

working with scientists  
to advance single cell  
research







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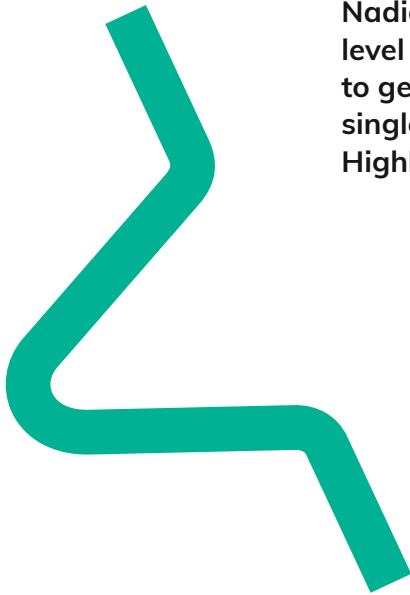
## nadia innovate

Nadia Innovate features



## why choose nadia?

Nadia takes scRNA-Seq to the next level by using automation and flexibility to generate high quality reproducible single cell data – 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.

# nadia instrument

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.





Cutting edge single cell techniques just became more accessible.”

**Dr Daniel Wong, Head of Biology**

## 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.

# nadia instrument features



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



Step-by-step tutorial software



Sample temperature control from 4°C to 40°C



Disposable cartridges prevent cross contamination



Independent gentle stirring of beads and cells prior to encapsulation



Automatic detection of application-specific cartridges



Easy-to-use integrated touch screen interface





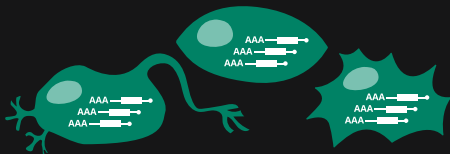
# why use high throughput single cell profiling?

Techniques such as high throughput scRNA-Seq 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.

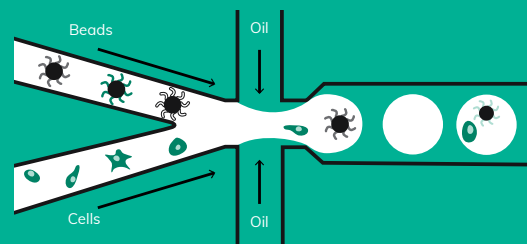
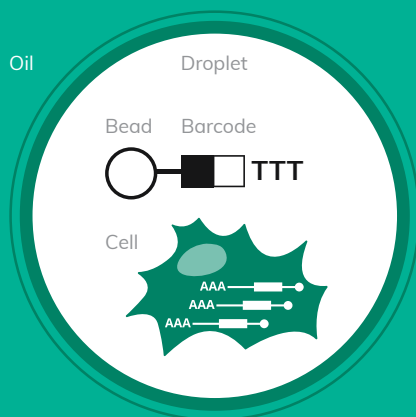
High throughput scRNASeq is also used for profiling paired V(D)J transcripts from B and T cells to identify diversity and clonality in an antibody, or TCR repertoire, and obtain useful insights into immune responses and reactions.

## working with scRNA-Seq



### Sample preparation

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



### Microfluidic compartmentalization of cells and barcoded mRNA capture beads

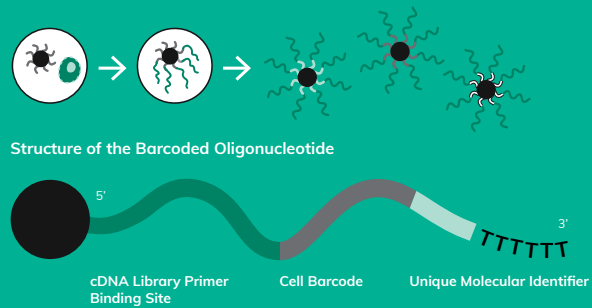
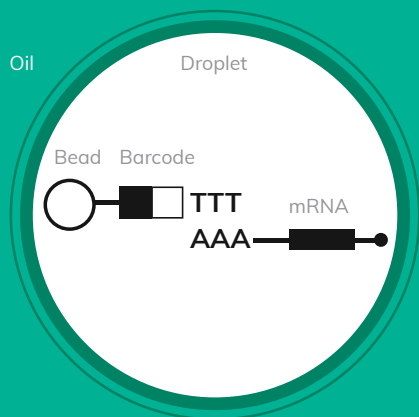
On a microfluidic chip, thousands of single cells are individually encapsulated together with barcoded oligo beads.

