

# Singleron

From single cell multi-omics  
to precision medicine



Unique Single Cell Multi-omics  
Solutions.

From Sample to Sequencing-ready Library.  
Manual and Automated.

Comprehensive Data Analysis and Interpretation Tools.

### Challenge your limits in Single Cell Experiments



#### Company

- **Experts in single cell sequencing**
- Young, dynamic, and fast-growing company
- Subsidiaries in Germany, China, the United States, and Singapore
- ~2500 customer organizations worldwide
- ~520 million single cells sequenced



#### Solution

- **One-Stop-Shop for multi-omics single cell analysis and clinically relevant insights**
- Instruments, kits, devices, software, and database to address a large array of different applications
- Comprehensive sequencing service with expert support



#### Technology

- **Proprietary microfluidics technology**
- Platform technology including hardware, software, kits, assays, and data sciences
- Covered by 200+ patents and patent applications
- Validated with 1400+ different sample types



#### Mission

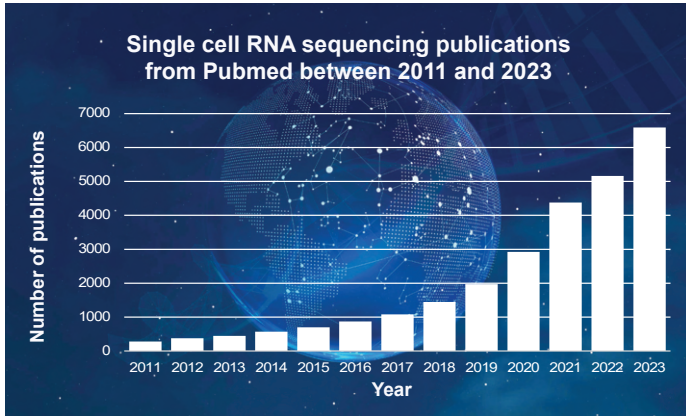
- **Overcoming limitations in single cell analysis**
- Detecting disorders at very early stages
- Paving the path for novel diagnostic approaches
- Speeding up drug development
- Translating biological insights to better medical practice





**Figure 1.** Singleron has more than 500 employees on three continents working on product development, manufacturing, clinical translation, and commercialization.





**Figure 2:** The rising importance of single cell RNA sequencing in research exponentially increased in the past decade.

- Single cell RNA sequencing is a fast-developing and powerful technology which enables high throughput transcriptome profiling of individual cells.
- Single cell resolution provides insight into the heterogeneity of a cell population and its microenvironment.
- By combining single cell whole transcriptomic profiling with target-specific sequencing, proteomics or epigenomics dimensions, Singleron offers multi-omics solutions to a wide range of applications.



### Cancer

- Elucidate cancer cell heterogeneity
- Connect cell expression profiles to the tumor microenvironment
- Profile drug resistant cancer cells



### Development

- Trace cell lineages in early development
- Reveal the dynamics of epigenetic rewiring in stem cell differentiation
- Study genetic modality in specific cell fates



### Neuroscience

- Classify neuronal cell types during development and neurodegeneration
- Track neuronal gene expression dynamics
- Study brain cell interaction profiles



### Microbiology

- Analyze response to cellular stress
- Conduct phylogeny studies
- Profile cells for genetic engineering studies
- Detect and study rare phenotypes

## Applications



### Immunology

- Identify immune cell subtypes
- Map regulation of immunological memory
- Profile TCR/BCR in disease settings
- Predict immunotherapy outcomes



### Pharmacology

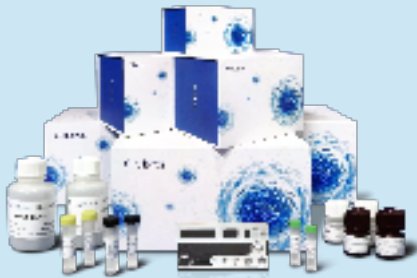
- Link gene expression profiles to disease states for biomarker discovery
- Describe the mechanism of drug resistance
- Vaccine development by immune profiling

**Figure 3:** Main applications of single cell sequencing which can be addressed with Singleron solutions.

# One-Stop-Shop Solution for High-throughput Single Cell Sequencing

Singleron offers a unique **One-Stop-Shop solution** for preservation and dissociation of tissue samples such as biopsies; and subsequent single cell partition, barcoding, and library construction of up to 30,000 cells using one microfluidic chip. Dedicated single cell data analysis software and database for result interpretation are also provided.

