BD Rhapsody™ T-Cell Targeted Panel (Human)

Targeted human T-cell gene panel for the BD Rhapsody Single-Cell Analysis System

- Validated panel focuses on genes relevant to T-cell biology
- Single-cell expression profiling complements traditional FACS
- Reproducible assay empowers numbers applications

The mammalian immune system is a complicated defense network against foreign invaders, such as pathogens, environmental antigens and cancer. T cells are integral members of this system, conducting intracellular surveillance, cellular destruction, and immune system stimulation and memory. Therefore, T cells are subject to complex regulation and differentiation, sometimes yielding very rare functional subtypes.

The BD Rhapsody™ T-Cell Targeted Panel (Human) provides a streamlined assay for single-cell research of T cells with the BD Rhapsody Single-Cell Analysis System. The panels provide a snapshot of T-cell gene expression, to complement traditional techniques like FACS. Researchers interested in advancing understanding of T-cell biology will appreciate a cost-efficient solution suited for studying autoimmune disorders, allergy, infection, cancer, metabolic inflammation and more.

Expertly designed panels give you the right genes

Drawing from BD's 40 years of experience in immunology and FACS, the panel content was chosen to include relevant FACS phenotypic markers known to identify various T-cell subpopulations, as well as the genes involved in proliferation, activation signaling, and metabolism. While the panel content overlaps with genes in the BD Rhapsody Immune Response Panel, the BD Rhapsody T-Cell Targeted Panel assay is tailored for T-cell biology, and allows researchers to customize the panel with user-selected genes.

Easier, comprehensive libraries for sequencing

The BD Rhapsody T-Cell Targeted Panel (Human) utilizes multiplex PCR for detecting 259 genes chosen for T-cell profiling. After cells are lysed in the BD Rhapsody Cartridge, beads containing captured mRNA are magnetically retrieved for cDNA synthesis. Included primers are used for gene-specific nested PCR for library construction. The final PCR amplification products for sequencing contain sequencing adapters, a cell label, unique molecular index (UMI) and up to 400 bp of the 3' end of the target gene. Assay products can be sequenced on Illumina MiSeq, NextSeq, HiSeq2500 and HiSeq4000 sequencers.
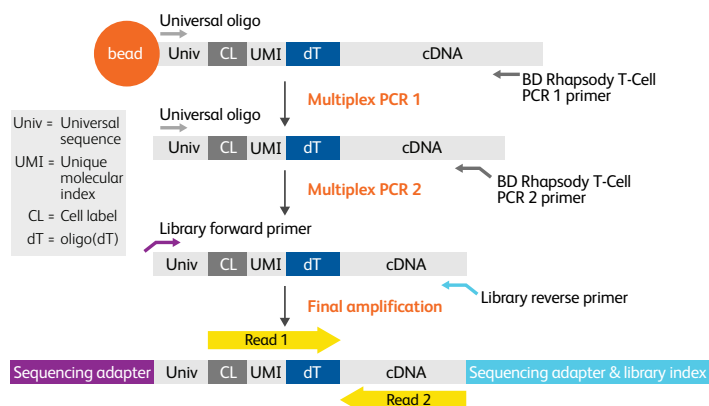

Figure 1. cDNA synthesis and library construction chemistry using the BD Rhapsody T-Cell Targeted Panel (Human).

Custom panels let you design your own targets

For exploring genes beyond the panel, the BD Rhapsody T-Cell Targeted Panel allows customization by adding user-defined genes. Select up to 100 additional genes as a BD Rhapsody Supplemental Panel. Using BD's primer design software, primers for supplemental gene targets are designed to be compatible with pre-designed base panels. Supplemental primers are shipped to you and combined with the BD Rhapsody T-Cell Targeted Panel for library preparation.

Expression profiling of the single cell

To show the performance of the BD Rhapsody T-Cell Targeted Panel (Human), CD3 T cells were isolated from cryopreserved PBMCs and stimulated overnight with anti-CD3/28 (activated T) or isolated immediately before use (resting T). 3,436 cells in the resting T-cell sample and 5,115 cells in the activated T-cell sample were profiled using the BD Rhapsody system T-Cell Targeted Panel. In addition to differentiation of commonly observed CD4 and CD8 naïve, effector and memory T-cell subsets, rarer populations, such as gamma delta T cells, are identified with the panel.

