

## iF488 Anti-Human TCRbV3.1(TRbV28) Antibody

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|---------------------------|---------------------|
| <b>Catalog Number:</b>    | 107103, 107104      |
| <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>                 | J0VI-3                                                                                                                                                                                                                                                                                      |
| <b>Application:</b>           | Flow Cytometry                                                                                                                                                                                                                                                                              |
| <b>Reactivity:</b>            | Human                                                                                                                                                                                                                                                                                       |
| <b>Format:</b>                | iF488                                                                                                                                                                                                                                                                                       |
| <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. iF488 has an excitation max at 491 nm and an emission max at 516 nm. |
| <b>Excitation Laser:</b>      | Blue Laser (488 nm)                                                                                                                                                                                                                                                                         |
| <b>Isotype Control:</b>       | 301505                                                                                                                                                                                                                                                                                      |

### 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

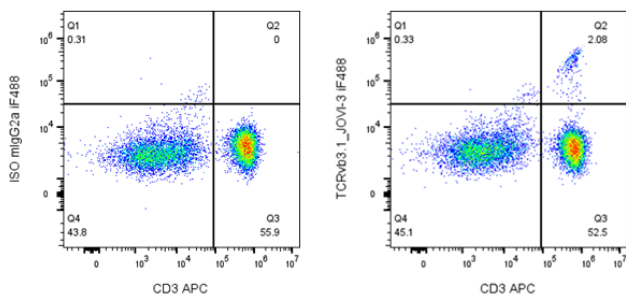
the TCR variable domains and both the peptide and the MHC molecule. In addition to conventional peptide antigens, certain TCR V $\beta$  families, including TRBV3-1, can be selectively engaged by bacterial or viral superantigens. Superantigens bind outside the conventional peptide-binding groove, cross-linking 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.

## PRODUCT DATA

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Human peripheral blood lymphocytes stained with APC Anti-human CD3 and either iF488 Anti-Human TCR $\beta$ V3.1(TR $\beta$ V28) clone JOVI-3 (right panel) or an isotype control (left panel).

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