## Consumables



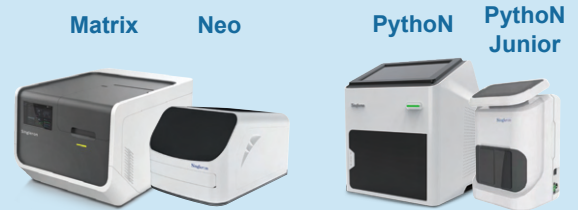
### SCOPE

- Single cell transcriptome and multi-omics solutions

### AccuraCode

- High-throughput RNA library construction kits

## Instruments



### Matrix and Neo

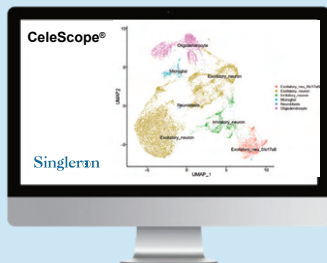
- Automated single cell processing platform

### PythoN and PythoN Junior

- Automated tissue dissociation

## Product Portfolio

## Software



### CeleScope® software

- Single cell sequencing data processing software
- QC report and feature-barcode matrices
- Expression matrix generation

## Clinical Database



### SynEcoSys® database

- Accurate cell type annotation
- Data mining for clinically focused interpretation
- Intuitive, easy-to-use interface

## Single Cell Sequencing Service



**Tissue**



**Data Analysis**

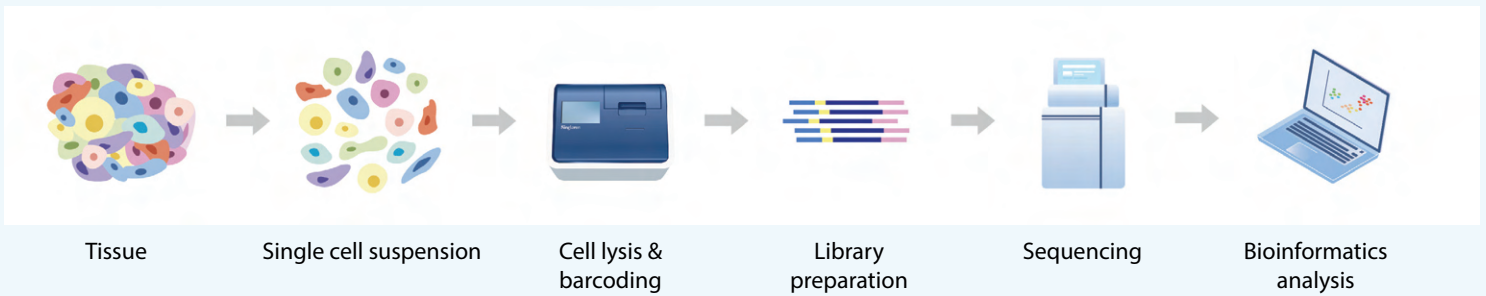
### Sequencing Service

- Covers all steps from tissue to bioinformatic analysis
- Free initial consultation
- Experience with 400+ different tissue types including challenging tissues such as needle biopsies



Highly efficient tissue processing solutions, easy-to-use microfluidic chip and the comprehensive data analysis tools are major innovations of Singleron's proprietary technologies and contribute to high success rates of the single cell sequencing workflow.

- Protected by more than **100 patents** and patent applications
- Comprise unique products for stabilization and dissociation of tissues
- Partitioning **up to 30,000 cells on a chip** and subsequent lysis and RNA capture
- Sequencing library construction and data analysis of genetic materials at single cell level



**Figure 4:** Singleron's single cell sequencing solutions cover each step of the workflow, from tissue collection, dissociation, single cell partition, library construction, to data analysis, and data mining.

