

iF647 Anti-Mouse TCR β chain Antibody

Catalog Number:	200405, 200406
Size:	25 tests, 100 tests
Target Name:	TCR β chain, TCR- β
Regulatory Status:	RUO

PRODUCT DETAILS

Clone:	H57-597-M2a
Application:	Flow Cytometry
Reactivity:	Mouse
Format:	iF647
Isotype:	Mouse IgG2a
Antibody Type:	Monoclonal
Formulation:	Phosphate-buffered solution, pH 7.2, containing 0.09% sodium azide and 0.2% (w/v) BSA
Protein Concentration:	Supplied at a lot-specific concentration.
Storage and Handling:	The antibody solution should be stored undiluted between 2°C and 8°C, and protected from prolonged exposure to light. Do not freeze.
Recommended Usage:	For flow cytometric staining, it is recommended to use 5 μ L of this reagent per 0.5-1.0 million cells in a 100 μ L volume. Optimal reagent performance should be determined by titration for each specific application. iF647 has an excitation max at 656 nm and an emission max at 670 nm.
Excitation Laser:	Red Laser (633 nm)
Isotype Control:	302607

BACKGROUND INFORMATION

The mouse T cell receptor (TCR) β chain is a critical component of the heterodimeric $\alpha\beta$ TCR complex expressed on most mature T lymphocytes. Together with the TCR α chain, it confers antigen specificity to T cells, enabling the recognition of peptide fragments presented by major histocompatibility complex (MHC) molecules on antigen-presenting cells. This recognition event is essential for initiating adaptive immune responses, including T cell activation, proliferation, and differentiation into effector and memory subsets.

Structurally, the TCR β chain is composed of variable (V), diversity (D), joining (J), and constant (C) gene segments that undergo somatic recombination during T cell development in the thymus. This recombination process generates the highly variable complementarity-determining region 3 (CDR3), which contributes most significantly to antigen specificity. The β chain pairs non-covalently with the TCR α chain, forming the antigen-binding site. Each chain contains two extracellular immunoglobulin-like domains, a variable domain involved in antigen binding and a constant domain that stabilizes structure, along with a

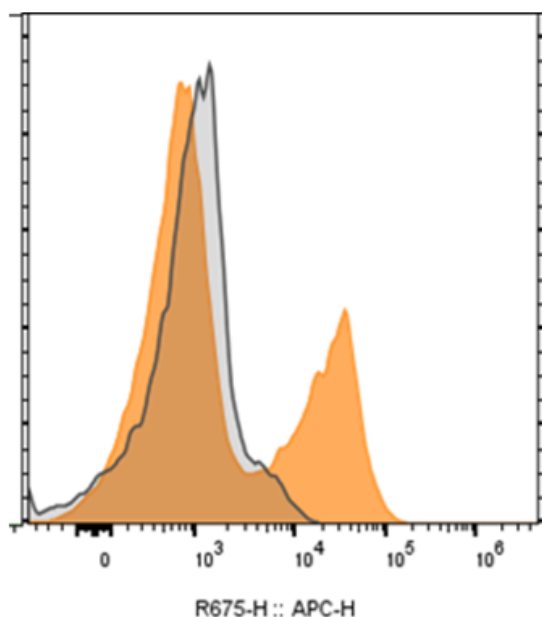
transmembrane segment and a short cytoplasmic tail. The TCR complex also associates with CD3 signaling molecules (CD3 γ , CD3 δ , CD3 ϵ , and CD3 ζ), which transduce activation signals through immunoreceptor tyrosine-based activation motifs (ITAMs).

The ligands for the mouse TCR β chain are peptide antigens bound to MHC class I or II molecules. Engagement of the $\alpha\beta$ TCR with these peptide-MHC complexes triggers receptor conformational changes that initiate intracellular signaling cascades involving kinases such as Lck and ZAP-70, leading to T cell activation and effector function.

In disease, alterations in TCR β chain expression or repertoire diversity can contribute to immune dysfunction. Restricted TCR β repertoires are associated with autoimmune diseases, such as experimental autoimmune encephalomyelitis (EAE, a model for multiple sclerosis), and with impaired immune defense in infections or cancer. Somatic mutations or skewed TCR β usage have also been observed in T cell lymphomas and leukemia.

The mouse TCR β chain has significant therapeutic and experimental relevance. It serves as a model for studying clonal selection, antigen recognition, and tolerance mechanisms. In immunotherapy, manipulation of TCR β sequence diversity underpins TCR-engineered T cell strategies for cancer and infection control. Furthermore, analyzing mouse TCR β repertoires provides insights into vaccine efficacy, autoimmune mechanisms, and immune reconstitution following bone marrow transplantation.

PRODUCT DATA



Mouse splenocytes stained with either iF647 Anti-Mouse TCR β chain clone H57-597-M2a (orange histogram) or an isotype control (gray histogram).

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