

sCircle® Single Cell Full Length Immunoreceptor Library Kit

- Simultaneous immune receptor full-length sequences and whole transcriptome analysis

The sCircle® Single Cell Full Length Immunoreceptor Library Kit enables simultaneous detection of full-length T-cell or B-cell receptor together with the whole transcriptome expression at the single cell level. Such a multi-omics approach enables the profiling of both immune and non-immune cells in a sample, which can be applied to studies, for example, the characterization of the immune cell repertoire during infectious diseases or clonal kinetics and single cell transcriptional profiling in patients undergoing cell therapy (e.g. CAR T-cells).

The sCircle® Single Cell Full Length Immunoreceptor Library Kit uses the SCOPE-chip®, a portable microwell chip, and the specifically designed barcode beads for capturing both whole mRNA and the full-length immune receptor (BCR or TCR) transcripts, enabling high capturing efficiency and specificity.



Figure 1. sCircle® Single Cell Full Length Immunoreceptor Library Kit

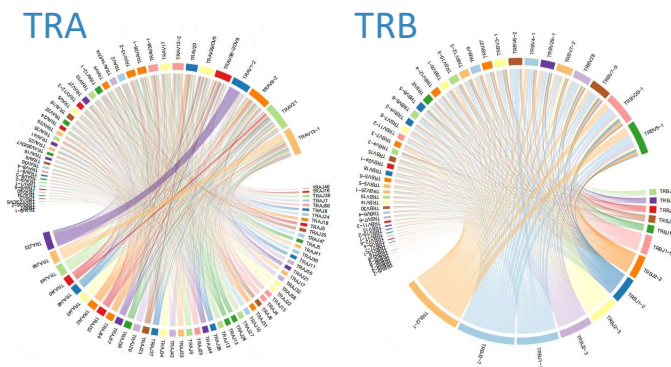


Figure 2. High throughput single cell sequencing reveals clonotype frequencies, the full length of the BCR or TCR transcript, their TRA and TRB or BCR IGH/IGL pairing map, as well as the amino acid sequence of their variable regions (CDR3).

Highlights

- **Comprehensive:** combines transcriptome profiling with **full-length** TCR or BCR sequences
- **High Capture Efficiency & Specificity:** Robust poly-A based capture combined with unique circularization and 3-round enrichment process of the immunoreceptor-specific transcript (BCR or TCR)
- **High Pairing Rate:**
 - ✓ Mouse TCR α - β chains productive pairing **>80%**
 - ✓ Human BCR IgH-IgK/IgL productive pairing **>85%**

sCircle® Single Cell Full Length Immunoreceptor Library Kit workflow

A single cell suspension is loaded onto the SCOPE-chip. The microchip integrates single cell capture, cell lysis, molecular labeling (barcoding) and capture of both the targeted immunoreceptor (BCR or TCR) and the cellular mRNA. To automatize the procedure, the loading of the SCOPE-chip can be performed using the Singleron Matrix® instrument.

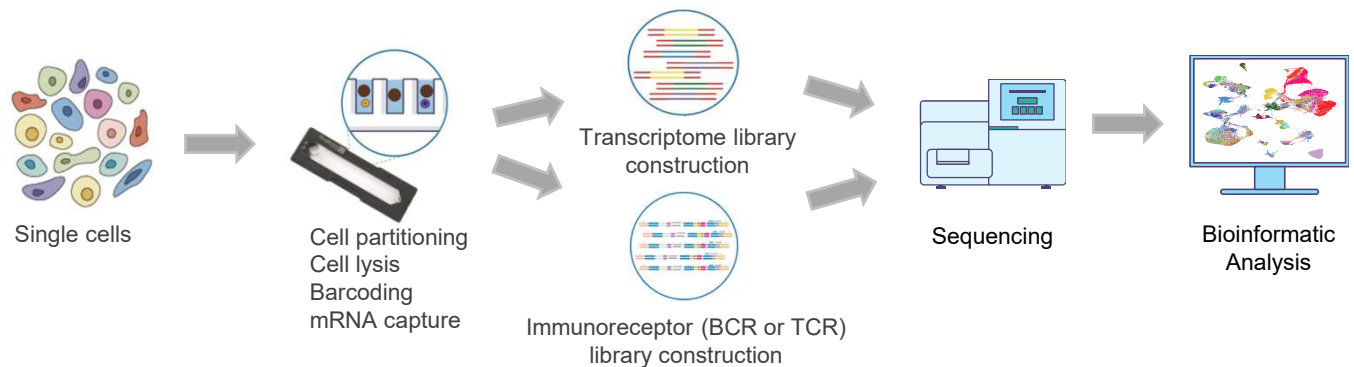


Figure 3. Overview of the sCircle® Single Cell Full Length Immunoreceptor Library workflow

sCircle® Single Cell Full Length Immunoreceptor Library Kit principle:

The technology of sCircle® Single Cell Full Length Immunoreceptor Library Kit is centered around specifically designed barcoding beads. Upon cell lysis, the barcoding beads capture both the immune receptor transcripts (BCR and TCR) and the whole mRNA. This is achieved by transcript hybridization with oligonucleotides bound to the surface of the beads. The oligonucleotides contain a poly(dT) sequence on its 3' end which binds to the polyA tails of mRNAs, including the immunoreceptor mRNAs. Following reverse transcription (RT), the cellular cDNA obtained is used for generating the cellular transcriptome library while the barcoded immunoreceptor cDNA is circularized to invert the sequence so that the 5'-end gets close to the UMI and the cell barcode in order to obtain the full-length sequence. Eventually, the circularized product is then enriched through 3 rounds of nested PCR to generate the immune receptor specific transcript library of choice (BCR or TCR).