### sCellLiVE® Tissue Preservation and Dissociation Solutions



**Unique advantages to ensure high success rate:**

- Preservation of fresh tissues for up to 72 hours
- Effective dissociation of diverse tissue types while keeping cells alive
- Validation with 400+ sample types of different origins and sizes



### Singleron Python®/ Python Junior - Automated tissue dissociation

**Reproducible and time-saving automation**

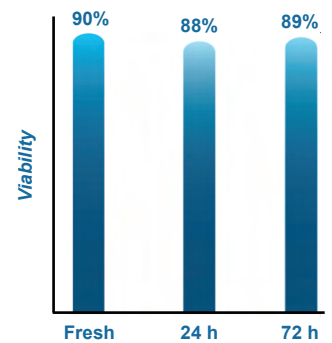
- Cutting, grinding, heating, and enzymatic dissociation of a broad range of tissues
- Processing of up to 8 samples in parallel
- High efficiency with as little as 10 mg of tissue



**Python**



**Python Junior**



**Figure 5:** Cells from mouse brain tissues maintain about 90% viability after 24 hours and 72 hours storage in sCellLiVE Tissue Preservation Buffer at 4°C

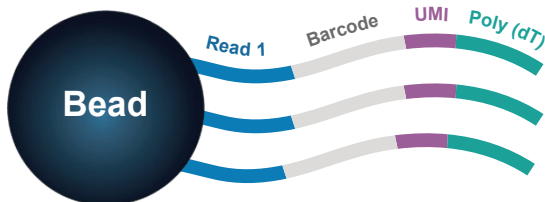
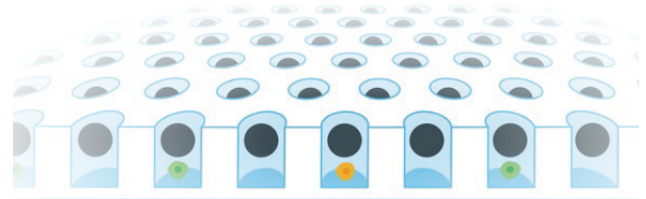
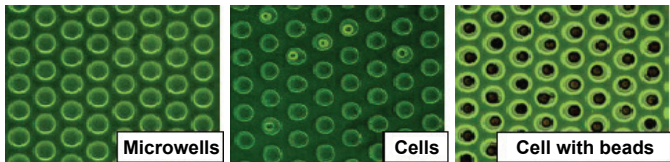
Microfluidic SCOPE-chip® with flexible configurations



The SCOPE-chip® captures single cells by partitioning them into hundreds of thousands of microwells with a flexible choice of chip types to accommodate different applications (no instrument necessary).



- Standard chip captures 500-10,000 single cells
- High-density chip captures up to 30,000 cells per sample
- Large-well chip allows analysis of cells sized up to 100 µm

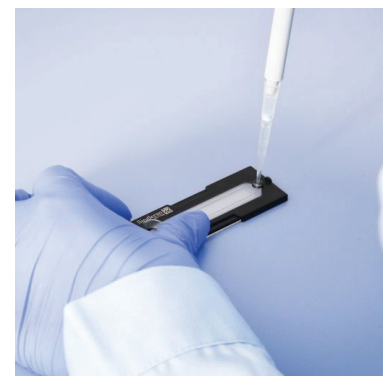


**Figure 6:** Single cells and barcoding beads are partitioned into the microwells (the chip can be visualized under the microscope). After cell lysis, the beads capture the RNA transcripts and render them with a unique cell barcode, as well as a unique molecular identifier (UMI). Following subsequent amplification and library construction steps, a single cell sequencing library that represents targeted analytes (mRNA, genetic variant, and more) can be sequenced to obtain complex genetic information from tens of thousands of cells, at single cell resolution.



Advantages of using our SCOPE-chip®

- Easy to use
- Can be operated manually with a P200 pipette
- No specialized instrument is required

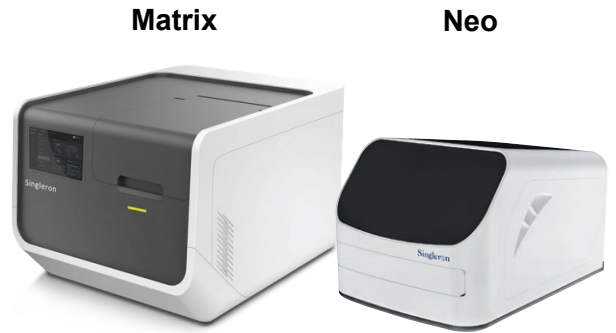


Singleron Matrix® and Neo® - Automated single cell processing platform



Reproducible and time-saving automation

- **Automatic** cell separation, cell lysis, and mRNA capture steps on SCOPE-chip within 40 minutes
- Processing of multiple SCOPE-chips simultaneously
- Easy-to-use interface
- High reproducibility



Singleron Matrix/Neo ensures walk away level of automation

SCOPE kits – “All-In-One” single cell sequencing from Sample to Library Preparation



- Customizable barcoding beads can be specifically tailored to your research needs
- Applications go beyond the standard transcriptome profiling

A diverse set of single cell multi-omics kits

**GEXSCOPE®**

- Transcriptome profiling (cells, nuclei)
- Transcriptome profiling of yeast
- Transcriptome + V(D)J sequences

**sCircle®**

- Full-length immunoreceptor profiling

**FocuSCOPE®**

- Transcriptome + target sequences (mutations, gene fusions, viral sequences, etc.)

