Miltenyi Biotec

Human IL-4
research grade

Contents

1. Description
   - 1.1 Background information
   - 1.2 Applications
2. References

1. Description

Products

Human IL-4, research grade.

Recombinant human interleukin 4.

Content in µg	Order no.
5	130-093-915
10	130-095-373
25	130-093-917
100	130-094-117

Biological activity

The ED_{50} is ≤0.5 ng/mL corresponding to an activity of ≥2×10^6 IU/mg.

▲ **Note:** The ED_{50} is determined by proliferation assay using TF-1 cells according to Kitamura *et al.*[1] The proliferation assay was calibrated with the international standard for human IL-4 (NIBSC code 88/656) provided by the WHO/ National Institute for Biological Standards and Control.

Primary structure

Single, non-glycosylated polypeptide chain (130 amino acid residues including N-terminal methionine).

Molecular mass

15.1 kDa.

Source

Produced in *E. coli*.

Product format

Lyophilized from a filtered (0.2 µm) buffer solution.

Stabilizer

Mannitol and trehalose.

Purity

>97% 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-4, 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-4, 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

Interleukin 4 (IL-4) is a pleiotropic cytokine and plays a central role in humoral and adaptive immune responses. IL-4 is predominantly secreted by activated $CD4^+$ memory and effector TH2 cells, basophils, and mast cells. It promotes the proliferation and differentiation of B cells, as well as immunoglobulin isotype switching, and MHC class II antigen and low-affinity IgE receptor expression. Furthermore, IL-4 induces the differentiation of naive $CD4^+$ T cells into helper TH2 cells, while suppressing TH1 development, and promotes chemotaxis of mast cells and basophils. Excessive IL-4 production and mechanisms involving TH2 types have been associated with immunological disorders, such as IgE-mediated allergy.

1.2 Applications

Human IL-4 can be used for a variety of applications including:

- *In vitro* generation of Mo-DCs together with GM-CSF.
- *In vitro* differentiation of naive $CD4^+$ T cells towards TH2 cells.

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

2. References

1. Kitamura, T. *et al.* (1991) IL-1 up-regulates the expression of cytokine receptors on a factor-dependent human hemopoetic cell line, TF-1. Int. Immunol. 3: 571–577.
2. Herr, F. *et al.* (2014) IL-2 phosphorylates STAT5 to drive IFN-γ production and activation of human dendritic cells. J Immunol 192: 5660–5670.
3. Kaebisch R. *et al.* (2014) Helicobacter pylori cytotoxin-associated gene A impairs human dendritic cell maturation and function through IL-10-mediated activation of STAT3. J Immunol 192: 316–323.
4. Guery, L. *et al.* (2014) Fine-tuning nucleophosmin in macrophage differentiation and activation. Blood 118: 4694–4704.
5. Grötsch, B. *et al.* (2014) The AP-1 transcription factor Fra1 inhibits follicular B cell differentiation into plasma cells. J. Exp. Med. 211 (11): 2199–2212.
6. Kandler, K. *et al.* (2006) The anti-microbial peptide LL-37 inhibits the activation of dendritic cells by TLR ligands. Int. Immunol. 18: 1729–1736.
7. Zhu, J. *et al.* (2006) Gfi-1 plays an important role in IL-2-mediated TH2 cell expansion. Proc. Natl. Acad. Sci. U.S.A. 103: 18214–18219.
8. Klatka, J. *et al.* (2013) Expression of selected regulatory molecules on the $CD83^+$ monocyte-derived dendritic cells generated from patients with laryngeal cancer and their clinical significance. Eur. Arch. Otorhinolaryngol. 270 (10): 2683–2693.
9. Sampangi, S. *et al.* (2015) The mechanisms of human renal epithelial cell modulation of autologous dendritic cell phenotype and function. PLoS One 10 (7): e0134688.
10. Hsieh, S.-H. *et al.* (2017) Persistence within dendritic cells marks an antifungal evasion and dissemination strategy of *Aspergillus terreus*. Sci Rep 6;7 (1): 10590.
11. Johnson, M. J. *et al.* (2018) Transcriptional profiles of human islet and exocrine endothelial cells in subjects with or without impaired glucose metabolism. Sci Rep 8 (1): 12144.
12. Chase A. J. *et al.* (2011) Impairment of $CD4^+$ T cell polarization by dengue virus-infected dendritic cells. J. Infect. Dis. 203: 1763–1774.
13. Ackaert, C. *et al.* (2021) Immunogenicity risk profile of nanobodies. Front Immunol 12: 632687.
14. De Laere, M. *et al.* (2018) Shuttling tolerogenic dendritic cells across the blood-brain barrier *in vitro* via the introduction of *de novo* C-C chemokine receptor

140-002-363.10

Miltenyi Biotec B.V. & Co. KG
Friedrich-Ebert-Straße 68, 51429 Bergisch Gladbach, Germany
Phone +49 2204 8306-0, Fax +49 2204 85197
macsde@miltenyi.com
www.miltenyibiotec.com

5 expression using messenger RNA electroporation. Front Immunol 8: 1964.

