

DESCRIPTION

Species Reactivity	Rat
Specificity	Detects rat 4-1BB in direct ELISAs.
Source	Polyclonal Goat IgG
Purification	Antigen Affinity-purified
Immunogen	Mouse myeloma cell line NS0-derived recombinant rat 4-1BB.
Formulation	Lyophilized from a 0.2 µm filtered solution in PBS with Trehalose. See Certificate of Analysis for details. *Small pack size (-SP) is supplied as a 0.2 µm filtered solution in PBS.

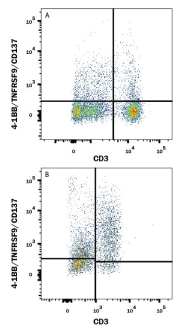
APPLICATIONS

Please Note: Optimal dilutions should be determined by each laboratory for each application. *General Protocols* are available in the *Technical Information* section on our website.

	Recommended Concentration	Sample
Flow Cytometry	0.25 µg/10 ⁶ cells	See Below
Immunocytochemistry	5-15 µg/mL	See Below
CyTOF-ready	Ready to be labeled using established conjugation methods. No BSA or other carrier proteins that could interfere with conjugation.	

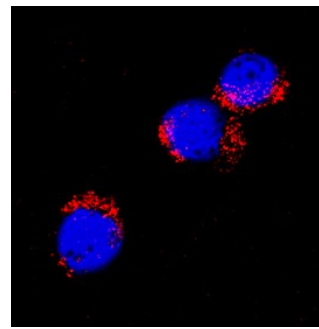
DATA

Flow Cytometry



Detection of 4-1BB/TNFRSF9/CD137 in Rat Splenocytes by Flow Cytometry. Rat splenocytes either (A) resting or (B) activated with 50 ng/mL PMA and 200 ng/mL Calcium Ionomycin overnight were stained with Goat Anti-Rat 4-1BB/TNFRSF9/CD137 Antigen Affinity-purified Polyclonal Antibody (Catalog # AF9029) followed by Phycoerythrin-conjugated Anti-Goat IgG Secondary Antibody (Catalog # F0107) and APC-conjugated Anti-Rat CD3. Quadrant markers were set based on control antibody staining (Catalog # AB-108-C). View our protocol for [Staining Membrane-associated Proteins](#).

Immunocytochemistry



4-1BB/TNFRSF9/CD137 in Rat Splenocytes. 4-1BB/TNFRSF9/CD137 was detected in immersion fixed rat splenocytes treated with calcium ionomycin and PMA using Goat Anti-Rat 4-1BB/TNFRSF9/CD137 Antigen Affinity-purified Polyclonal Antibody (Catalog # AF9029) at 15 µg/mL for 3 hours at room temperature. Cells were stained using the NorthernLights™ 557-conjugated Anti-Goat IgG Secondary Antibody (red; Catalog # NL001) and counterstained with DAPI (blue). Specific staining was localized to cytoplasm. View our protocol for [Fluorescent ICC Staining of Non-adherent Cells](#).

PREPARATION AND STORAGE

Reconstitution	Reconstitute at 0.2 mg/mL in sterile PBS.
Shipping	The product is shipped at ambient temperature. Upon receipt, store it immediately at the temperature recommended below. *Small pack size (-SP) is shipped with polar packs. Upon receipt, store it immediately at -20 to -70 °C
Stability & Storage	Use a manual defrost freezer and avoid repeated freeze-thaw cycles. <ul style="list-style-type: none"> ● 12 months from date of receipt, -20 to -70 °C as supplied. ● 1 month, 2 to 8 °C under sterile conditions after reconstitution. ● 6 months, -20 to -70 °C under sterile conditions after reconstitution.

BACKGROUND

4-1BB, also known as CD137 and TNFRSF9, is an approximately 30 kDa transmembrane glycoprotein in the TNF receptor superfamily. 4-1BB functions in the development and activation of multiple immune cells (1). Mature rat consists of a 166 amino acid (aa) extracellular domain (ECD) with four TNFR cysteine-rich repeats, a 21 aa transmembrane segment, and a 48 aa cytoplasmic domain. Within the ECD, rat 4-1BB shares 60% and 79% aa sequence identity with human and mouse 4-1BB, respectively. 4-1BB is expressed as a disulfide-linked homodimer on various populations of activated T cells including CD4⁺, CD8⁺, memory CD8⁺, NKT, and regulatory T cells (2-5) as well as on myeloid and mast cell progenitors, dendritic cells, mast cells, and bacterially infected osteoblasts (6-9). It binds with high affinity to the transmembrane 4-1BB Ligand/TNFSF9 which is expressed on antigen presenting cells and myeloid progenitor cells (6, 10). This interaction co-stimulates the proliferation, activation, and/or survival of the 4-1BB expressing cell (2-5, 10). It can also enhance the activation-induced cell death of repetitively stimulated T cells (10). Mice lacking 4-1BB show augmented T cell activation, perhaps due to its absence on regulatory T cells (11). 4-1BB can associate with OX40 on activated T cells, forming a complex that responds to either ligand and inhibits Treg and CD8⁺ T cell proliferation (12). Reverse signaling through 4-1BB Ligand inhibits the development of dendritic cells, B cells, and osteoclasts (6, 9) but supports mature dendritic cell survival and co-stimulates the proliferation and activation of mast cells (7, 8). 4-1BB activation enhances CD8⁺ T cell and NK cell mediated anti-tumor immunity (13). It also contributes to the development of inflammation in high fat diet-induced metabolic syndrome (14). Soluble forms of 4-1BB and 4-1BB Ligand circulate at elevated levels in the serum of rheumatoid arthritis and hematologic cancer patients, respectively (15, 16).

References:

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