

GEXSCOPE® Single Cell V(D)J Kit

- Simultaneous immune profile and whole transcriptome analysis

The GEXSCOPE® Single Cell V(D)J Kit enables simultaneous detection of T-cell or B-cell receptor variable region (CDR3) together with the whole transcriptome expression at single-cell level. Such multi-omics approach enables comprehensive profiling of both immune and non-immune cells in a sample, which can be applied to studies like characterization of immune cell clonotypes or mapping cancer-immune cell crosstalk in the tumor microenvironment (TME).

The GEXSCOPE Single Cell V(D)J Kit uses the SCOPE-chip®, a portable microwell chip, and specifically designed barcode beads for capturing both whole mRNA and targeted regions of V(D)J transcripts, enabling high capturing efficiency and specificity.

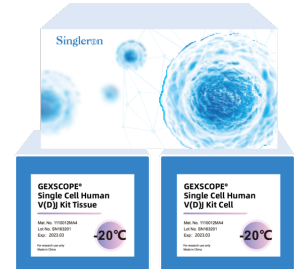
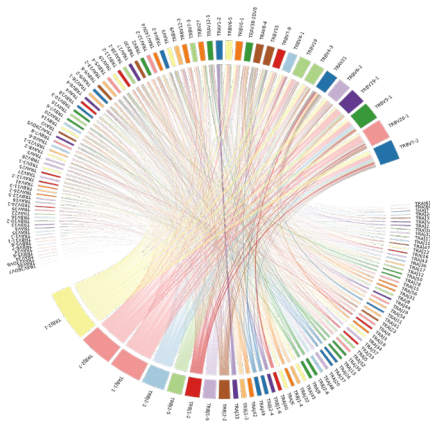


Figure 1. GEXSCOPE Single Cell V(D)J Kit



Highlights

- **High Capture Efficiency:** Unique probe design increases the efficiency of V(D)J transcript capture
- **High Specificity:** V(D)J sequence-specific capture
- **High Pairing Rate:** TCR α chain and β chain >80% pairing, BCR IgH IgK/IgL >90% pairing

Figure 2. High throughput single cell sequencing reveals clonotype frequencies, their TRA/TRB pairing map, as well as the amino acid sequence of their variable regions (CDR3).

GEXSCOPE® Single Cell V(D)J Kit Workflow

A single cell suspension is prepared by cell sorting, tissue dissociation or from PBMCs and loaded onto the SCOPE-chip. The microchip integrates single cell capture, cell lysis, molecular labeling (barcoding) and capture of both the targeted V(D)J regions and the rest of the mRNA. To automatize the procedure, the loading of the SCOPE-chip can be performed using the Singleron Matrix® instrument.

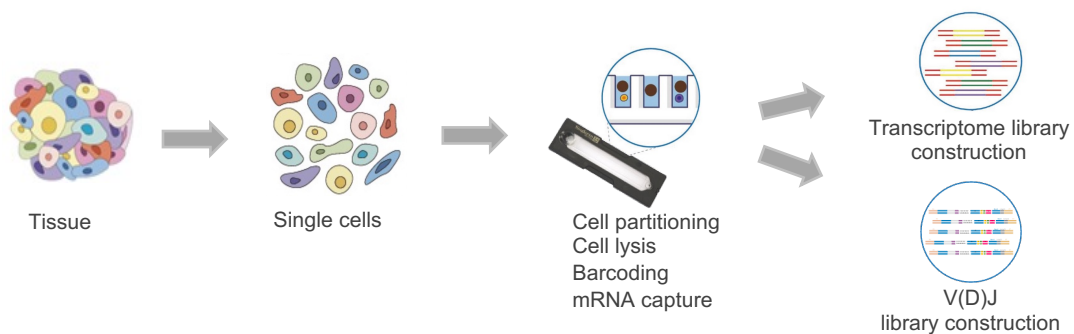


Figure 3. Overview of the GEXSCOPE Single Cell V(D)J workflow.

