

## APC Anti-Human TCRbV3.1(TRbV28) Antibody

<b>Catalog Number:</b>	107107, 107108
<b>Size:</b>	25 tests, 100 tests
<b>Target Name:</b>	TCRbV3.1
<b>Regulatory Status:</b>	RUO

### PRODUCT DETAILS

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<b>Clone:</b>	JOVI-3
<b>Application:</b>	Flow Cytometry
<b>Reactivity:</b>	Human
<b>Format:</b>	APC
<b>Isotype:</b>	Mouse IgG2a
<b>Antibody Type:</b>	Monoclonal
<b>Formulation:</b>	Phosphate-buffered solution, pH 7.2, containing 0.09% sodium azide and 0.2% (w/v) BSA
<b>Protein Concentration:</b>	Supplied at a lot-specific concentration.
<b>Storage&amp;Handling:</b>	The antibody solution should be stored undiluted between 2°C and 8°C, and protected from prolonged exposure to light. Do not freeze.
<b>Recommended Usage:</b>	For flow cytometric staining, it is recommended to use 5 µL of this reagent per 0.5-1.0 million cells in a 100 µL volume. Optimal reagent performance should be determined by titration for each specific application. APC has an excitation max at 650 nm and an emission max at 660 nm.
<b>Excitation Laser:</b>	Red Laser (633 nm)
<b>Isotype Control:</b>	301503

### BACKGROUND INFORMATION

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TCR $\beta$  V3.1, more formally designated TRBV3-1, is a variable gene segment of the T cell receptor (TCR)  $\beta$  chain that contributes to antigen recognition by  $\alpha\beta$  T lymphocytes. The TCR is central to adaptive immunity, enabling T cells to recognize peptide antigens presented by major histocompatibility complex (MHC) molecules. Use of the TRBV3-1 gene segment defines a subset of T cells with shared structural features in the variable region of their TCR  $\beta$  chain, contributing to repertoire diversity and antigen specificity.

Structurally, TCR $\beta$  V3.1 encodes part of the extracellular variable domain of the TCR  $\beta$  chain. During T cell development in the thymus, the TRBV3-1 gene recombines with diversity (D $\beta$ ) and joining (J $\beta$ ) gene segments through V(D)J recombination. This process, along with junctional diversity, generates a highly variable complementarity-determining region 3 (CDR3), which is the primary determinant of antigen specificity. The resulting TCR  $\beta$  chain pairs with a TCR  $\alpha$  chain to form the complete  $\alpha\beta$  TCR, which associates with the CD3 signaling complex to transduce activation signals. The functional "ligands" of TCR $\beta$  V3.1-containing TCRs are peptide-MHC complexes displayed on antigen-presenting cells. Antigen recognition is mediated through interactions between the TCR variable domains and both the peptide and the MHC molecule. In addition to conventional peptide antigens, certain TCR V $\beta$

families, including TRBV3-1, can be selectively engaged by bacterial or viral superantigens. Superantigens bind outside the conventional peptide-binding groove, cross-linking specific TCR V $\beta$  regions with MHC class II molecules and triggering massive, non-specific T cell activation.

TCR $\beta$  V3.1 has been implicated in disease primarily through skewed or clonal expansion of TRBV3-1-expressing T cells. Such expansions have been reported in settings of superantigen exposure, chronic infection, autoimmune disease, and some T cell leukemias or lymphomas, where restricted TCR V $\beta$  usage can reflect antigen-driven or malignant proliferation. Monitoring TRBV3-1 usage is therefore useful in studying immune dysregulation and T cell clonality.

In therapeutic and research contexts, TCR $\beta$  V3.1 is mainly used as a biomarker rather than a direct drug target. Antibodies specific for TCR V $\beta$  families enable detailed immune repertoire analysis by flow cytometry, aiding in the diagnosis of T cell malignancies and the study of antigen-specific immune responses. In adoptive T cell therapies and TCR-engineered approaches, understanding V $\beta$  usage, including TRBV3-1, contributes to safety assessment and optimization of TCR specificity and function.

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