Miltenyi Biotec

Human IL-7-Fc
research grade

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1. Description

Products

Human IL-7-Fc, research grade.

Fc-fused recombinant human interleukin 7.

Content in µg	Order no.
10	130-137-021
25	130-137-023

Biological activity

The ED_{50} is ≤6.7 ng/mL corresponding to an activity of ≥1.5×10^5 U/mg.

▲ **Note:** The ED50 is determined by proliferation assay using mouse 2E8 cells.

Primary structure

Two identical glycosylated covalently-linked polypeptide chains (386 amino acid residues each).

Molecular mass

87.0 kDa (dimer, calculated).

Source

Produced in HEK293 cells.

Product format

Lyophilized from a filtered (0.2 µm) buffer solution.

Stabilizer

Mannitol and trehalose.

Purity

>95%% as determined by SDS-PAGE analysis.

Endotoxin level

Low endotoxin (<1.0 EU/µg cytokine) as determined by Limulus Amebocyte Lysate (LAL) assay.

Storage

Lyophilized Human IL-7-Fc, research grade should be stored at –20 °C. The expiration date is indicated on the vial label. Upon reconstitution aliquots should be stored at –20 °C or below. Avoid repeated freeze-thaw cycles.

Reconstitution

It is recommended to reconstitute lyophilized Human IL-7-Fc, research grade with deionized sterile-filtered water to a final concentration of 0.1-1.0 mg/mL in a minimal volume of 100 µL. Further dilutions should be prepared with 0.1% bovine serum albumin (BSA) or human serum albumin (HSA) in phosphate-buffered saline.

1.1 Background information

Human IL-7-Fc (Fc-fused Human IL-7) is a fusion protein consisting of recombinant Human IL-7 and the mutated Fc region of human IgG1. The Fc region contains mutations that prevent binding to Fc gamma receptors. Due to the Fc domain forming stable homodimers, the fusion protein presents two IL-7 molecules, one on each Fc arm, resulting in a dimeric configuration of IL-7.

In its function as a stimulatory cytokine, IL-7 is crucial for the development, differentiation and maintenance of T and B cells, and has shown therapeutic potential in boosting immune and antitumor responses. However, IL-7 has a short half-life in vivo and can only act in an autocrine or paracrine manner over short distances. Fusion to the dimeric Fc region extends the protein's half-life in the bloodstream by reducing its clearance rate. While mutations in the Fc region prevent it from binding to Fc gamma receptors (FcγRs), the Fc region can interact with neonatal Fc receptor (FcRn), which protects the protein from degradation and facilitates transcytosis. This results in prolonged circulation time and better tissue distribution, making IL-7-Fc a promising candidate for therapeutic applications.[1,2]

In mice, the administration of Fc-fused IL-7 proteins has been shown to mobilize hematopoietic stem and progenitor cells from the bone marrow,[3] enhance anti-tumor effects in cancer immunotherapy by promoting the expansion of $CD8^+$ cells and have protective effects against viral infections.[4,5] Additionally, the recombinant protein efineptakin alfa (NT-17), another Fc-fused IL-7 variant, has been shown to enhance the expansion, persistence and anti-tumor efficacy of CAR T cells in mice, including in the treatment of solid tumors.[6,7]

Human IL-7-Fc can be used for *in vivo* studies in humanized mouse models of disease. The recombinant protein is produced in a human embryonic kidney (HEK) cell line, to ensure proper folding and post-translational modifications.

1.2 Applications

Human IL-7-Fc can be used for a variety of applications including:

- Investigating immunomodulatory, antitumor and therapeutic effects *in vivo* using humanized mice.
- *In vitro* expansion and priming of T cells.
- *In vitro* differentiation of T cells and iNKT cells.

Optimal concentration for a specific application should be determined by a dose-response experiment.

2. References

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3. Kim, S. *et al.* (2021) Fc-fused IL-7 mobilizes long-term HSCs in a pro-B cell-dependent manner and synergizes with G-CSF and AMD3100. Leukemia 35 (10): 3030–3034.
4. Kang, M.C. *et al.* (2015) Intranasal Introduction of Fc-Fused Interleukin-7 Provides Long-Lasting Prophylaxis against Lethal Influenza Virus Infection. J Virol. 90 (5): 2273–2284.
5. Kwon, D. *et al.* (2024) Fc-fused IL-7 provides broad antiviral effects against

140-007-316.01

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6. Kim, M.Y. *et al.* (2022) A long-acting interleukin-7, rhIL-7-hyFc, enhances CAR T cell expansion, persistence, and anti-tumor activity. Nat Commun 13 (1): 3296.
7. Li, D. *et al.* (2024) rhIL-7-hyFc, a long-acting interleukin-7, improves efficacy of CAR-T cell therapy in solid tumors. J Immunother Cancer 12 (7): e008989.

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140-007-316.01

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