GEXSCOPE® Single Cell V(D)J Kit principle:

The technology of GEXSCOPE Single Cell V(D)J Kit is centered around specifically designed barcoding beads. Upon cell lysis, the barcoding beads capture both the V(D)J transcripts and whole mRNA. This is achieved by transcript hybridization with two types of oligonucleotides bound to the surface of the beads. The first type of oligonucleotides contains a poly(dT) sequence on its 3' end which binds to the polyA tails of mRNAs. The second type of oligonucleotides has a sequence complementary to the constant region of immunoreceptor sequences which captures the variable region of V(D)J transcripts with high specificity. Following reverse transcription (RT), the barcoded V(D)J cDNA is enriched in two rounds of nested PCR while the cDNA of the rest of the mRNA is amplified in a separate PCR reaction.

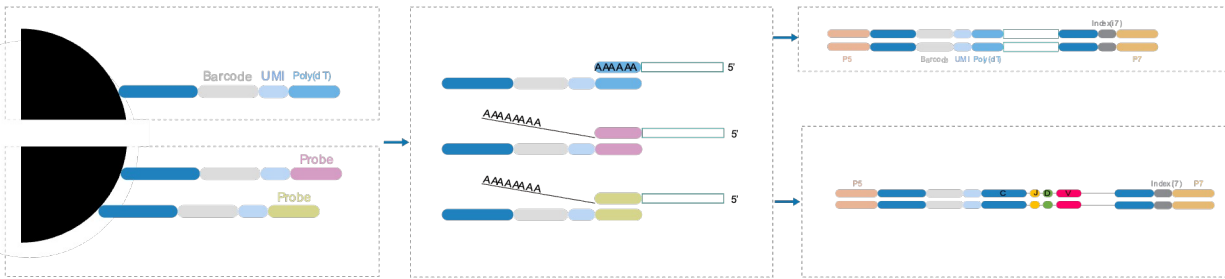


Figure 4: Two types of oligonucleotides on the surface of GEXSCOPE Single Cell V(D)J Kit barcode beads. The beads capture both whole mRNA and CDR3 regions of immunoreceptors. Following RT, amplification or enrichment, and library construction, two separate libraries are obtained that can be combined for sequencing.

High Specificity and Sensitivity

GEXSCOPE Single Cell V(D)J Kit has significant advantages compared to other methods due to the barcoded beads specifically designed to capture the V(D)J regions of the transcripts. This results in high number of reads mapped to the V(D)J gene, high immunoreceptor pairing rate, and high number of V(D)J transcript-specific UMIs detected per cell, rendering both high specificity and sensitivity.

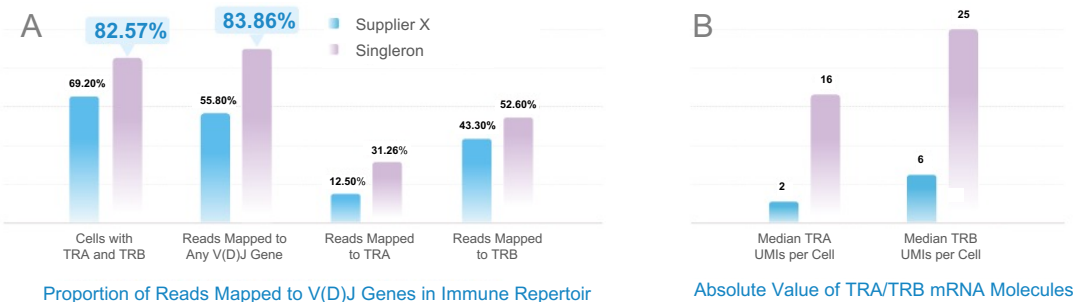


Figure 5: GEXSCOPE Single Cell V(D)J Kit shows higher specificity and sensitivity compared to other commercial methods. (A) Higher TRA/TRB pairing rate and mapping to all V(D)J genes, exhibiting significantly higher specificity. (B) The kit also captures significantly more unique transcripts, assuring higher sensitivity.

Ordering information:

| Product | Cell | Tissue |
|---|-------------------|-------------------|
| | 2 RXNs / 16 RXNs | 2 RXNs / 16 RXNs |
| GEXSCOPE Single Cell Human V(D)J Kit | 4183111 / 4183112 | 5183111 / 5183112 |
| GEXSCOPE Single Cell Human V(D)J Kit for Matrix | 4183121 / 4183122 | 5183121 / 5183122 |

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