Recombinant Human IL-1α Protein

Product Name

Recombinant Human IL-1α Protein

Size / Catalog Number

10μg / TL109-0010

Product Information

Synonyms: Interleukin-1α, Hematopoietin-1

Accession: UniProt P01583

Expressed Region: Ser113-Ala271

Tag: C-terminal 6×His-tag

Predicted Expression system: *E. coli*

Molecular weight: 19.2 kDa

Purity: > 90% as determined by SDS-PAGE

Endotoxin: < 0.1 EU per 1 μg of protein (LAL method)

Activity: Determined by its ability to induce human NK-92 natural killer lymphoma cells to secrete IFN-γ, the corresponding specific activity is ≥ $5x10^6$ IU/mg.

Form: Lyophilized from sterile PBS (pH7.4), typically supplemented with 6% mannitol as a protectant.

Background

IL-1α is a pleiotropic proinflammatory cytokine and core member of the IL-1 superfamily. Constitutively expressed as a precursor in epithelial cells (particularly dermal keratinocytes), it is proteolytically activated by calpain into a 17-kDa mature form that engages dual receptor mechanisms (IL-1RI signaling/IL-1RII decoy) to trigger NF-κB and MAPK pathways, inducing cascading release of inflammatory mediators including IL-6, COX-2, and nitric oxide (NO). It exhibits dual immunological functions: acting as an 'alarmin' to initiate innate immunity upon tissue injury while maintaining skin barrier integrity against pathogens. For cell therapy applications, it serves as a critical modulator in *ex vivo* immune cell maturation: 1) In dendritic cell (DC) vaccine production, pulsed low-dose stimulation (pM-fM range) synergizes with TLR ligands to enhance MHC-II/co-stimulatory molecule expression, optimizing tumor antigen presentation; 2) For mesenchymal stem cell (MSC) therapeutics, it fine-tunes TRAF6 signaling intensity to induce immunosuppressive HLA-G secretion, augmenting immunomodulatory potency in graft-versus-host disease (GVHD) treatment. Its activity is reversibly inhibited by IL-1Ra and regulated by nuclear localization sequence (NLS)-mediated translocation, establishing a dynamic equilibrium exploitable for precision interventions in autoimmune disease cell therapies.

Stability & Storage

Lyophilized powder: Stable for 12 months at -80°C or 6 months at -20°C when stored in the original sealed container under desiccant.

Reconstitution: Dissolve contents in 200 μL sterile water for injection, 0.9% NaCl, or PBS (pH7.4), maintaining a final concentration about 50 μg/mL.

Handling: Aliquot to avoid repeated freeze-thaw cycles.

References

1. Malik A, Kanneganti TD. Function and regulation of IL-1α in inflammatory diseases and cancer. Immunol Rev. 2018 Jan;281(1):124-137.

2. Chiu JW, Binte Hanafi Z, Chew LCY, *et al*. IL-1α Processing, Signaling and Its Role in Cancer Progression. Cells. 2021 Jan 7;10(1):92.

3. Pfeiler S, Winkels H, Kelm M, *et al*. IL-1 family cytokines in cardiovascular disease. Cytokine. 2019 Oct;122:154215.

4. Garlanda C, Dinarello CA, Mantovani A. The interleukin-1 family: back to the future. Immunity. 2013 Dec 12;39(6):1003-18.

5. Rider P, Carmi Y, Voronov E, *et al*. Interleukin-1α. Semin Immunol. 2013 Dec 15;25(6):430-8.

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