

SeekOne[®] DD Single Cell Immune Profiling

● Platform Overview

Single-cell immune repertoire sequencing, also known as single-cell V(D)J sequencing, involves targeting single T lymphocytes or B lymphocytes, constructing an immune repertoire RNA library via RNA enrichment of the TCR (T-cell receptor)/BCR (B-cell receptor) region, and analyzing the diverse sequences of TCR/BCR, to obtain the immune features of the body.

SeekOne[®] DD single-cell immune profiling (5' transcriptome & immune repertoire sequencing), proposed by Beijing SeekGene BioSciences Co., Ltd., achieves single-cell partitioning and labelling by the microfluidic system and barcoded beads. The library of both full-length TCR/BCR sequences and mRNA sequences can be constructed from a single sample, followed by high-throughput sequencing and bioinformatics analysis.

As a result, The kit can be used to investigate T/B cell heterogeneity, TCR/BCR diversity, antigen specificity, gene expression profiling, etc.

Highlights

- Achieve **efficient capture of V(D)J sequences** with a mapping rate greater than 90%, ensuring more accurate data for immune research on immune cell diversity, clonal expansion, immune response, and vaccine development.
- Acquire **complete coverage of the full-length V(D)J sequences**, providing more comprehensive information for studying autoimmune and infectious diseases, elucidating the underlying pathogenesis, or exploring innovative therapeutic strategies.
- Provide **accurate representation of α/β (light/heavy) chain pairing information of TCR or BCR**. Pairing information from the same cell reveals the receptor-antigen specificity of immune cells.
- **Simultaneous immune repertoire (BCR/TCR) and gene expression** profiling from a single sample, linking cell types with comprehensive immunophenotyping.

● Core Technologies

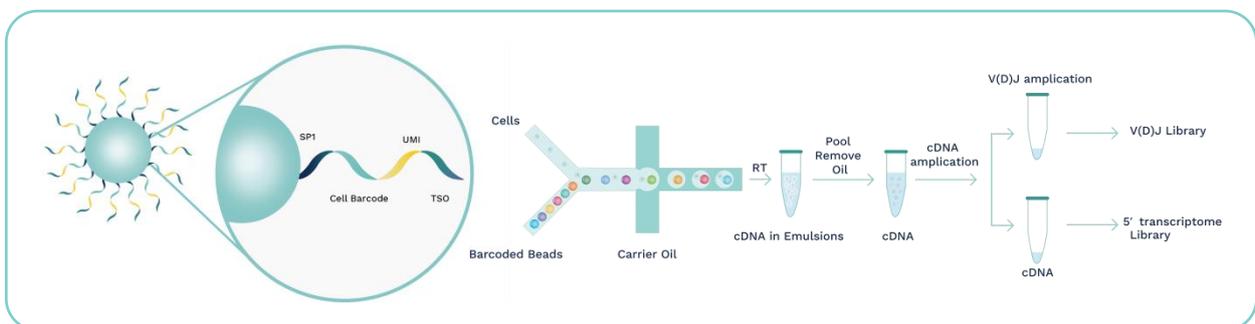


Figure 1. The core technology of SeekOne[®] Immune Profiling Analysis. SeekOne[®] DD single cell immune profiling products are based on the principle of microfluidic technology. Cells and barcoded beads are added separately and then react in the carrier oil to form emulsion droplets in the X-shaped channel. After capturing mRNA tagged with barcoded beads, two separate libraries (gene expression & immune repertoire) can be constructed from a single sample.

● Product Features

Full Length	Complete coverage of the full-length V(D)J sequences. Analyze all V(D)J sequences, including CDR3 sequences, for more comprehensive information.
Efficient Capture	Efficiently capture V(D)J sequences with an alignment rate greater than 90%. Obtain more accurate and authentic capture data.
True Alignment	True representation of α/β (light/heavy) chain pairing information of TCR (BCR). Reports pairing information from the same cell to reveal receptor-antigen specificity of the immune cells.
One sample, Two profiles	Simultaneous profiling of immune repertoire (BCR/TCR) and 5' gene expression. Multiple libraries are constructed from a single sample, which is more economical and suitable for samples with limited amounts, such as needle biopsy samples.