**DynaSCOPE®**

- Transcriptome with temporal resolution

**ProMoSCOPE®**

- Transcriptome + cell surface glycosylation quantification

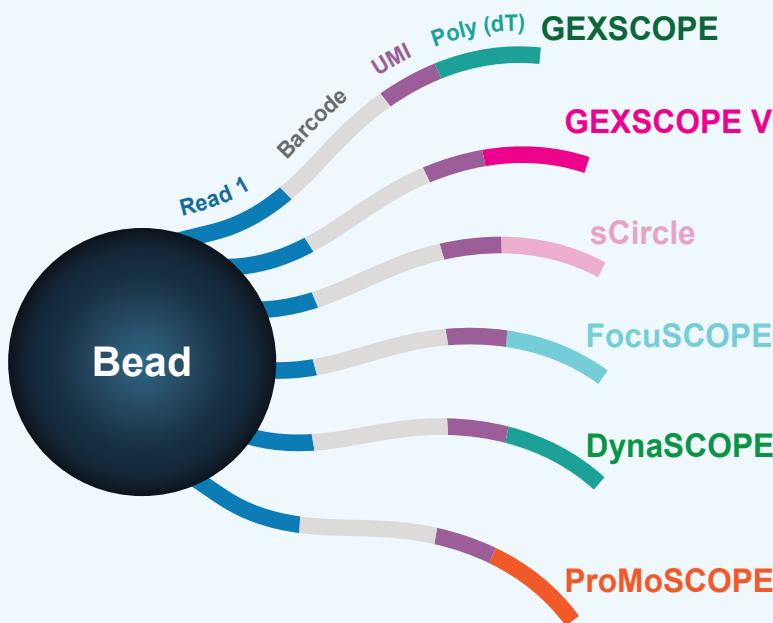


Figure 8: Singleron’s unique technology offers diverse solutions for single cell sequencing and multi-omics.



SCOPE kits – “All-In-One” single cell sequencing from Sample to Library Preparation



Figure 9: Singleron’s All-In-One solutions for single cell sequencing and multi-omics.



## AccuraSCOPE Product Line



- AccuraSCOPE is a flexible single-cell sequencing solution that enables high resolution transcriptomic studies of samples with limited cell number. Its plate-based format also offers the advantage of correlating cellular phenotypes with transcriptomic changes, as well as accommodating cells with unusual size and morphology.
- AccuraSCOPE is an evolving and expanding product line, so you can expect new and exciting solutions to emerge soon. Regardless of your specific research focus, it offers a powerful and reliable solution to meet your experimental needs.

### Everything you need for the full workflow

- Tissue preservation and dissociation solutions.
- SCOPE-chips and barcoding beads for RNA capture.
- Reagents for cell lysis, RT, amplification, and library construction.



## Singleron Janus - Magnetic Rack

### Magnetic bead separation optimized for single cell library generation workflow

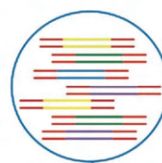


- For flexible sample preparation including isolation, enrichment, purification, and/or selection of small biomolecules
- Fast and efficient separation of magnetic beads from surrounding medium
- For up to twelve 0.2 ml tubes (compatible with PCR strips) and up to eight 1.5 mL or 2mL tubes in parallel



### CeleScope® - Bioinformatic software for data analysis

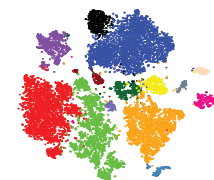
- Processes the data generated by SCOPE-chip
- QC and calibrating raw sequencing data with cell barcodes
- Reference genome alignment and gene quantification
- Expression matrix generation
- Unsupervised cell clustering



