Recombinant Human IL-2 GMP

Catalog Number: 202-GMP

DESCRIPTION

Source	*E. coli*-derived human IL-2 protein Ala21-Thr153, with an N-terminal Met Accession # P60568.1 Produced using non-animal reagents in an animal-free laboratory. Manufactured and tested under cGMP guidelines.
N-terminal Sequence Analysis	Met-Ala_{21}-Pro-Thr-Ser-Ser-Ser-Thr-Lys-Lys
Predicted Molecular Mass	15.5 kDa

SPECIFICATIONS

SDS-PAGE	13 kDa, reducing conditions
Activity	Measured in a cell proliferation assay using CTLL-2 mouse cytotoxic T cells. Gearing, A.J.H. and C.B. Bird (1987) in Lymphokines and Interferons, A Practical Approach. Clemens, M.J. *et al.* (eds): IRL Press. 295. The ED_{50} for this effect is 0.05-0.25 ng/mL. The specific activity of recombinant human IL-2 is >5.0 x 10^6 IU/mg, which is calibrated against the human IL-2 WHO International Standard (NIBSC code: 86/500).
Endotoxin Level	<0.01 EU per 1 µg of the protein by the LAL method.
Purity	>97%, by SDS-PAGE with silver staining, under reducing conditions.
Mass Spectrometry	Intact mass analysis of recombinant human IL-2 confirms the predicted molecular mass of 15549 Da.
Host Cell Protein	<0.5 ng per µg of protein when tested by ELISA.
Mycoplasma	Negative for Mycoplasma.
Host Cell DNA	<0.0015 ng per µg of protein when tested by PCR.
Formulation	Lyophilized from a 0.2 µm filtered solution in Acetonitrile and TFA. See Certificate of Analysis for details.

PREPARATION AND STORAGE

Reconstitution	Reconstitute at 100 µg/mL in 100 mM acetic acid. Alternatively, reconstitute at 100 µg/mL in sterile deionized water and use within 24 hours, store at 2 to 8 °C.
Shipping	The product is shipped with polar packs. Upon receipt, store it immediately at the temperature recommended below.
Stability & Storage	**Use a manual defrost freezer and avoid repeated freeze-thaw cycles.** • A minimum of 12 months when stored at ≤ -20 °C as supplied. Refer to lot specific COA for the Use by Date. • 1 month, 2 to 8 °C under sterile conditions after reconstitution. • 3 months, ≤ -20 °C under sterile conditions after reconstitution.

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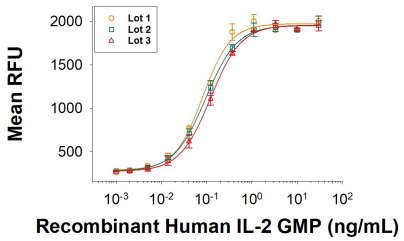
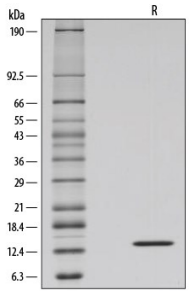
DATA

Bioactivity



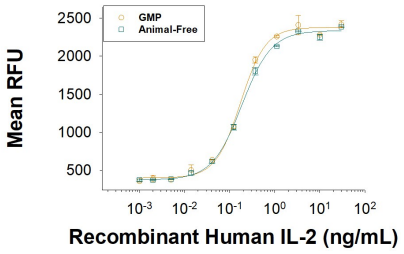
Recombinant Human IL-2 GMP Protein Bioactivity GMP-grade Recombinant Human IL-2 (Catalog # 202-GMP) stimulates cell proliferation of the CTLL-2 mouse cytotoxic T cell line. The ED_{50} for this effect is 0.05-0.25 ng/mL. Three independent lots were tested for activity and plotted on the same graph to show lot-to-lot consistency of GMP IL-2.