Table 1: Example genes by category

Pathway	# of genes in panel
CD marker	25
Cell type marker	21
Chemokine	12
Chemokine receptor	15
Cytokine	11
Cytokine receptor	8
Interleukin	29
Other*	138

*Apoptosis regulator; cell adhesion; cell cycle & proliferation; effector molecule; enzyme; growth factor; Immune checkpoint; Immune receptor; integrin; kinase; metabolism; MHC class I or II; NK cell receptor; nuclear receptor; stress response; toll like receptor; transcription factor; transporter

Table 2: BD Rhapsody T-Cell Targeted Panel metrics

Total reads recommended per cell	
For cell type identification	2K
For direct comparison across samples	20K
# of genes in panel	259

Learn more about the power of targeted single-cell analysis

The BD Rhapsody T-Cell Targeted Panel shows validated, reproducible and reliable dissection of T-cell subsets, useful for exploring cell types in a wide variety of applications. Contact us to learn what this panel and the BD Rhapsody system can do for your research.
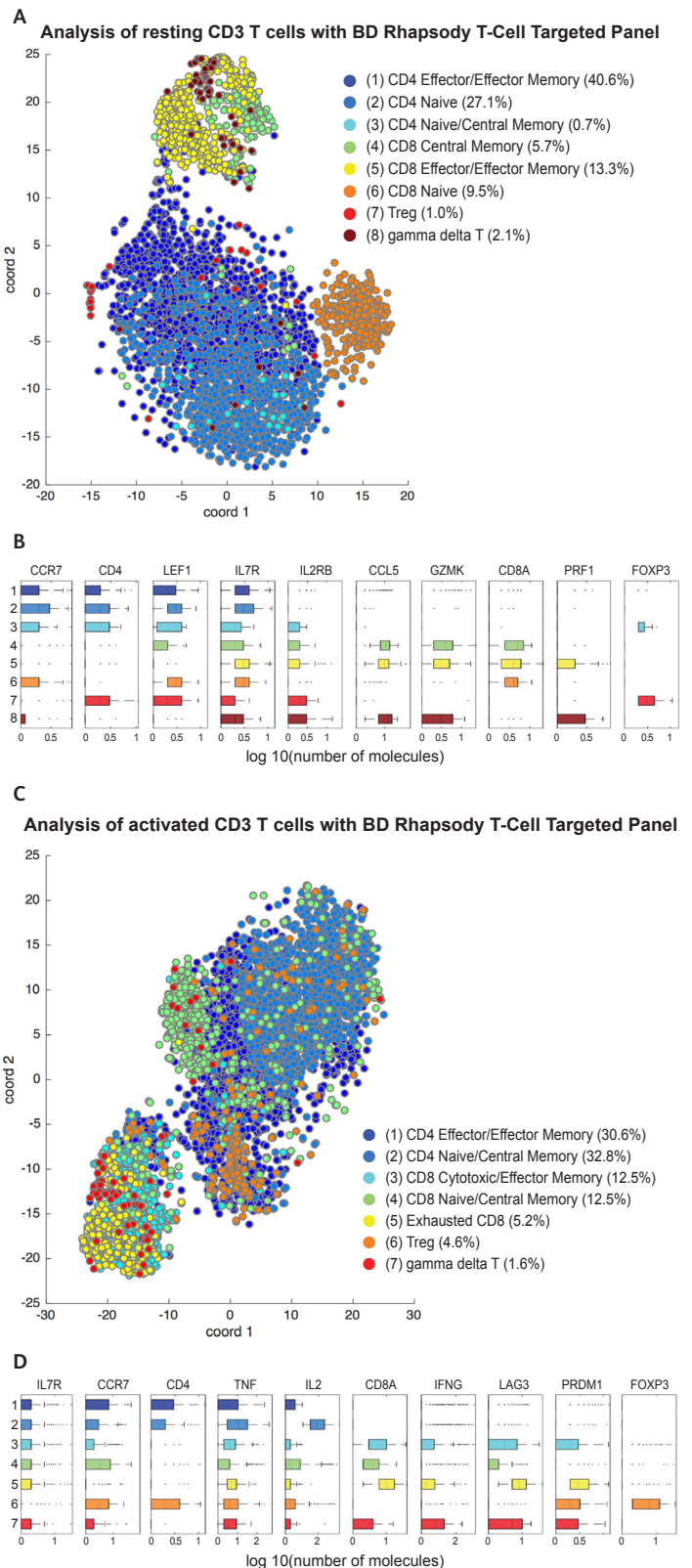
Figure 2. Example data of the BD Rhapsody T-cell panel. (a) tSNE projection of 3,436 resting CD3+ T cells, annotated by cell type. (b) Box plots of marker gene expression for each major cell type, annotated in Figure 2a. (c) tSNE project of 5,115 activated CD3+ T cells, annotated by cell type. (d) Box plots of marker gene expression for each major cell type annotated in Figure 2c.

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