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Biotin Anti-Human CD4 Antibody

Catalog Number:	108211, 108212
Size:	25 ug, 100 ug
Target Name:	CD4, T4, Leu3a
Regulatory Status:	RUO

PRODUCT DETAILS

Clone:	RPA-T4
Application:	Flow Cytometry
Reactivity:	Human, Chimpanzee
Format:	Biotin
Isotype:	Mouse IgG1
Antibody Type:	Monoclonal
Formulation:	Phosphate-buffered solution, pH 7.2, containing 0.09% sodium azide and 0.2% (w/v) BSA
Protein Concentration:	0.2 mg/mL
Storage and Handling:	The antibody solution should be stored between 2°C and 8°C
Recommended Usage:	For flow cytometric staining, it is recommended to use less than 0.05 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. For detection, use a secondary reagent with this product.
Isotype Control:	301425
RRID:	AB_3738825
GeneID:	920

BACKGROUND INFORMATION

CD4 is a cell surface glycoprotein best known for its essential role in adaptive immunity. It is primarily expressed on helper T lymphocytes ($CD4^+$ T cells), as well as on subsets of dendritic cells, macrophages, and monocytes. CD4 functions as a co-receptor for the T cell receptor (TCR), enhancing antigen recognition and signal transduction during immune activation. Through its central role in coordinating immune responses, $CD4^+$ T cells help regulate both cellular and humoral immunity.

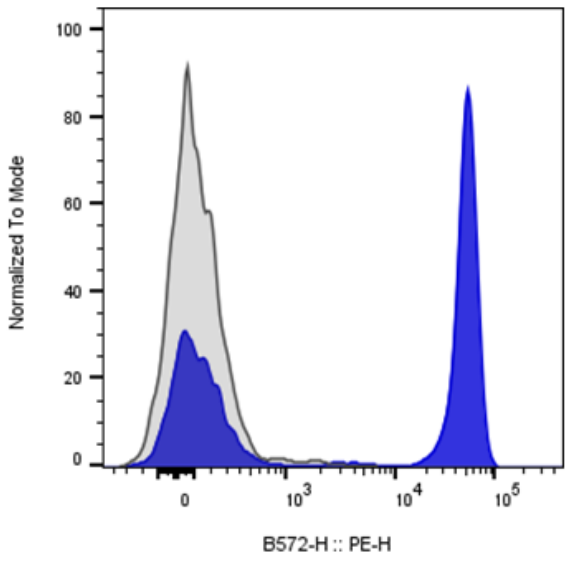
The primary ligand for CD4 is the major histocompatibility complex class II (MHC II), which is expressed on professional antigen-presenting cells such as dendritic cells, B cells, and macrophages. During antigen presentation, CD4 binds to a conserved region of MHC II while the TCR recognizes the antigenic peptide. This interaction stabilizes the immunological synapse and recruits the Src-family kinase Lck to the TCR complex, amplifying downstream signaling. Through this mechanism, CD4 lowers the threshold for T cell activation and promotes effective immune responses. CD4 can also interact with other ligands, most notably the HIV envelope glycoprotein gp120, which exploits CD4 as a receptor for viral entry.

CD4⁺ T cells differentiate into multiple functional subsets, including Th1, Th2, Th17, T follicular helper (Tfh), and regulatory T cells (Tregs). Each subset produces distinct cytokines and performs specialized functions, ranging from activation of macrophages and cytotoxic T cells to support of antibody production and maintenance of immune tolerance. Proper balance among these subsets is critical for immune homeostasis.

Dysregulation or loss of CD4⁺ T cells is associated with a wide range of diseases. The most well-known example is HIV infection, in which viral-mediated depletion of CD4⁺ T cells leads to progressive immunodeficiency and increased susceptibility to opportunistic infections. Abnormal CD4⁺ T cell responses also contribute to autoimmune diseases such as multiple sclerosis, rheumatoid arthritis, and inflammatory bowel disease, as well as allergic and chronic inflammatory conditions.

CD4 plays an important role in therapeutics both as a biomarker and a direct target. CD4⁺ T cell counts are routinely used to monitor immune status in HIV patients. Therapeutic strategies aimed at modulating CD4⁺ T cell function-such as immune checkpoint inhibitors, cytokine-targeting biologics, and tolerogenic therapies-are widely used in cancer, autoimmunity, and transplantation. Additionally, CD4 is a key consideration in vaccine design, as effective and durable immune responses depend on robust CD4⁺ T cell help.

PRODUCT DATA



Human peripheral blood lymphocytes stained either with biotinylated anti-human CD4 clone RPA-T4 (blue histogram) or an isotype control (gray histogram), followed by SA-PE.

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