

## Anti-Human IL-4 Antibody

<b>Catalog Number:</b>	110701
<b>Size:</b>	500 ug
<b>Target Name:</b>	IL-4, Interleukin-4, MCGF-2 (Mast cell growth factor-2), MFF (Macrophage fusion factor), TCGF-2 (T cell growth factor-2)
<b>Regulatory Status:</b>	RUO

### PRODUCT DETAILS

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<b>Clone:</b>	MP4-25D2
<b>Application:</b>	Intracellular Flow Cytometry
<b>Reactivity:</b>	Human
<b>Format:</b>	Purified
<b>Isotype:</b>	Rat IgG1
<b>Antibody Type:</b>	Monoclonal
<b>Formulation:</b>	Phosphate-buffered solution, pH 7.2, containing 0.09% sodium azide
<b>Protein Concentration:</b>	0.5 mg/mL
<b>Storage&amp;Handling:</b>	The antibody solution should be stored between 2°C and 8°C
<b>Recommended Usage:</b>	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.
<b>Isotype Control:</b>	300101

### BACKGROUND INFORMATION

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Interleukin-4 (IL-4) is a pleiotropic cytokine that plays a central role in shaping immune responses, particularly those associated with type 2 immunity. It is produced mainly by activated CD4<sup>+</sup> T helper 2 (Th2) cells, as well as by mast cells, basophils, eosinophils, and innate lymphoid cells. IL-4 is best known for driving the differentiation of naïve CD4<sup>+</sup> T cells into Th2 cells, thereby promoting immune programs involved in defense against helminths and in allergic inflammation.

Structurally, IL-4 is a small, secreted glycoprotein of approximately 15-17 kDa that adopts a compact four- $\alpha$ -helix bundle characteristic of many cytokines in the hematopoietin family. IL-4 signals through a heterodimeric receptor complex composed of the IL-4 receptor alpha chain (IL-4R $\alpha$ ) paired with either the common gamma chain ( $\gamma$ c) to form the type I IL-4 receptor, or with IL-13 receptor alpha 1 (IL-13R $\alpha$ 1) to form the type II receptor. Engagement of these receptor complexes initiates intracellular signaling primarily via the JAK-STAT pathway, with STAT6 acting as a key transcriptional mediator.

The functional "ligand" of IL-4 receptors is IL-4 itself, although IL-13 can also signal through the type II IL-4 receptor due to shared receptor subunits and overlapping biological effects. Through receptor engagement, IL-4 influences a wide array of immune cell functions. It stimulates B cell proliferation and promotes immunoglobulin class switching to IgE and IgG1 in mice, enhances expression of MHC class II and co-stimulatory molecules, and drives alternative (M2) activation of macrophages, which are

associated with tissue repair and modulation of inflammation.

IL-4 plays a prominent role in disease, particularly in allergic and atopic conditions such as asthma, allergic rhinitis, and atopic dermatitis. Excessive or dysregulated IL-4 signaling contributes to elevated IgE production, eosinophilic inflammation, and airway hyperresponsiveness. IL-4 is also involved in fibrotic diseases through its effects on macrophages and fibroblasts. In cancer, IL-4-driven macrophage polarization may support tumor growth in certain contexts by promoting immunosuppressive microenvironments.

Therapeutically, IL-4 signaling has become an important target in immune-mediated disease. Biologic agents that block IL-4R $\alpha$ , thereby inhibiting both IL-4 and IL-13 signaling, have demonstrated significant clinical benefit in allergic and inflammatory disorders. Conversely, controlled manipulation of IL-4 pathways is being explored to enhance tissue repair or modulate immune responses, highlighting IL-4's dual relevance as both a driver of pathology and a potential therapeutic lever.

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