● Product Specifications

- Up to **90%** of reads mapped to any V(D)J gene
- Rapid generation of **150,000** water-in-oil droplets in **3** minutes
- Efficiently capture **500-12,000** cells per channel
- Flexible running of **1~8** samples in parallel
- Cell size flexibility: cell diameter of **5~40 μ m**
- High cell capture rates of up to **65%**
- Low doublet rates of under **0.3%** per **1,000** cells

● Workflow Steps

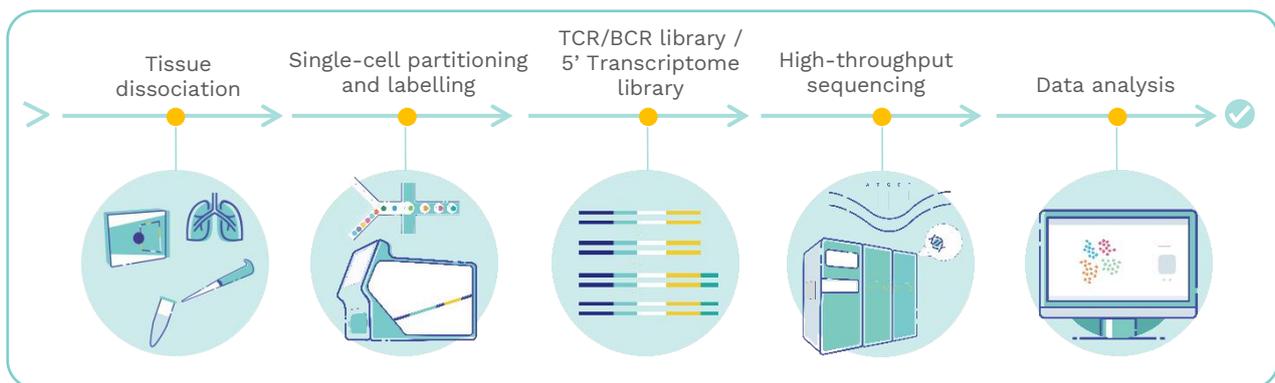


Figure 2. SeekOne[®] DD Single Cell V(D)J Analysis Workflow. The process begins with the collection of single cell suspension. After partitioning, capturing and labelling of single cells, a single cell library compatible with Illumina and MGI sequencers is constructed for high-throughput sequencing. Single cell V(D)J data can be processed with SeekSoul Tools —the efficient data analysis software for investigating immune cell diversity, immune response to infection or drug, and Ab-Ag specificity.

● Data Presentation

5' Transcriptome Data Quality Control

Table 1. Representative data presentation of single-cell 5' Transcriptome-seq from human PBMCs and nasal polyp samples targeting 10,000 cells. These data can be used to evaluate assay performance.

Tissue Type	Estimated Number of Cells	Mean Reads per Cell	Median Genes per Cell	Number of Reads	Valid Barcodes	Sequencing Saturation	Reads Mapped Confidently to Genome	Fraction Reads In Cells	Total Genes Detected	Median UMI Counts per Cell
pbmc	9074	44158	1923	400692103	94.73%	67.45%	66.06%	88.07%	24982	4929
pbmc	11463	29032	1567	332803805	96.17%	71.94%	72.59%	89.95%	23658	3242
Nasal polyps	7773	66336	1371	515635197	95.64%	84.79%	63.30%	87.18%	26778	2851

TCR Data Quality Control

Table 2. Representative data presentation of TCR-seq from human PBMCs and nasal polyp samples targeting 10,000 cells. These data can be used to evaluate assay performance.

Tissue Type	Estimated Number of Cells	Mean Reads Pairs per Cell	Number of Cells With Productive V-J Spanning pair	Reads Mapped to Any V(D)J Gene	Reads Mapped to TRA	Reads Mapped to TRB	Cells With Productive V-J Spanning Pair	Cells With Productive V-J Spanning (TRA,TRB) Pair	Paired Clonotype Diversity
pbmc	4337	15708	3117	90.40%	32.60%	57.70%	71.90%	71.90%	723.75
pbmc	7305	5506	5762	93.10%	30.70%	62.20%	78.90%	78.90%	3694.22
Nasal polyps	3666	10794	2743	90.80%	26.60%	64.10%	74.80%	74.80%	27.88

BCR Data Quality Control

Table 3. Representative data presentation of BCR-seq from human PBMCs and nasal polyp samples targeting 10,000 cells. These data can be used to evaluate assay performance.

