

DESCRIPTION

Source *E. coli*-derived human IL-21 protein
Gln32-Ser162 with a N-terminal Met
Accession # Q9HBE4.3
Produced using non-animal reagents in an animal-free laboratory.
Manufactured and tested under cGMP guidelines.

N-terminal Sequence Analysis Met-Gln32-Asp-Arg-His-Met-Ile-Arg-Met-Arg

Predicted Molecular Mass 15 kDa

SPECIFICATIONS

SDS-PAGE 15-17 kDa, under reducing conditions.

Activity Measured in a cell proliferation assay using B9 mouse hybridoma cells.
The ED₅₀ for this effect is 5.00-50.0 ng/mL.
The specific activity of recombinant human IL-21 is >1.00 x 10⁶ units/mg, which is calibrated against an internal reference standard for human IL-21.

Endotoxin Level <0.10 EU per 1 µg of the protein by the LAL method.

Purity >95%, by SDS-PAGE with quantitative densitometry by Coomassie® Blue Staining.

Mass Spectrometry The molecular weight by mass spectrometry is 15396 Da ± 50 Da.

Host Cell Protein <0.100 ng per µg of protein when tested by ELISA.

Mycoplasma Negative for Mycoplasma.

Host Cell DNA <0.00150 ng per µg of protein when tested by PCR.

Formulation Lyophilized from a 0.2 µm filtered solution in PBS with Trehalose. See Certificate of Analysis for details.

PREPARATION AND STORAGE

Reconstitution Reconstitute the 25 µg size at 250 µg/mL in PBS. Reconstitute all other sizes at 500 µg/mL in PBS.

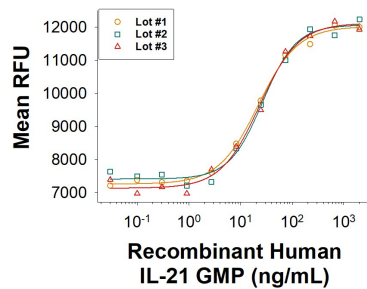
Shipping The product is shipped with polar packs. Upon receipt, store it immediately at the temperature recommended below.

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.

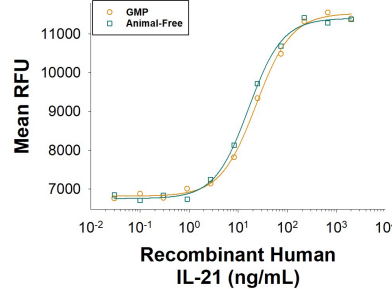
DATA

Bioactivity



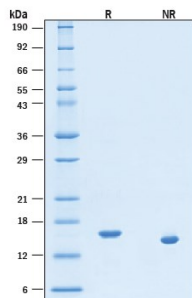
Recombinant Human IL-21 GMP Protein Bioactivity. GMP-grade Recombinant Human IL-21 Protein (Catalog # BT-021-GMP) as measured in a cell proliferation assay using B9 mouse hybridoma cells. The ED₅₀ for this effect is 5.00-50.0 ng/mL. Three independent lots were tested for activity and plotted on the same graph to show lot-to-lot consistency of GMP IL-21.

Bioactivity



Equivalent Bioactivity of GMP and Animal-Free grades of Recombinant Human IL-21. Equivalent bioactivity of GMP (Catalog # BT-021-GMP) and Animal-Free (Catalog # BT-021-AFL) grades of Recombinant Human IL-21 as measured in a cell proliferation assay using B9 mouse hybridoma cells (orange and green, respectively).

SDS-PAGE



Recombinant Human IL-21 GMP Protein SDS-PAGE. 2 µg/lane of Recombinant Human IL-21 GMP Protein (Catalog # BT-021-GMP) was resolved with SDS-PAGE under reducing (R) and non-reducing (NR) conditions and visualized by Coomassie® Blue staining, showing bands at 15-17 kDa, under reducing conditions.