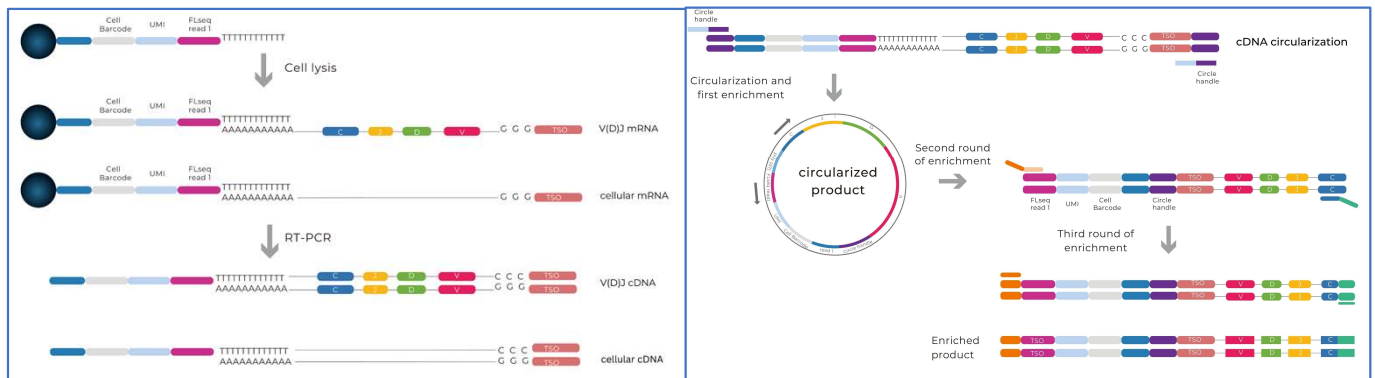
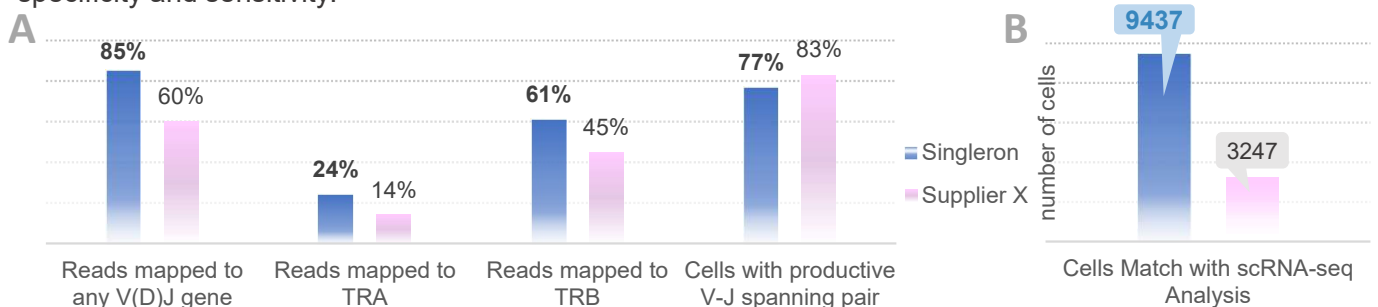


Figure 4: Oligonucleotides on the surface of sCircle® Single Cell Full Length Immunoreceptor Library Kit barcode beads. The beads capture whole cellular mRNAs, including immunoreceptors transcripts (left) through poly(dT) tails combining full-length TCR or BCR sequences. The barcoded immunoreceptor cDNA is used for immunoreceptor circularization and a 3-round nested-PCR enrichment process (right) to generate a full-length specific immunoreceptor transcript library.

High Specificity and Sensitivity

sCircle® Single Cell Full Length Immunoreceptor Library Kit has significant advantages compared to other methods due to the circularization process of the immunoreceptor cDNA specifically designed to reverse the sequence of the transcript and, through this, allows the full-length of the immune receptor to be sequenced.

This results in reads mapped to the full-length sequence of the immunoreceptor gene (BCR or TCR), including the V(D)J region and part of the constant region. It also shows a high immunoreceptor pairing rate, and a high number of immune receptor transcript-specific UMIs detected per cell, rendering both high specificity and sensitivity.



Ordering information:

Product	Manual	Matrix
	2 RXNs	2 RXNs
sCircle® Single Cell Full Length Immuno_TCR Library Kit Cell	4153011	4153021
sCircle® Single Cell Full Length Immuno_BCR Library Kit Cell	4154011	4154021

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