Tissue Type	Estimated Number of Cells	Mean Reads Pairs per Cell	Number of Cells With Productive V-J Spanning pair	Reads Mapped to Any V(D)J Gene	Reads Mapped to IGH	Reads Mapped to IGK	Reads Mapped to IGL	Cells With Productive V-J Spanning Pair	Cells With Productive V-J Spanning (IGK,IGH) Pair	Cells With Productive V-J Spanning (IGL,IGH) Pair	Paired Clonotype Diversity
pbmc	2546	24562	1888	92.70%	39.30%	34.20%	19.30%	74.20%	48.00%	27.40%	609.34
pbmc	3834	10937	2716	93.60%	40.60%	32.00%	21.00%	70.80%	33.50%	38.10%	1273.79
Nasal polyps	1592	21051	1266	92.50%	44.90%	33.70%	13.90%	79.50%	53.10%	27.70%	31.77

● SeekOne® DD Immune Profiling Kits

1. SeekOne® DD Single Cell 5' Transcriptome-seq Kit

Product	Product code
SeekOne® DD Single Cell 5' Transcriptome-seq Kit, 2 tests/8 tests	K00501-02/K00501-08
Product Components	Component code
SeekOne® DD Chip S3 Kit, 2 tests/8 tests	K00202-0201/K00202-0801
SeekOne® DD Single Cell 5' Barcoded Beads Kit, 2 tests/8 tests	K00501-0202/K00501-0802
SeekOne® DD Single Cell 5' Reverse Transcription Kit, 2 tests/8 tests	K00501-0203/K00501-0803
SeekOne® DD Library Construction Kit, 2 tests/8 tests	K00202-0204/K00501-0803
SeekOne® DD Single Cell Cleanup Kit, 2 tests/8 tests	K00202-0205/K00202-0805

2. SeekOne® DD TCR amplification Kit (Human)

Product	Product code
SeekOne® DD Single Cell TCR Enrichment Kit (Human), 2 tests/8 tests	K00601-02/K00601-08
Product Components	Component code
SeekOne® DD Single Cell TCR Amplification Kit (Human) , 2 tests/8 tests	K00601-0201/K00601-0801
SeekOne® DD Library Construction Kit, 2 tests/8 tests	K00202-0204/K00501-0804

3. SeekOne® DD TCR amplification Kit (Mouse)

Product	Product code
SeekOne® DD Single Cell TCR Enrichment Kit (Mouse), 2 tests/8 tests	K01101-02/K01101-08
Product Components	Component code
SeekOne® DD Single Cell TCR Amplification Kit (Mouse) , 2 tests/8 tests	K01101-0201/K01101-0201
SeekOne® DD Library Construction Kit, 2 tests/8 tests	K00202-0204/K00501-0804

4. SeekOne® DD BCR amplification Kit (Human)

Product	Product code
SeekOne® DD Single Cell BCR Enrichment Kit (Human), 2 tests/8 tests	K00701-02/K00701-08
Product Components	Component code
SeekOne® DD Single Cell BCR Amplification Kit (Human) , 2 tests/8 tests	K00701-0201/K00701-0801
SeekOne® DD Library Construction Kit, 2 tests/8 tests	K00202-0204/K00501-0804

5. SeekOne® DD BCR amplification Kit (Mouse)

Product	Product code
SeekOne® DD Single Cell BCR Enrichment Kit (Mouse), 2 tests/8 tests	K01201-02/K01201-08
Product Components	Component code
SeekOne® DD Single Cell BCR Amplification Kit (Mouse) , 2 tests/8 tests	K01201-0201/K01201-0801
SeekOne® DD Library Construction Kit, 2 tests/8 tests	K00202-0204/K00501-0804

Compatible Instrument

Compatible Instrument	Product code
SeekOne® Digital Droplet System	M001A

Compatible Software

Compatible Software
SeekSoul®Tools single-cell data analysis software

FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC PROCEDURES.



SeekOne® DD Single Cell Immune Profiling

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