Library Sequencing

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

Expression Matrix

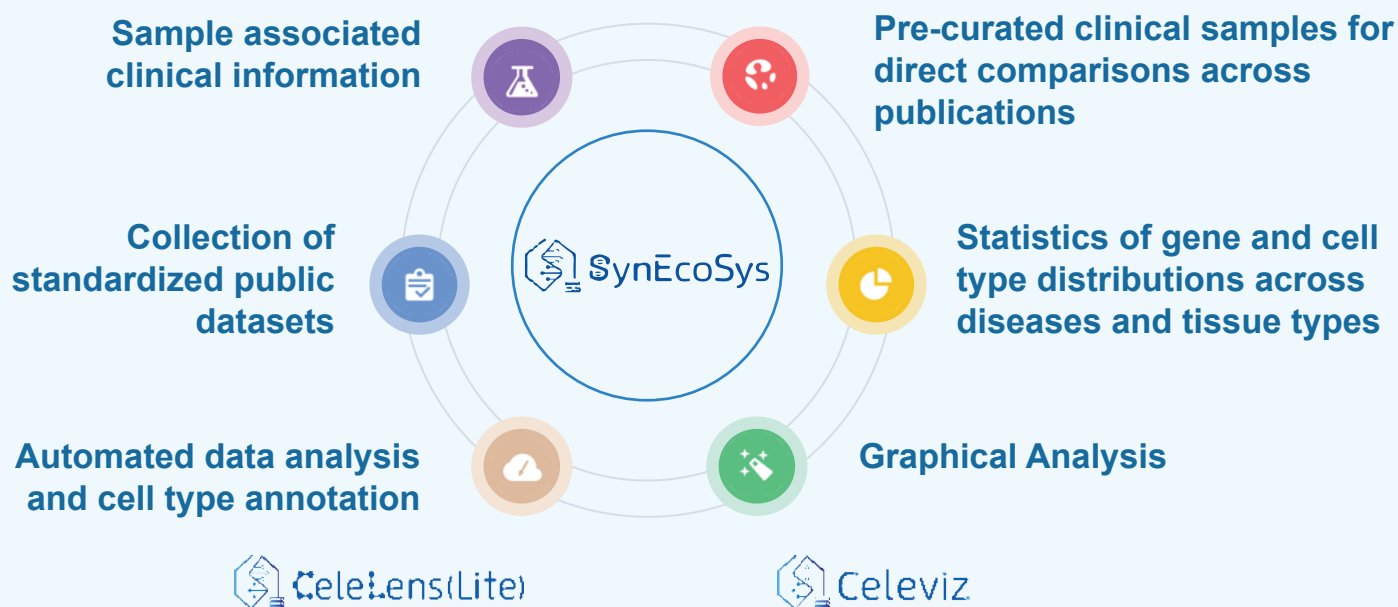


Unsupervised cell clustering



### SynEcoSys® - curated clinical annotation database

- Accurate cell type annotation
- Data mining for clinically focused interpretation
- Filter the database by chosen parameters (disease type, drug response etc.)
- Real-time updates in the field of single-cell research
- Publication-ready data visualization



**Figure 10: SynEcoSys** clinical database. **CeleLens(Lite)** automatically performs data analysis and cell type annotation against pre-curated, published clinical samples and standardized public datasets across diseases and tissue types. The **Celeviz** graphical analysis enables comprehensive statistical visualization of gene expression and cell distribution on whole database level.



SynEcoSys® - curated clinical annotation database

**Brain 122**  
Click on cell types to view canonical markers

- Epithelial cells +
- Epithelial-mesenchymal transition cells
- Glia cells +
- Immune cells +

