

FocuSCOPE® Single Cell Targeted Capture Kit – Intracellular Bacteria (IB) Panel

The IB panel is a standard panel of the FocuSCOPE kit, designed to capture and identify bacterial ribosomal RNA (rRNA) within single cells. A common bottleneck of studying intracellular bacterial transcripts is their low abundance. To address this, Singleron has developed the IB panel, a multi-omics sequencing solution capable of detecting bacterial transcripts by combining probe-based capture and primer-directed enrichment in library construction.

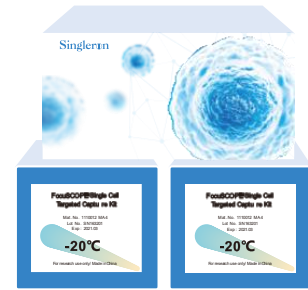
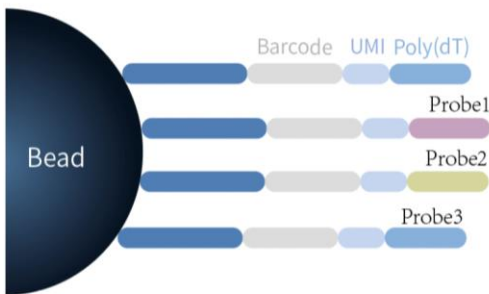


Figure 1. FocuSCOPE Single Cell RNA Library Kit



Hypervariable regions of the bacterial 16S rRNA targeted by FocuSCOPE IB probes:



Figure 2. FocuSCOPE barcode design. For the BI panel, each bead contains several non-poly(dT) probes, which are designed to target constant regions near hypervariable regions.

FocuSCOPE Kit Advantages:

- **Complete solution:** contains all reagents from cell partitioning to ready-to-sequence NGS libraries.
- **No prior enrichment required:** RNA of interest will be directly captured during cell lysis.
- **High sensitivity:** Designed to detect low abundance transcripts.

Principle

FocuSCOPE IB panel uses specially designed barcoding beads that contain two types of oligonucleotides (Figure 2). The first type of oligonucleotides contain Illumina sequencing primer sequence, a unique cell barcode for identifying the cell origin of the RNA, a unique molecular index (UMI) for cDNA quantification, and poly (dT) sequence for capturing mRNA. The second type of oligonucleotides contain probes designed specifically to capture bacteria rRNA (Figure 2).

FocuSCOPE Single Cell Targeted Library Kit Workflow

Single cell suspension are loaded onto the SCOPE-chip, alongside barcoding beads. (Solid tissues can be dissociated into single cell suspensions using the sCellLiVE kit.) The microchip handles single cell capture, cell lysis, capture of the cellular mRNA and molecular labeling. The barcoded cDNA is then amplified and used for the construction of two NGS libraries, a host mRNA transcriptomics library and a bacterial rRNA library (Figure 3). To automate the procedure, the loading of the SCOPE-chip can be performed using the Singleron Matrix® NEO instrument.

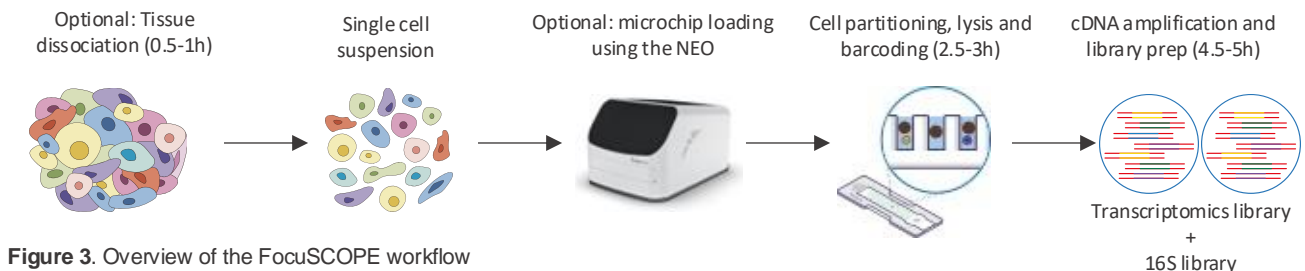


Figure 3. Overview of the FocuSCOPE workflow

IB panel demo data

As the two libraries originate from the same set of cDNA, the host cell identity of each bacterial UMI can be determined. This information enables analysis of the correlation between cell type and bacteria abundance, the taxonomical distribution of bacteria communities, and the impact of disease or treatment on the bacteria profile.

