The fully automated Nadia Instrument guides users through all relevant steps of the experiment via an easy-to-use touchscreen interface. The Nadia can be used with customer supplied reagents or Dolomite Bio’s scRNA-Seq Reagent Kit.
Benefits

**Automation:** Fully automated sample encapsulation.

**Ease of use:** Automatic detection of application-specific cartridges, touch screen interface and sample loading guide lights.

**Scalability:** Processing capability of up to 8 samples in parallel.

**Temperature control:** Automated sample chilling to maintain transcriptome state.

**Single use cartridge:** Disposable cartridges with no wetted parts to avoid cross contamination.

**Truly single cell:** Ultra low cell doublet rates due to gentle cell agitation.

“Cutting edge single cell techniques just became more accessible.”
Dr Daniel Wong, Head of Biology
Nadia Instrument features

3 independent ultra-smooth pressure pumps each up to 1 bar

Sample temperature control from 4°C to 40°C

Independent gentle stirring of beads and cells prior to encapsulation

Easy-to-use integrated touch screen interface

Step-by-step tutorial software

Disposable cartridges prevent cross contamination

Automatic detection of application-specific cartridges

Compatible with Dolomite Bio’s scRNA-Seq Reagent Kit or customer supplied reagents
Why use high throughput single cell profiling?

Techniques such as high throughput single cell profiling offer the unique capability of obtaining qualitative and quantitative transcriptome information from single cells.

With this technology, single cells from heterogenous samples, including cultured cells, biopsies, blood and other tissues, can be rapidly profiled for quantification of gene expression and identification of specific cells or cell sub-types.

Working with single cell profiling

Sample preparation
Preparation of single cells or nuclei from sample types such as tissues, blood, biopsies, tumours, cultured cells, plants, yeasts or protoplasts.

Microfluidic compartmentalization of cells and capture beads
On a microfluidic chip, thousands of single cells are individually encapsulated together with capture beads.
**Cell lysis and capture**

Inside each droplet, the cells are lysed and the target is captured on a single uniquely barcoded bead. Droplets are collected in the on-chip reservoir.

**First strand cDNA synthesis**

The single cell target sequences captured on the beads are recovered in bulk and reverse transcribed. The resulting bead bound single cell cDNA libraries retain information about their cell of origin.

**Library amplification**

For library preparation, the cDNAs are PCR amplified in bulk. This results in a pool of thousands of single cell cDNA libraries.

**NGS sequencing**

The pooled barcoded cDNA libraries are typically processed with an Illumina Nextera® kit and sequenced using an Illumina® sequencer i.e. HiSeq®4000/2500/NextSeq®/MiSeq®.

**Bioinformatics pipeline**

Data analysis is performed using established data analysis pipelines including sequence alignment, barcode processing, and transcript counting.

**Data visualization**

Data visualization is performed using specialised analysis tools (e.g. Partek Flow) including t-stochastic neighbour embedding (t-SNE).
Nadia technology highlights

The Nadia product family elegantly solves industry-wide single cell profiling challenges by implementing a range of technological innovations.

Pressure pumps
Ultra-smooth pressure pumps for monodisperse droplet formation and superior single capture.

Above: Nadia cartridge chip
Right: Cross-section of the Nadia cartridge chip

Oil and surfactant
Biocompatible oil and emulsion stabiliser for droplet formation.

Filters
On-chip filters for fibre and dust removal for successful encapsulation.
Oil u-bend
Proprietary technology including a novel priming step to ensure highest quality droplet formation.

Capture beads
Beads to capture cellular targets e.g. mRNA.

Cell stirrer
In-built stirrers for gentle cell agitation to minimize cell doublet formation and blockages.

Bead stirrers
Continuous stirring to ensure singulation and an even distribution of beads throughout the encapsulation process.

Guide lights
Sample loading guidelights and touch screen interface to prevent user errors.

Cartridges and chips
Up to 8 chips can be held in one cartridge.

Temperature controller
The in-built temperature controller chills samples to maintain the cell transcription profile and minimize cell doublet formation.

High throughput droplet junction
Over 50,000 single cells can be captured per cartridge in a run. Live junction visualization is enabled when using the Nadia Innovate.
Nadia Innovate

Nadia Innovate enables the development of user-defined single cell protocols and applications. Newly developed protocols can be transferred to the Nadia Instrument for high throughput parallel operation. By allowing users to control parameters such as droplet size, droplet frequency, temperature, agitation and timing, innovation is unlocked.
Benefits

**Flexibility:** Open configurable system to develop new protocols and applications.

**Transferable:** Following optimization, experimental conditions can be transferred and run on the Nadia Instrument.

**Rapid protocol optimization:** User-defined adjustment of droplet size, frequency, droplet components, temperature, and agitation.

**Easy process visualization:** High-speed microscope and camera for real-time droplet formation observation.

**Flexible PC software:** In-run software adjustments to monitor new protocols and protocol adjustments.

“Enabling biologists to develop science in ways not previously possible.”

Dr Muriel Breteau, Technical Applications Specialist
Nadia Innovate features

- Integrated temperature control from 4 – 40°C
- Ability to visualize droplet formation at the junction
- View entire chip when using inverted mode, for visualization of reagent flow during early development
- Integrated stirring of 2 aqueous reservoirs
- Pressure control of 3 independent channels up to 1 bar
- High speed camera to capture droplet formation
- Seamless transfer of newly established protocol parameters to the Nadia Instrument
Get in touch

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Dolomite Bio is working with scientists around the world to develop and advance the field of single cell biology. We aim to make cutting-edge technology and techniques accessible to all, allowing the community to push forward and develop science in this field.

Our latest innovation, Nadia, opens up high throughput single cell research to anyone working in biology. By making this technology readily available, and providing the ability to easily develop new protocols when using the Nadia Innovate, we’re empowering scientists to accelerate single cell research.

“This novel system represents a huge leap forward for single cell research and we’re looking forward to seeing customers unlock its potential.” Mark Gilligan, CEO