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In Vivo Star Anti-Mouse CD40 Antibody

Catalog Number:	512801, 512802, 512803
Size:	1 mg, 5 mg, 25 mg
Target Name:	CD40, Bp50, TNFRSF5
Regulatory Status:	RUO

PRODUCT DETAILS

Clone:	FGK4.5-m2a
Application:	ELISA, WB, Flow cytometry, IHC, ICC, animal model study
Reactivity:	Mouse
Format:	Liquid
Product Description:	In vivo Grade Recombinant Anti-mouse CD40 Monoclonal Antibody
Isotype:	Mouse IgG2a Kappa
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
RRID:	AB_3739402
GeneID:	21939

BACKGROUND INFORMATION

CD40 is a costimulatory receptor that plays a central role in coordinating innate and adaptive immune responses. It is expressed primarily on antigen-presenting cells, including B cells, dendritic cells, macrophages, and monocytes, as well as on some non-hematopoietic cells such as endothelial and epithelial cells. Through interactions with T cells and other immune populations, CD40 signaling is essential for effective antibody responses, T cell activation, and the development of immune memory.

Structurally, CD40 is a type I transmembrane glycoprotein and a member of the tumor necrosis factor receptor (TNFR) superfamily. Its extracellular region contains multiple cysteine-rich domains that mediate ligand binding. CD40 has a single transmembrane segment and a cytoplasmic tail that lacks intrinsic kinase activity but recruits TNF receptor–associated factors (TRAFs), including TRAF2, TRAF3, TRAF5, and TRAF6. These adaptor proteins initiate downstream signaling pathways such as NF-κB, MAPK, and PI3K, leading to changes in gene expression that support immune activation and cell survival.

The primary ligand for CD40 is CD40 ligand (CD40L, also known as CD154 or TNFSF5), which is transiently expressed on activated CD4+ T helper cells and is also found on platelets and other immune cells. Engagement of CD40 by CD40L delivers a powerful activation signal to antigen-presenting cells. In B cells, this interaction is required for immunoglobulin class switching, germinal center formation, affinity maturation, and the generation of long-lived plasma cells and memory B cells. In dendritic cells and macrophages, CD40 signaling enhances antigen presentation, cytokine production, and the ability to prime T cells.

Dysregulation of the CD40–CD40L pathway is implicated in a variety of diseases. Defects in CD40 signaling result in impaired humoral immunity, exemplified by hyper-IgM syndrome, in which patients cannot effectively class-switch antibodies. Conversely, excessive or chronic CD40 activation contributes to autoimmune diseases, chronic inflammatory conditions, and transplant rejection by sustaining pathogenic immune responses. CD40 signaling has also been implicated in cancer, where it can either promote anti-tumor immunity through enhanced antigen presentation or, in some contexts, support tumor-associated inflammation.

Therapeutically, CD40 is an important immunomodulatory target. Agonistic CD40 antibodies are being developed to activate dendritic cells and macrophages and enhance anti-tumor immune responses, particularly in cancer immunotherapy and vaccine strategies. In contrast, blocking CD40–CD40L interactions is being explored to treat autoimmune diseases and prevent transplant rejection. These opposing approaches highlight CD40’s pivotal role as a master regulator of immune activation and tolerance.

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