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Upstream

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Nadia Instrument



### Cell lysis and mRNA capture

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

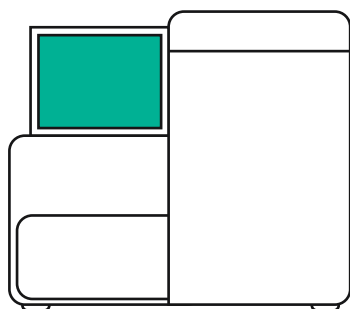


### First strand cDNA synthesis

The single cell mRNAs captured on the beads are recovered in bulk and reverse transcribed. The resulting bead bound single cell cDNA libraries are uniquely barcoded based on their cell origin.

### Library amplification

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



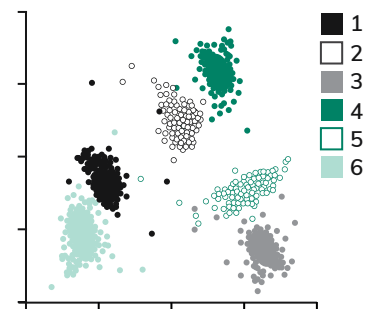
### NGS sequencing

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®.

	Cell: 1	2	...	N
GENE 1	1	2		14
GENE 2	4	27		8
GENE 3	0	0		1
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
GENE M	6	2		0