15. Giroud, P. *et al.* (2020) Expression of TAM-R in human immune cells and unique regulatory function of MerTK in IL-10 production by tolerogenic DC. Front Immunol 11: 564133.
16. Koliha, N. *et al.* (2016) Melanoma affects the composition of blood cell-derived extracellular vesicles. Front Immunol 7: 282.
17. Thépaut, M. *et al.* (2021) DC/L-SIGN recognition of spike glycoprotein promotes SARS-CoV-2 trans-infection and can be inhibited by a glycomimetic antagonist. PLoS Pathog. 17 (5): e1009576.
18. Zanoni, M. *et al.* (2020) Innate, non-cytolytic $CD8^+$ T cell-mediated suppression of HIV replication by MHC-independent inhibition of virus transcription. PLoS Pathog. 16 (9): e1008821.
19. Kassianos, A. J. *et al.* (2013) Human proximal tubule epithelial cells modulate autologous dendritic cell function. Nephrol Dial Transplant 28: 303–312.
20. Foord, E. *et al.* (2020) Profound functional suppression of tumor-infiltrating T-cells in ovarian cancer patients can be reversed using PD-1-blocking antibodies or DARPin® proteins. J Immunol Res: 7375947.
21. Bacher, P. *et al.* (2014) Antigen-specific expansion of human regulatory T cells as a major tolerance mechanism against mucosal fungi. Mucosal Immunol 7 (4): 916–928.
22. Perriard, G. *et al.* (2015) Interleukin-22 is increased in multiple sclerosis patients and targets astrocytes. J. Neuroinflammation 12: 119.
23. Feray, A. *et al.* (2020) How to address the adjuvant effects of nanoparticles on the immune system. Nanomaterials (Basel) 10 (3): 425.
24. Novak, N. *et al.* (2020) Interaction of monocyte-derived dendritic cells with Ara h 2 from raw and roasted peanuts. Foods 9 (7): 863.

Refer to **www.miltenyibiotec.com** for all data sheets and protocols. Miltenyi Biotec provides technical support worldwide. Visit www.miltenyibiotec.com for local Miltenyi Biotec Technical Support contact information.

Legal notices

Limited product warranty

Miltenyi Biotec B.V. & Co. KG and/or its affiliate(s) warrant this product to be free from material defects in workmanship and materials and to conform substantially with Miltenyi Biotec's published specifications for the product at the time of order, under normal use and conditions in accordance with its applicable documentation, for a period beginning on the date of delivery of the product by Miltenyi Biotec or its authorized distributor and ending on the expiration date of the product's applicable shelf life stated on the product label, packaging or documentation (as applicable) or, in the absence thereof, ONE (1) YEAR from date of delivery ("Product Warranty"). Miltenyi Biotec's Product Warranty is provided subject to the warranty terms as set forth in Miltenyi Biotec's General Terms and Conditions for the Sale of Products and Services available on Miltenyi Biotec's website at www.miltenyibiotec.com, as in effect at the time of order ("Product Warranty"). Additional terms may apply. BY USE OF THIS PRODUCT, THE CUSTOMER AGREES TO BE BOUND BY THESE TERMS.

THE CUSTOMER IS SOLELY RESPONSIBLE FOR DETERMINING IF A PRODUCT IS SUITABLE FOR CUSTOMER'S PARTICULAR PURPOSE AND APPLICATION METHODS.

Technical information

The technical information, data, protocols, and other statements provided by Miltenyi Biotec in this document are based on information, tests, or experience which Miltenyi Biotec believes to be reliable, but the accuracy or completeness of such information is not guaranteed. Such technical information and data are intended for persons with knowledge and technical skills sufficient to assess and apply their own informed judgment to the information. Miltenyi Biotec shall not be liable for any technical or editorial errors or omissions contained herein.

All information and specifications are subject to change without prior notice. Please contact Miltenyi Biotec Technical Support or visit www.miltenyibiotec.com for the most up-to-date information on Miltenyi Biotec products.

140-002-363.10

Licenses

This product and/or its use may be covered by one or more pending or issued patents and/or may have certain limitations. Certain uses may be excluded by separate terms and conditions. Please contact your local Miltenyi Biotec representative or visit Miltenyi Biotec's website at www.miltenyibiotec.com for more information.

The purchase of this product conveys to the customer the non-transferable right to use the purchased amount of the product in research conducted by the customer (whether the customer is an academic or for-profit entity). This product may not be further sold. Additional terms and conditions (including the terms of a Limited Use Label License) may apply.

CUSTOMER'S USE OF THIS PRODUCT MAY REQUIRE ADDITIONAL LICENSES DEPENDING ON THE SPECIFIC APPLICATION. THE CUSTOMER IS SOLELY RESPONSIBLE FOR DETERMINING FOR ITSELF WHETHER IT HAS ALL APPROPRIATE LICENSES IN PLACE. Miltenyi Biotec provides no warranty that customer's use of this product does not and will not infringe intellectual property rights owned by a third party. BY USE OF THIS PRODUCT, THE CUSTOMER AGREES TO BE BOUND BY THESE TERMS.

Trademarks

The Miltenyi Biotec logo is a registered trademark or trademark of Miltenyi Biotec B.V. & Co. KG and/or its affiliates in various countries worldwide.

Copyright © 2023 Miltenyi Biotec and/or its affiliates. All rights reserved.

Unless otherwise specifically indicated, Miltenyi Biotec products and services are for research use only and not for diagnostic or therapeutic use.