

Human IL-4 ELISA Kit

Catalog Number KHC0041 (96 tests)

Pub. No. MAN0014362 Rev. 2.0 (30)

CAUTION! This kit contains materials with small quantities of sodium azide and Proclin™ 300. Sodium azide reacts with lead and copper plumbing to form explosive metal azides. Upon disposal, flush drains with a large volume of water to prevent azide accumulation. In case of contact, rinse affected area with plenty of water. Proclin™ 300 is toxic, corrosive, and a skin irritant. Avoid ingestion and contact with eyes, skin and mucous membranes. In case of contact, rinse affected area with plenty of water. Observe all federal, state, and local regulations for disposal.

Note: For safety and biohazard guidelines, see the “Safety” appendix in the *ELISA Technical Guide* (Pub. no. MAN0006706). Read the Safety Data Sheets (SDSs) and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.

Product description

The Invitrogen™ Human IL-4 ELISA Kit is a solid-phase sandwich Enzyme-Linked Immunosorbent Assay (ELISA). This assay is designed to detect and quantify the level of human IL-4 in serum, plasma, buffered solution, or cell culture medium. The assay will recognize both natural and recombinant human IL-4.

Interleukin-4 (IL-4) is a 15 to 19 kDa glycoprotein produced by the Th2 sub-type of CD4+ T-lymphocytes and by mast cell precursors. IL-4 downregulates the production of IFN-α by Th1 CD4+ T-lymphocytes, induces the proliferation of thymocytes and mature T-lymphocytes, but blocks the IL-2 induced proliferation of peripheral T-cells as well as the production of IL-2 dependent LAK cells. On B-cells, IL-4 has a growth factor activity mediated via the production of soluble CD23, and a differentiation activity that leads to the production of IgE, IgM and IgG1. On monocytes, IL-4 induces an increased number of histocompatibility class II antigens and CD23 receptors, but inhibits the expression of IgG receptors. IL-4 blocks the production of IL-1, IL-6, TNF-α, PGE2, G-CSF and stimulates the production of M-CSF and G-CSF by the monocytes. IL-4 acts on eosinophiles by increasing the expression of CD23 and inhibiting the expression of IgG receptors.

Contents and storage

Upon receipt, store the kit at 2°C to 8°C.

Contents	Cat. No. KHC0041 (96 tests)
Hu IL-4 Standard, lyophilized	2 vials
Standard Diluent Buffer; contains 8 mM sodium azide	25 mL
Antibody-Coated Wells, 96-well plate	1 plate
Hu IL-4 Biotin Conjugate; contains 8 mM sodium azide	6 mL
Streptavidin-Peroxidase (HRP) (100X)	0.125 mL
Streptavidin-Peroxidase (HRP) Diluent; contains 1.3 mM thymol and 0.05% Proclin™ 300	25 mL
Wash Buffer Concentrate (25X)	100 mL
Stabilized Chromogen, Tetramethylbenzidine (TMB)	25 mL
Stop Solution	25 mL
Plate Covers, adhesive strips	3

Materials required but not supplied

- Distilled or deionized water
- Calibrated adjustable precision pipettes and glass or plastic tubes for diluting solutions; beakers, flask and cylinders for preparation of reagents
- Microtiter plate reader with software capable of measurement at or near 450 nm
- Plate washer—automated or manual (squirt bottle, manifold dispenser, or equivalent)

Before you begin

IMPORTANT! Reagents are lot-specific. Do not mix or interchange different reagent lots from various kit lots.

- Review the **Procedural guidelines** and **Plate washing directions** in the *ELISA Technical Guide* available at thermofisher.com.
- Allow reagents to reach room temperature before use. Mix to redissolve any precipitated salts.

Prepare 1X Wash Buffer

1. Dilute 16 mL of Wash Buffer Concentrate (25X) with 384 mL of deionized or distilled water. Label as 1X Wash Buffer.
2. Store the concentrate and 1X Wash Buffer in the refrigerator. Use the diluted buffer within 14 days.

Sample preparation guidelines

- Refer to the *ELISA Technical Guide* at thermofisher.com for detailed sample preparation procedures.
- Collect samples in pyrogen/endotoxin-free tubes.
- Freeze samples after collection if samples will not be tested immediately. Avoid multiple freeze-thaw cycles of frozen samples. Thaw completely and mix well (do not vortex) prior to analysis.
- Avoid the use of hemolyzed or lipemic sera. If large amounts of particulate matter are present in the sample, centrifuge or filter sample prior to analysis.

Pre-dilute samples

Sample concentrations should be within the range of the standard curve. Because conditions may vary, each investigator should determine the optimal dilution for each application.