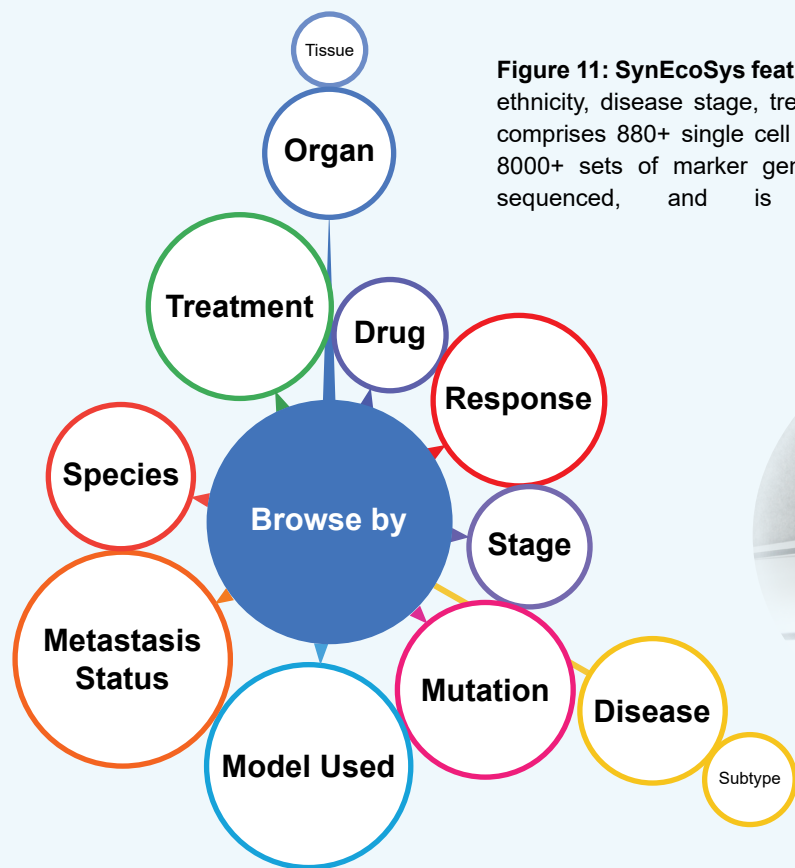
Brain	Dataset(37)	rker(767)
	Cell type(101)	laset(7)
	Marker(952)	ll type(90)
Ear	Dataset(1)	rker(908)
	Cell type(70)	laset(0)
	Marker(767)	ll type(67)
Eye	Dataset(7)	rker(766)
	Cell type(90)	laset(2)
	Marker(908)	ll type(69)
Ganglion	Dataset(0)	rker(769)
	Cell type(67)	Marker(766)
Spinal cord	Dataset(2)	Cell type(69)
	Marker(769)	

**Brain** Dataset(37)  
Cell type(101)  
Marker(952)

Canonical markers of T cells

- CCL5
- CCR7
- CD2
- CD247
- CD27
- CD30
- CD3E
- CD3G
- CD3Z
- CD4
- CD44
- CD5
- CD52

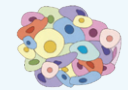
**Figure 11: SynEcoSys features.** (Left) Filter the dataset by parameters like age, gender, ethnicity, disease stage, treatment type, etc. (Above) SynEcoSys database currently comprises 880+ single cell RNAseq datasets from 14000+ samples; 600+ cell types; 8000+ sets of marker genes, 130+ tissue types, and more than 60 million cells sequenced, and is regularly updated with new public data.





**End-to-end sequencing service for clinical research**

- Focus on generating clinically relevant insights, from project consultation, sample processing, to sequencing and data interpretation
- Powered by **SynEcoSys** - curated database from tens of millions of single cells with information on clinics and drug discovery for clinical-relevant data interpretation
- Each project can be compared to and analyzed together with publicly available datasets or mined for potential biomarkers or novel drug targets
- Experience based on thousands of successfully processed samples and hundreds of sample types
- Project support by single cell experts with customer focus and fast response