### 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 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.

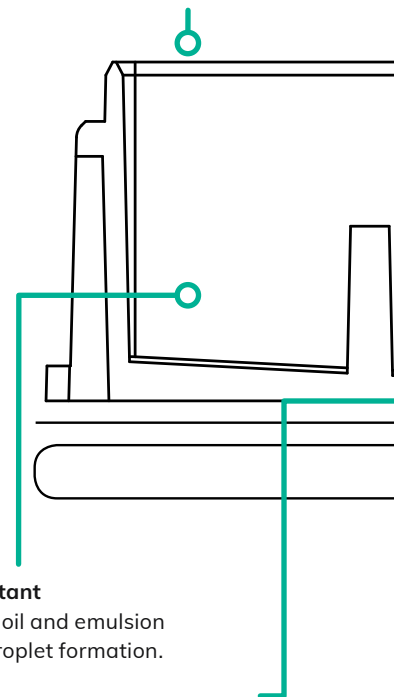


## Pressure pumps

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



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

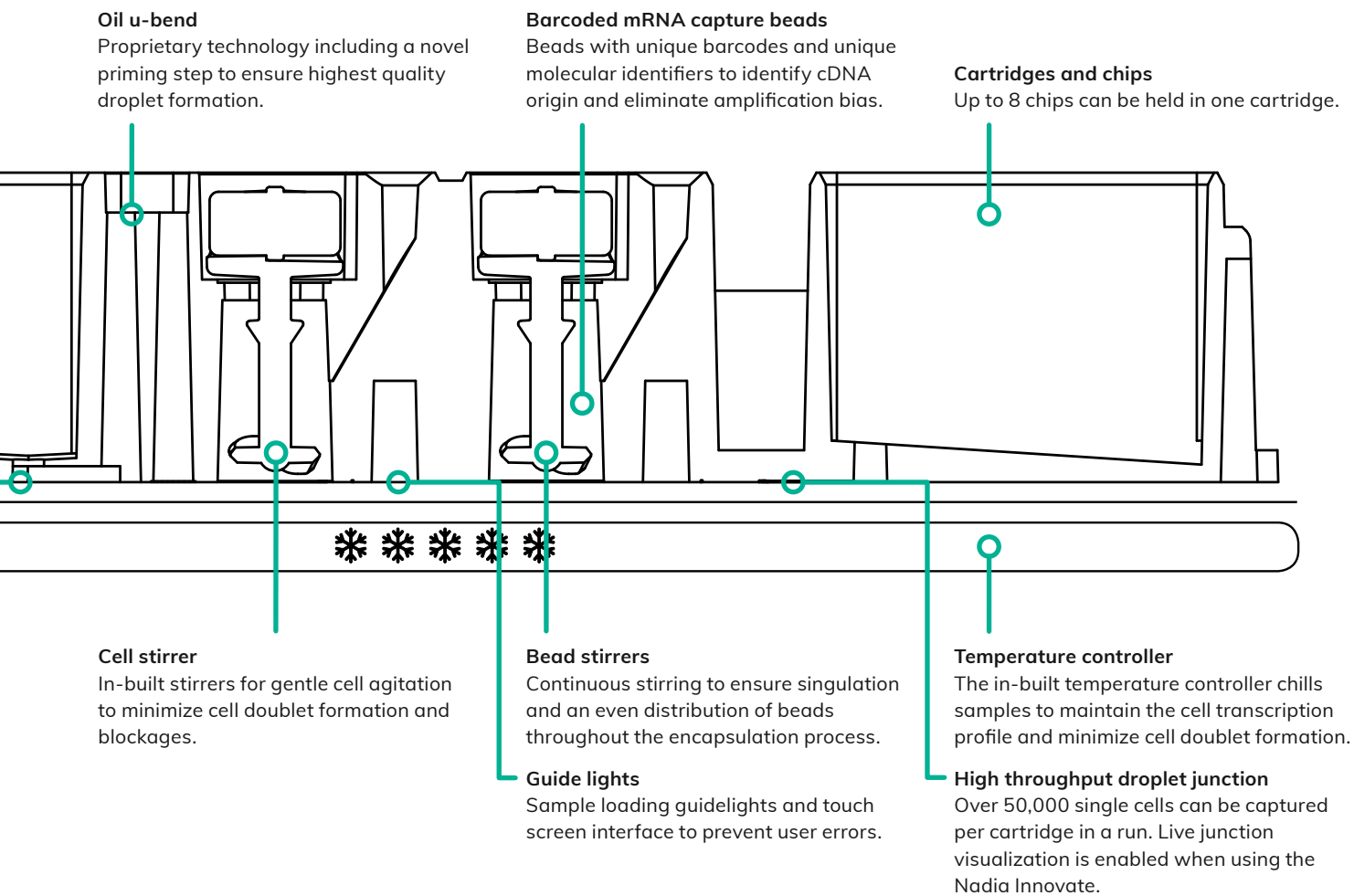


## Oil and surfactant

Biocompatible oil and emulsion stabiliser for droplet formation.

## Filters

On-chip filters for fibre and dust removal for successful encapsulation.



# 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.





Enabling biologists to develop science in ways not previously possible.”  
**Dr Muriel Breteau, Technical Applications Specialist**



## 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.

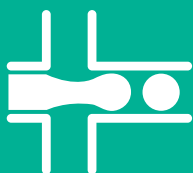
# nadia innovate features



Integrated temperature control from 4 – 40°C



Pressure control of 3 independent channels up to 1 bar



Ability to visualize droplet formation at the junction



High speed camera to capture droplet formation



View entire chip when using inverted mode, for visualization of reagent flow during early development



Seamless transfer of newly established protocol parameters to the Nadia Instrument



Integrated stirring of 2 aqueous reservoirs







dolomite  
bio



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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**

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 the world of high throughput single cell research to anyone working in biology. By making the technology readily available, and providing the ability to easily develop new protocols when using Nadia Innovate we're hoping to see the world of single cell research accelerating in a way we've not seen before.