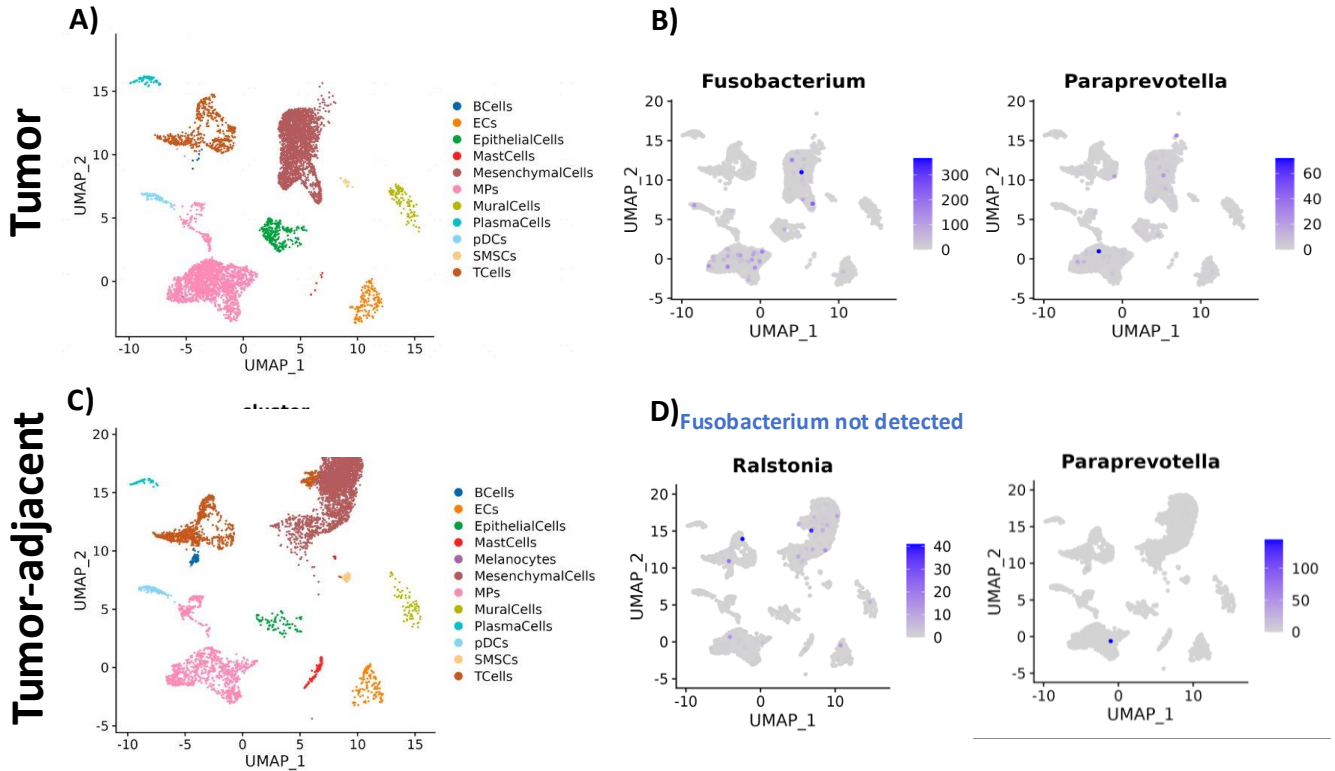


Figure 4. Cell clustering result (A,C) and bacteria UMI count (B,D). Samples are taken from oral cancer (A,B) and oral paracancer (C,D). Here, the most abundant 2 genus within the tumor sample are shown (B). *Fusobacterium* is known to inhabit oral tumor cells. In contrast, they are absent in tumor-adjacent cells (D). Scale bar: Number of bacterial UMIs detected per cell. Abbreviations: ECs – Endothelial Cells; MPs – Macrophages; pDCs – plasmacytoid Dendritic Cells; SMSCs – Skeletal Muscle Satellite Cells.

Ordering information:

Product	Reactions	Catalog number
FocuSCOPE® Single Cell mRNA x Bacterial 16S Library Kit	2 RXNs 16RXNs	4604511 4604512

Explore other FocuSCOPE kits:

Custom FocuSCOPE Single Cell Multiomics Kit	16RXNs	3000012-3
FocuSCOPE™ Single Cell mRNA x EBV Library Kit	2 RXNs 16 RXNs	4142111 4142112
FocuSCOPE® Single Cell Multiomics Blood Cancer mRNA x Mutation Analysis Kit	2 RXNs 16 RXNs	4212111 4212112
FocuSCOPE® Single Cell Multiomics mRNA x Clonal Hematopoiesis Kit	2 RXNs 16RXNs	4341011 4341012
FocuSCOPE® Single Cell Multiomics Lung Cancer Druggable Mutation Analysis Kit	2 RXNs 16 RXNs	4122111 4122112

Note: HD-chip format and NEO (automated workflow) format kits are available upon request