**Tissue**

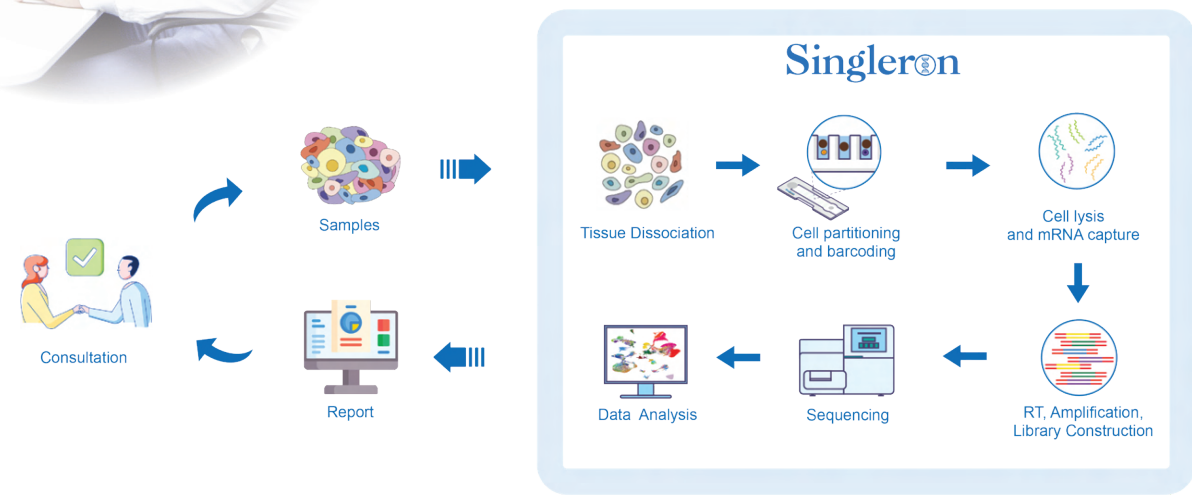


**Data Analysis**



RNA is very sensitive to degradation, and cells can go into apoptosis during processing, making them no longer representative for the samples. The ability to preserve tumor samples for up to three days can address these quality issues and allow sample collection and analysis away from the processing lab. It would also provide a chance to justify using single-cell analysis for diagnosis. With these three extra days, we can at least do some histological analysis.

**Prof. Dr. Margarete Odenthal, Professor, University Hospital Cologne**



**Figure 12:** End-to-end single cell sequencing service workflow: Investigators only need to collect their samples in sCellLiVE Tissue Preservation Buffer and send it to Singleron. Following stringent SOP, the Singleron Service Laboratory in Cologne, Germany, will process samples, construct sequencing libraries, have them sequenced, and deliver FASTQ files and bioinformatic analysis report.

For more information about our products, please contact us directly or visit <https://singleron.bio>

<b>Product</b>	<b>Description</b>	<b>Size*</b>	<b>Procedure</b>	<b>Category</b>
GEXSCOPE® Single Cell RNA Library Kit	Single cell mRNA library construction from fresh samples	2/4/16 RXNs	Automated/Manual	Consumable
GEXSCOPE® Single Nucleus RNA Library Kit	Single nucleus extraction and mRNA library construction from frozen tissue or special sample types (e.g., large cells with irregular morphology)	2/4/16 RXNs	Automated/Manual	Consumable
GEXSCOPE® Single Cell Human V(D)J Library Kits	Simultaneous analysis of TCR/BCR sequences and the whole transcriptome expression profiles in single cells	2/4/16 RXNs	Automated/Manual	Consumable
GEXSCOPE® Microbial Single Cell RNA Library Kit HD (Yeast)	Single cell mRNA library construction, specifically designed for yeast analysis	2/4/16 RXNs	Automated/Manual	Consumable
DynaSCOPE® Single Cell Dynamics RNA Library Kit	In vivo analysis of nascent RNA synthesis at single cell	2/4/16 RXNs	Automated/Manual	Consumable
FocuSCOPE® Single Cell Targeted Sequencing Library Kit	Simultaneous analysis of mRNA expression and genetic variants (mutation or gene fusion) or intracellular viral sequences in single cells	2/4/16 RXNs	Automated/Manual	Consumable
ProMoSCOPE™ Single Cell Glycosylation Detection Kit	Simultaneous analysis of mRNA expression and quantification of cell surface glycosylation levels in single cells	2/4/16 RXNs	Automated/Manual	Consumable
sCircle® Single Cell Full-Length Immuno-receptor Library Kit	Full-length V(D)J region sequencing at single cell level with short-read sequencing	2/4/16 RXNs	Automated/Manual	Consumable
Clindex® Sample Multiplexing Kit	Click-chemistry for pooling of up to 16 sample in the same single cell sequencing library	1/4 RXNs	N/A	Consumable
sCelLiVE® Tissue Dissociation Kit	Tissue Preservation and Dissociation Master Mix for obtaining single cell suspensions	16/24 RXNs	Automated/Manual	Consumable
AccuraCode® HTP One Step RNAseq Kit	High-throughput RNA library construction for drug screening or other large scale screening	1/4 RXNs	Manual	Consumable
AccuraCode® TCR Library Construction Kit	High-throughput RNA library construction for targeted TCR libraries at the bulk level	1 RXNs	Manual	Consumable
AccuraSCOPE® Single Cell Full-Length Transcriptome Library Kit	Analysis of full-length gene expression information in single cells	1 RXN	Manual	Consumable
AccuraSCOPE® Single Cell Transcriptome and Genome Library Kit	Single-cell mRNA and DNA library preparation	1 RXN	Manual	Consumable
Janus Magnetic Rack	Magnetic beads separation optimized for single cell library construction workflow	1	Manual	Device
Singleron Matrix®	Instrument for automated single cell processing	1	Automated	Instrument
Singleron NEO™	Instrument for automated single cell processing	1	Automated	Instrument
Singleron PythoN®	Instrument for automated tissue dissociation	1	Automated	Instrument
Singleron PythoN Junior™	Instrument for automated tissue dissociation	1	Automated	Instrument
CeleScope®	Processes the data generated by SCOPE-chip®	N/A	N/A	Software
SynEcoSys®	Database for clinically relevant data interpretation	N/A	N/A	Software

