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In Vivo Star Anti-Mouse TCR beta Antibody

Catalog Number:	515501, 515502, 515503
Size:	1 mg, 5 mg, 25 mg
Target Name:	TCR beta, TCRb, beta TCR
Regulatory Status:	RUO

PRODUCT DETAILS

Clone:	H57-597-m2a
Application:	ELISA, WB, Flow cytometry, IHC, ICC, animal model study
Reactivity:	Mouse
Format:	Liquid
Product Description:	In Vivo Grade Recombinant Anti-mouse TCR beta Monoclonal Antibody
Isotype:	Mouse IgG2a
Antibody Type:	Recombinant
Purity:	>95% by reducing SDS-PAGE
Endotoxin:	< 1 EU per 1 mg of the protein by the LAL method.
Storage Conditions:	4ºC
Grade:	In vivo
Recommended Usage:	This product is suitable for in vivo animal use. Optimal amounts need to be determined empirically for each experiment.
Hidden Synonyms:	InVivoMab, InVivoPlus, GoInVivo, In Vivo Gold

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.