

Product Information

ANTI- JAK1

Developed in Rabbit, Affinity Isolated Antibody

Product Number **J 4019**

Product Description

Anti-JAK1 is developed in rabbit using as immunogen a synthetic peptide derived from an internal region of JAK1. The serum is affinity purified using epitope-specific affinity chromatography.

Anti-JAK1 recognizes specifically JAK1 protein (130 kDa) from a number of tissues, including human, mouse and rat. This antibody does not cross react with other JAK or related proteins. It has been used in immunoblotting applications.

Janus kinases (JAK) are cytoplasmic non-receptor protein tyrosine kinases (PTKs) involved in signal transduction and control of cell survival, proliferation, differentiation and apoptosis.^{1,2,3} The members of the JAK family are JAK1, JAK2, JAK3 and TYK2. JAK1, JAK2 and TYK2 are expressed ubiquitously in a variety of cells and tissues. JAK3, on the other hand, is present only in natural killer (NK) cells and natural killer-like cells.⁴ JAK1 and JAK2 differ in their responses to interferons. JAK1 is a required regulatory molecule for interferons α and β , while JAK2 is required for signaling of interferon γ , but not IFN α or β .

Since JAKs lack their own receptors, they become activated by coupling to cellular receptors that lack enzymatic activity themselves. These receptors include cytokine receptors (IL-2, 4, 7, 9, and 15), T cell surface glycoproteins (CD4, CD8), growth factor receptors (GM-CSF), chemokine receptors (CXCR4, CCR5), hormones (growth hormone), and interferon receptors.^{5,6,7} Receptor-bound JAKs become activated via phosphorylation at two adjacent tyrosine residues, as well as one or more serine residues. In turn, they create docking sites for the SH2 containing signaling proteins STATs (Signal Transducers and Regulators of Transcription). STATs translocate to the nucleus, where they modify transcription of numerous genes. JAKs integrate components of diverse signaling cascades, including Src-kinase cascade, RAS-MAP kinase pathway, and the PI3K-AKT pathway.

The PTK activity is located in the C-terminal PTK-like domain. JAKs have a second phosphotransferase-related domain immediately N-terminal to the PTK domain; the role of this second domain is unknown.

Phosphorylation of JAKs occurs at site-specific tyrosine residues. Phosphorylation of tyrosine residues 1022 and 1023 is necessary for the activation of catalytic events in JAK1. Tyrosine 1007 and 1008 are autophosphorylation sites, and their phosphorylation is critical for JAK2 kinase activity.⁸

The negative regulation of Janus kinases has implication in many pathological conditions, including immunodeficiency, cardiac ischemia and carcinomas. This regulation occurs as a result of selective inhibition of cytokine-JAK-STAT pathways by such specific inhibitors as SOCS-1 (suppressor of cytokine signaling), phosphatase SHP-1, PIAS (protein inhibitor of activated STATs) and JAB/SOCS-1.^{9,10}

Reagent

Anti- JAK1 is supplied as approximately 100 μg of antibody in phosphate buffered saline, pH 7.3, with no preservatives added.

Storage/Stability

Store at $-70\text{ }^{\circ}\text{C}$. For extended storage, upon initial thawing, freeze in working aliquots. Avoid repeated freezing and thawing to prevent denaturing the antibody. Working dilution samples should be discarded if not used within 12 hours.

Product Profile

The recommended working concentration of 0.1 to 0.5 $\mu\text{g}/\text{ml}$ is determined by immunoblotting using 3T3-L1 cell extracts. Data demonstrate that only peptide derived from an internal region of JAK1 blocks the antibody signal, which confirms the specificity of the Anti-JAK1 for this peptide.

Note: In order to obtain best results in different techniques and preparations we recommend determining optimal working concentration by titration test.

References

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