SDS-PAGE



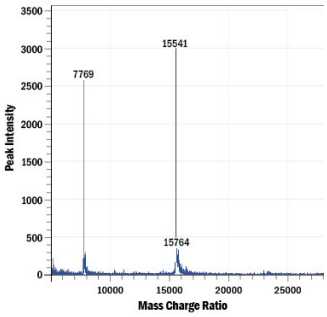
Recombinant Human IL-2 GMP Protein SDS-PAGE 1 µg/lane of GMP-grade Recombinant Human IL-2 (Catalog # 202-GMP) was resolved with SDS-PAGE under reducing (R) conditions and visualized by silver staining, showing a single band at 13 kDa.

Bioactivity



Equivalent Bioactivity of GMP and Animal-Free grades of Recombinant Human IL-2 Equivalent bioactivity of GMP (Catalog # 202-GMP) and Animal-Free (Catalog # AFL202) grades of Recombinant Human IL-2 as measured in a cell proliferation assay using CTLL 2 mouse cytotoxic T cells (orange and green, respectively).

Mass Spectrometry



Recombinant Human IL-2 GMP Protein Mass Spectrometry MALDI-TOF analysis of GMP-grade Recombinant Human IL-2 (Catalog # 202-GMP). The major peak corresponds to the calculated molecular mass, 15549 Da. The minor peak at 15764 Da is a matrix-associated artifact of the MALDI-TOF.

BACKGROUND

Interleukin-2 (IL-2) is a O-glycosylated, four α-helix bundle cytokine that has potent stimulatory activity for antigen-activated T cells. It is expressed by $CD4^+$ and $CD8^+$ T cells, γδ T cells, B cells, dendritic cells, and eosinophils (1-3). Mature human IL-2 shares 56% and 66% aa sequence identity with mouse and rat IL-2, respectively. Human and mouse IL-2 exhibit cross-species activity (4). The receptor for IL-2 consists of three subunits that are present on the cell surface in varying preformed complexes (5-7). The 55 kDa IL-2 Rα is specific for IL-2 and binds with low affinity. The 75 kDa IL-2 Rβ, which is also a component of the IL-15 receptor, binds IL-2 with intermediate affinity. The 64 kDa common gamma chain γc/IL-2 Rγ, which is shared with the receptors for IL-4, -7, -9, -15, and -21, does not independently interact with IL-2. Upon ligand binding, signal transduction is performed by both IL-2 Rβ and γc. IL-2 is best known for its autocrine and paracrine activity on T cells. It drives resting T cells to proliferate and induces IL-2 and IL-2 Rα synthesis (1, 2). It contributes to T cell homeostasis by promoting the Fas-induced death of naïve $CD4^+$ T cells but not activated $CD4^+$ memory lymphocytes (8). IL-2 plays a central role in the expansion and maintenance of regulatory T cells, although it inhibits the development of Th17 polarized cells (9-11). Thus, IL-2 may be a key cytokine in the natural suppression of autoimmunity (12, 13).

References:

1. Ma, A. *et al.* (2006) Annu. Rev. Immunol. **24**:657.
2. Gaffen, S.L. and K.D. Liu (2004) Cytokine **28**:109.
3. Taniguchi, T. *et al.* (1983) Nature **302**:305.
4. Mosmann, T.R. *et al.* (1987) J. Immunol. **138**:1813.
5. Liparoto, S.F. *et al.* (2002) Biochemistry **41**:2543.
6. Wang, X. *et al.* (2005) Science **310**:1159.
7. Bodnar, A. *et al.* (2008) Immunol. Lett. **116**:117.
8. Jaleco, S. *et al.* (2003) J. Immunol. **171**:61.
9. Malek, T.R. (2003) J. Leukoc. Biol. **74**:961.
10. Laurence, A. *et al.* (2007) Immunity **26**:371.
11. Kryczek, I. *et al.* (2007) J. Immunol. **178**:6730.
12. Afzali, B. *et al.* (2007) Clin. Exp. Immunol. **148**:32.
13. Fehervari, Z. *et al.* (2006) Trends Immunol. **27**:109.

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