

**DESCRIPTION**

**Source** *E. coli*-derived  
His25-Ser153, with an N-terminal Met  
Accession # P05112  
Produced using non-animal reagents in an animal-free laboratory.

**N-terminal Sequence Analysis** Met

**Predicted Molecular Mass** 15 kDa

**SPECIFICATIONS**

**SDS-PAGE** 14 kDa, reducing conditions

**Activity** Measured in a cell proliferation assay using TF-1 human erythroleukemic cells. Kitamura, T. *et al.* (1989) *J. Cell Physiol.* **140**:323.  
The ED<sub>50</sub> for this effect is 0.05-0.2 ng/mL.  
The specific activity of Recombinant Human IL-4 is approximately 2.9 x 10<sup>4</sup> IU/μg, which is calibrated against human IL-4 WHO International Standard (NIBSC code: 88/656).

**Endotoxin Level** <0.01 EU per 1 μg of the protein by the LAL method.

**Purity** >97%, by SDS-PAGE under reducing conditions and visualized by silver stain.

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

**PREPARATION AND STORAGE**

**Reconstitution** Reconstitute at 0.2 mg/mL in sterile PBS.

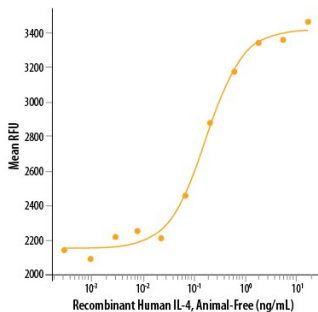
**Shipping** The product is shipped at ambient temperature. Upon receipt, store it immediately at the temperature recommended below.

**Stability & Storage** Use a manual defrost freezer and avoid repeated freeze-thaw cycles.

- 12 months from date of receipt, -20 to -70 °C as supplied.
- 1 month, 2 to 8 °C under sterile conditions after reconstitution.
- 12 months, -20 to -70 °C under sterile conditions after reconstitution.

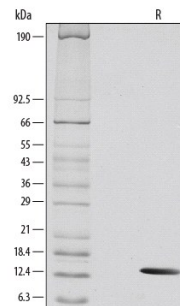
**DATA**

**Bioactivity**



Animal-Free™ Recombinant Human IL-4 (Catalog # AFL204) stimulates cell proliferation of the TF-1 human erythroleukemic cell line. The ED<sub>50</sub> for this effect is 0.05-0.2 ng/mL.

**SDS-PAGE**



1 μg/lane of Animal-Free™ Recombinant Human IL-4 (Catalog # AFL204) was resolved with SDS-PAGE under reducing (R) conditions and visualized by silver staining, showing a single band at 14 kDa.

## BACKGROUND

Interleukin-4 (IL-4), also known as B cell-stimulatory factor-1, is a monomeric, approximately 13 kDa-18 kDa Th2 cytokine that shows pleiotropic effects during immune responses (1-3). It is a glycosylated polypeptide that contains three intrachain disulfide bridges and adopts a bundled four  $\alpha$ -helix structure (4). Human IL-4 is synthesized with a 24 aa signal sequence. Alternate splicing generates an isoform with a 16 aa internal deletion. Mature human IL-4 shares 55%, 39% and 43% aa sequence identity with bovine, mouse, and rat IL-4, respectively. Human, mouse, and rat IL-4 are species-specific in their activities (5-7). IL-4 exerts its effects through two receptor complexes (8, 9). The type I receptor, which is expressed on hematopoietic cells, is a heterodimer of the ligand binding IL-4  $\alpha$  and the common  $\gamma$  chain (a shared subunit of the receptors for IL-2, -7, -9, -15, and -21). The type II receptor on nonhematopoietic cells consists of IL-4  $\alpha$  and IL-13  $\alpha$ 1. The type II receptor also transduces IL-13 mediated signals. IL-4 is primarily expressed by Th2-biased CD4<sup>+</sup> T cells, mast cells, basophils, and eosinophils (1, 2). It promotes cell proliferation, survival, and immunoglobulin class switch to IgG4 and IgE in human B cells, acquisition of the Th2 phenotype by naive CD4<sup>+</sup> T cells, priming and chemotaxis of mast cells, eosinophils, and basophils, and the proliferation and activation of epithelial cells (10-13). IL-4 plays a dominant role in the development of allergic inflammation and asthma (12, 14).

## References:

1. Benczik, M. and S.L. Gaffen (2004) *Immunol. Invest.* **33**:109.
2. Chomarat, P. and J. Banchereau (1998) *Int. Rev. Immunol.* **17**:1.
3. Yokota, T. *et al.* (1986) *Proc. Natl. Acad. Sci.* **83**:5894.
4. Redfield, C. *et al.* (1991) *Biochemistry* **30**:11029.
5. Ramirez, F. *et al.* (1988) *J. Immunol. Meth.* **221**:141.
6. Leitenberg, D. and T.L. Feldbush (1988) *Cell. Immunol.* **111**:451.
7. Mosman, T.R. *et al.* (1987) *J. Immunol.* **138**:1813.
8. Mueller, T.D. *et al.* (2002) *Biochim. Biophys. Acta* **1592**:237.
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11. Corthay, A. (2006) *Scand. J. Immunol.* **64**:93.
12. Ryan, J.J. *et al.* (2007) *Crit. Rev. Immunol.* **27**:15.
13. Grone, A. (2002) *Vet. Immunol. Immunopathol.* **88**:1.
14. Rosenberg, H.F. *et al.* (2007) *J. Allergy Clin. Immunol.* **119**:1303.

## MANUFACTURING SPECIFICATIONS

### 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

- Low Endotoxin Level.
- No impairment of biological activity.
- High quality product obtained under stringent conditions.
- For ex vivo research or bioproduction, [additional documentation](#) can be provided.

[Please read our complete Animal-Free Statement](#)