



# JAK1 siRNA (h): sc-35719

## BACKGROUND

JAK1 (janus kinase 1) belongs to the family of non-receptor janus tyrosine kinases, which regulate a spectrum of cellular functions downstream of activated cytokine receptors in the lympho-hematopoietic system. Immunological stimuli, such as interferons and cytokines, induce recruitment of Stat transcription factors to cytokine receptor-associated JAK1. JAK1 then phosphorylates proximal Stat factors, which subsequently dimerize, translocate to the nucleus and bind to *cis* elements upstream of target gene promoters to regulate transcription. Upon ligand binding, JAK1 undergoes tyrosine phosphorylation and catalytic activation in an interdependent manner. Phosphorylation of tyrosine residues at position 1,022 and 1,023 is believed to function in the activation of catalytic events. The canonical JAK-Stat pathway is integral to maintaining a normal immune system by stimulating proliferation, differentiation, survival, and host resistance to pathogens. Altering JAK-Stat signaling to reduce cytokine induced pro-inflammatory responses represents an attractive target for anti-inflammatory therapies.

## REFERENCES

1. Heim, M.H. 1996. The JAK-Stat pathway: specific signal transduction from the cell membrane to the nucleus. *Eur. J. Clin. Invest.* 26: 1-12.
2. Gauzzi, M.C., et al. 1996. Interferon- $\alpha$ -dependent activation of Tyk2 requires phosphorylation of positive regulatory tyrosines by another kinase. *J. Biol. Chem.* 271: 20494-20500.

## CHROMOSOMAL LOCATION

Genetic locus: JAK1 (human) mapping to 1p31.3.

## PRODUCT

JAK1 siRNA (h) is a pool of 3 target-specific 19-25 nt siRNAs designed to knock down gene expression. Each vial contains 3.3 nmol of lyophilized siRNA, sufficient for a 10  $\mu$ M solution once resuspended using protocol below. Suitable for 50-100 transfections. Also see JAK1 shRNA Plasmid (h): sc-35719-SH and JAK1 shRNA (h) Lentiviral Particles: sc-35719-V as alternate gene silencing products.

For independent verification of JAK1 (h) gene silencing results, we also provide the individual siRNA duplex components. Each is available as 3.3 nmol of lyophilized siRNA. These include: sc-35719A, sc-35719B and sc-35719C.

## STORAGE AND RESUSPENSION

Store lyophilized siRNA duplex at -20° C with desiccant. Stable for at least one year from the date of shipment. Once resuspended, store at -20° C, avoid contact with RNAses and repeated freeze thaw cycles.

Resuspend lyophilized siRNA duplex in 330  $\mu$ l of the RNase-free water provided. Resuspension of the siRNA duplex in 330  $\mu$ l of RNase-free water makes a 10  $\mu$ M solution in a 10  $\mu$ M Tris-HCl, pH 8.0, 20 mM NaCl, 1 mM EDTA buffered solution.

## APPLICATIONS

JAK1 siRNA (h) is recommended for the inhibition of JAK1 expression in human cells.

## SUPPORT REAGENTS

For optimal siRNA transfection efficiency, Santa Cruz Biotechnology's siRNA Transfection Reagent: sc-29528 (0.3 ml), siRNA Transfection Medium: sc-36868 (20 ml) and siRNA Dilution Buffer: sc-29527 (1.5 ml) are recommended. Control siRNAs or Fluorescein Conjugated Control siRNAs are available as 10  $\mu$ M in 66  $\mu$ l. Each contain a scrambled sequence that will not lead to the specific degradation of any known cellular mRNA. Fluorescein Conjugated Control siRNAs include: sc-36869, sc-44239, sc-44240 and sc-44241. Control siRNAs include: sc-37007, sc-44230, sc-44231, sc-44232, sc-44233, sc-44234, sc-44235, sc-44236, sc-44237 and sc-44238.

## GENE EXPRESSION MONITORING

JAK1 (B-3): sc-376996 is recommended as a control antibody for monitoring of JAK1 gene expression knockdown by Western Blotting (starting dilution 1:200, dilution range 1:100-1:1000) or immunofluorescence (starting dilution 1:50, dilution range 1:50-1:500).

To ensure optimal results, the following support reagents are recommended: 1) Western Blotting: use m-IgG $\kappa$  BP-HRP: sc-516102 or m-IgG $\kappa$  BP-HRP (Cruz Marker): sc-516102-CM (dilution range: 1:1000-1:10000), Cruz Marker™ Molecular Weight Standards: sc-2035, UltraCruz® Blocking Reagent: sc-516214 and Western Blotting Luminol Reagent: sc-2048. 2) Immunofluorescence: use m-IgG $\kappa$  BP-FITC: sc-516140 or m-IgG $\kappa$  BP-PE: sc-516141 (dilution range: 1:50-1:200) with UltraCruz® Mounting Medium: sc-24941 or UltraCruz® Hard-set Mounting Medium: sc-359850.

## RT-PCR REAGENTS

Semi-quantitative RT-PCR may be performed to monitor JAK1 gene expression knockdown using RT-PCR Primer: JAK1 (h)-PR: sc-35719-PR (20  $\mu$ l, 599 bp). Annealing temperature for the primers should be 55-60° C and the extension temperature should be 68-72° C.

## SELECT PRODUCT CITATIONS

1. Sarma, N.J., et al. 2014. Hepatitis C virus-induced changes in microRNA 107 (miRNA-107) and miRNA-449a modulate CCL2 by targeting the interleukin-6 receptor complex in hepatitis. *J. Virol.* 88: 3733-3743.
2. Padmanabhan, S., et al. 2021. IFN $\gamma$  induces JAK1/Stat1/p65 NF $\kappa$ B-dependent interleukin-8 expression in ovarian cancer cells, resulting in their increased migration. *Int. J. Biochem. Cell Biol.* 141: 106093.
3. Padmanabhan, S., et al. 2022. IFN $\gamma$ -induced PD-L1 expression in ovarian cancer cells is regulated by JAK1, Stat1 and IRF1 signaling. *Cell. Signal.* 97: 110400.
4. Gaire, B., et al. 2023. IFN $\gamma$  induces Bcl3 expression by JAK1/Stat1/p65 signaling, resulting in increased IL-8 expression in ovarian cancer cells. *FEBS Open Bio* 13: 1495-1506.

## RESEARCH USE

For research use only, not for use in diagnostic procedures.