www.innocyto.com.cn

InnoCyto Inc.

15375 Barranca Pkwy, Suite I-103
Irvine, CA 92618
Email: info@innocyto.com
Phone: 1-949-418-7543

iF647 Anti-Mouse TCR β chain Antibody

Catalog Number:	200405, 200406
Size:	25 μg, 100 μg
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 less than 0.2 µg 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. 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 αβ 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

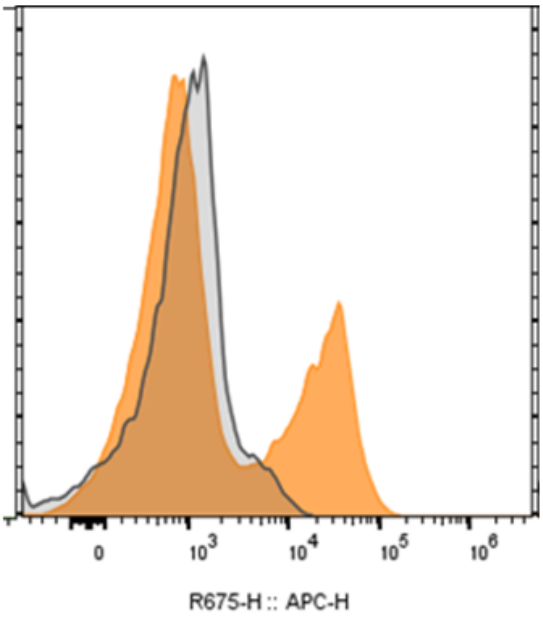
transmembrane segment and a short cytoplasmic tail. The TCR complex also associates with CD3 signaling molecules (CD3γ, CD3δ, CD3ε, and CD3ζ), which transduce activation signals through immunoreceptor tyrosine-based activation motifs (ITAMs).

The ligands for the mouse TCR β chain are peptide antigens bound to MHC class I or II molecules. Engagement of the αβ 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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