All trademarks are the property of Singleron Biotechnologies

\* Kit size availability depends on version



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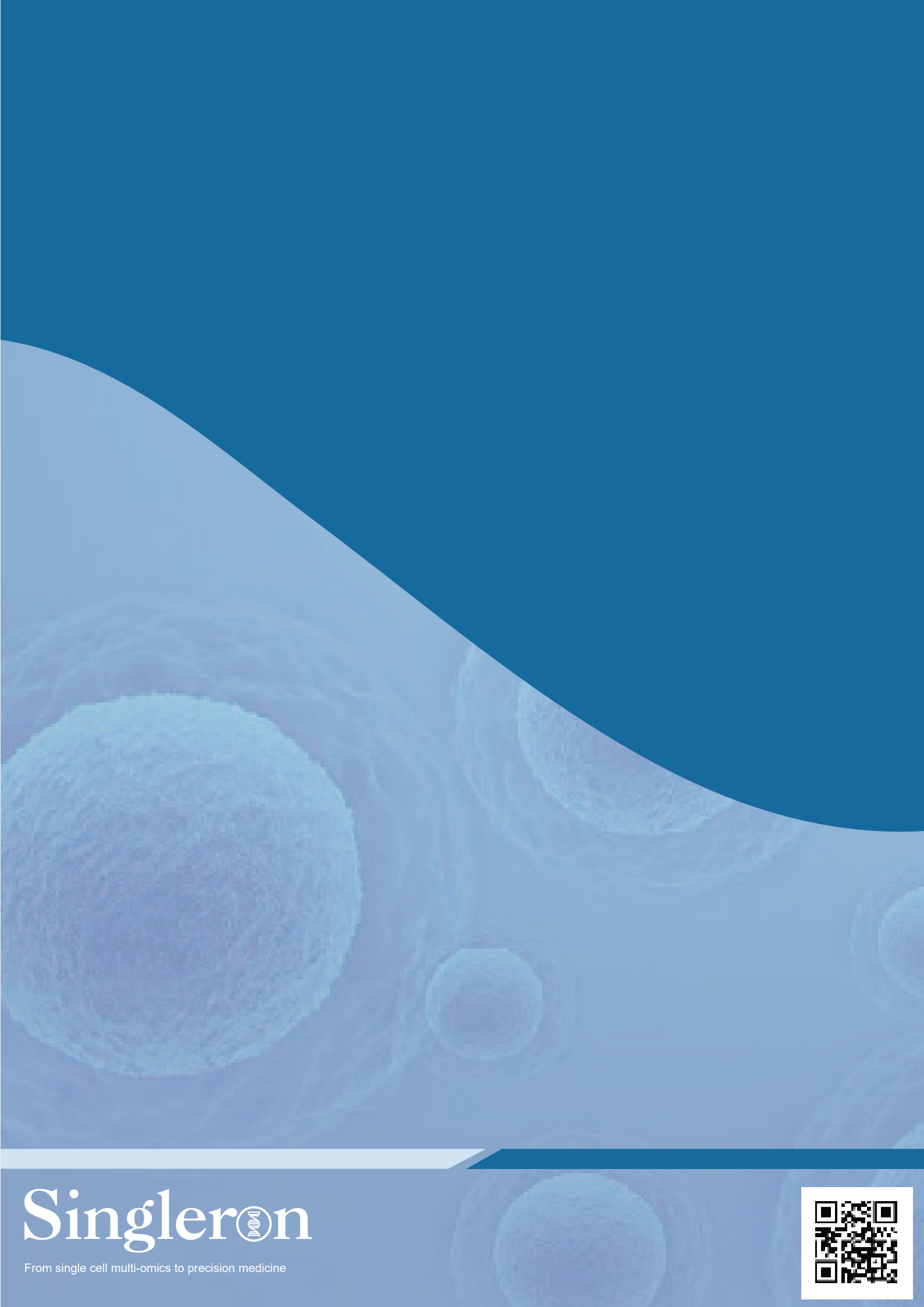
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