BACKGROUND

Interleukin-21 (IL-21) is an approximately 14 kDa four-helix-bundle member of the family of cytokines that utilize the common gamma chain (γ_c) as a receptor subunit. γ_c is also a subunit of the receptors for IL-2, IL-4, IL-7, IL-9, and IL-15 (1). IL-21 is produced by activated T follicular helper cells (Tfh), Th17 cells, and NKT cells (2-6). It exerts its biological effects through a heterodimeric receptor complex of γ_c and the IL-21-specific IL-21 R (2, 7). Tfh-derived IL-21 plays an important role in the development of humoral immunity through its autocrine effects on the Tfh cell and paracrine effects on immunoglobulin affinity maturation, plasma cell differentiation, and B cell memory responses (4, 8, 9). It is also required for the migration of dendritic cells to draining lymph nodes (10). IL-21 regulates several aspects of T cell function. It co-stimulates the activation, proliferation, and survival of CD8⁺ T cells and NKT cells and promotes Th17 cell polarization (3, 5, 6, 11, 12). It blocks the generation of regulatory T cells and their suppressive effects on CD4⁺ T cells (13, 14). IL-21 R engagement enhances the cytolytic activity and IFN- γ production of activated NK cells but limits the expansion of resting NK cells (15). In addition, IL-21 suppresses cutaneous hypersensitivity reactions by limiting allergen-specific IgE production and mast cell degranulation (16). Dysregulation of the IL-21/IL-21 R system contributes to the development of multiple immunological disorders (1, 17). The 133 amino acid (aa) mature human IL-21 shares 63% and 61% aa sequence identity with mouse and rat IL-21, respectively. Alternative splicing generates an additional isoform with a substitution of the C-terminal 16 amino acids (18).

References:

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14. Bucher, C. *et al.* (2009) *Blood* **114**:5375.
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MANUFACTURING SPECIFICATIONS

GMP Proteins

R&D Systems, a Bio-Techne Brand's GMP proteins are produced according to relevant sections of the following documents: USP Chapter 1043, Ancillary Materials for Cell, Gene and Tissue-Engineered Products and Eu. Ph. 5.2.12, Raw Materials of Biological Origin for the Production of Cell-based and Gene Therapy Medicinal Products.

R&D Systems' quality focus includes:

- Manufactured and tested under an ISO 9001:2015 and ISO 13485:2016 certified quality system
- Documented processes and QA control of documentation and process changes
- Personnel training programs
- Raw material testing and vendor qualification/monitoring
- Fully validated equipment, processes and test methods
- Equipment calibration schedules using a computerized calibration program
- Facility maintenance, safety programs and pest control
- Material review process for variances
- Monitoring of stability over product shelf-life

R&D Systems strives to provide our customers with the analytical characteristics of each product so that customers may determine whether our products are appropriate for their research. The Certificate of Analysis provided contains the following lot specific information:

- N-terminal amino acid analysis, SDS-PAGE analysis, and endotoxin level (as determined by LAL assay) performed on each bulk QC lot, not on individual bottlings of each QC lot
- Post-bottling lot-specific bioassay results (compliance with an established range) and results of microbial testing according to USP <71>
- Host Cell Protein testing performed by ELISA
- Mycoplasma testing by ribosomal RNA hybridization assay

Additional testing and documentation requested by the customer can be arranged at an additional cost.

Production records and facilities are available for examination by appropriate personnel on-site at R&D Systems in Minneapolis, Minnesota USA.

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Animal-Free Manufacturing Conditions

Our dedicated controlled-access animal-free laboratories ensure that at no point in production are the products exposed to potential contamination by animal components or byproducts. Every stage of manufacturing is conducted in compliance with R&D Systems' stringent Standard Operating Procedures (SOPs). Production and purification procedures use equipment and media that are confirmed animal-free.

Production

- All molecular biology procedures use animal-free media and dedicated labware.
- Dedicated fermentors are utilized in committed animal-free areas.

Purification

- Protein purification columns are animal-free.
- Bulk proteins are filtered using animal-free filters.
- Purified proteins are stored in animal-free containers in a dedicated cold storage room.

Quality Assurance

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- High quality product obtained under stringent conditions.

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