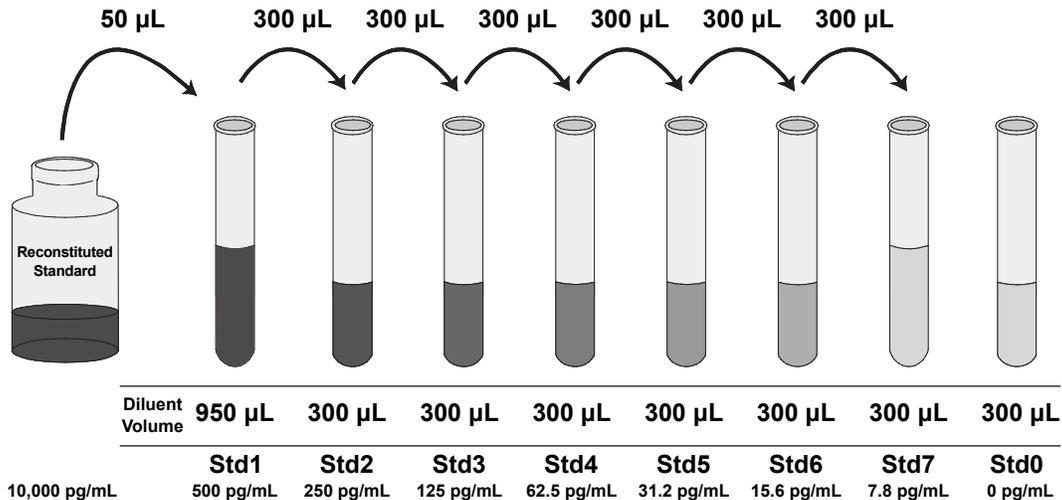
- Perform sample dilutions with Standard Diluent Buffer.

Dilute standards

Note: Use glass or plastic tubes for diluting standards.

Note: This assay has been calibrated against the WHO reference preparation 88/656 (NIBSC, Hertfordshire, UK, EN6 3QG). One microgram equals 10,000 arbitrary units.

1. Reconstitute Hu IL-4 Standard to 10,000 pg/mL with Standard Diluent Buffer. Refer to the standard vial label for instructions. Swirl or mix gently and allow the contents to sit for 10 minutes to ensure complete reconstitution. Label as 10,000 pg/mL human IL-4. **Use the standard within 1 hour of reconstitution.**
2. Add 50 μ L Reconstituted Standard to one tube containing 950 μ L Standard Diluent Buffer and mix. Label as 500 pg/mL human IL-4.
3. Add 300 μ L Standard Diluent Buffer to each of 7 tubes labeled as follows: 250, 125, 62.5, 31.2, 15.6, 7.8, and 0 pg/mL human IL-4.
4. Make serial dilutions of the standard as shown in the following dilution diagram. Mix thoroughly between steps.
5. Discard any remaining reconstituted standard. Return Standard Diluent Buffer to the refrigerator.



Prepare 1X Streptavidin-HRP solution

Note: Prepare 1X Streptavidin-HRP within 15 minutes of usage.

1. For each 8-well strip used in the assay, pipet 10 μ L Streptavidin-HRP (100X) solution, and dispense the solution into a tube containing 1 mL of 1X Assay Buffer. Mix thoroughly.
2. Return the unused Streptavidin-HRP (100X) solution to the refrigerator.

Perform ELISA (Total assay time: 3 hours)

IMPORTANT! Perform a standard curve with each assay.

- Allow all components to reach room temperature before use. Mix all liquid reagents prior to use.
- Determine the number of 8-well strips required for the assay. Insert the strips in the frames for use. Re-bag any unused strips and frames, and store at 2°C to 8°C for future use.

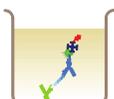


1 Bind antigen



- Add 100 μL of standards, controls, or samples (see “Pre-dilute samples” on page 2) to the appropriate wells. Leave the wells for chromogen blanks empty.
- Add 50 μL Hu IL-4 Biotin Conjugate solution into each well except the chromogen blanks.
- Tap the side of the plate to mix. Cover the plate with a plate cover and incubate for 2 hours at room temperature.
- Thoroughly aspirate the solution and wash wells 4 times with 1X Wash Buffer.

2 Add Streptavidin-HRP



- Add 100 μL 1X Streptavidin-HRP solution (see page 2) into each well except the chromogen blanks.
- Cover the plate with a plate cover and incubate for 30 minutes at room temperature.
- Thoroughly aspirate the solution from the wells and wash wells 4 times with 1X Wash Buffer.

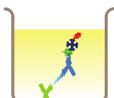
3 Add Stabilized Chromogen



- Add 100 μL Stabilized Chromogen to each well. The substrate solution begins to turn blue.
- Incubate for 30 minutes at room temperature in the dark.

Note: TMB should not touch aluminum foil or other metals.

4 Add Stop Solution



Add 100 μL Stop Solution to each well. Tap the side of the plate to mix. The solution in the wells changes from blue to yellow.

Read the plate and generate the standard curve

- Read the absorbance at 450 nm. Read the plate within 2 hours after adding the Stop Solution.
- Use curve-fitting software to generate the standard curve. A 4 parameter algorithm provides the best standard curve fit. Optimally, the background absorbance may be subtracted from all data points, including standards, unknowns and controls, prior to plotting.
- Read the concentrations for unknown samples and controls from the standard curve. Multiply value(s) obtained for sample(s) by the appropriate factor to correct for the sample dilution.

Note: Dilute samples producing signals greater than the upper limit of the standard curve in Standard Diluent Buffer and reanalyze. Multiply the concentration by the appropriate dilution factor.

Performance characteristics

Standard curve example

The following data was obtained for the various standards over the range of 0 to 500 pg/mL human IL-4.

Standard Human IL-4 (pg/mL)	Optical Density (450 nm)
500	2.70
250	1.44
125	0.83
62.5	0.47
31.2	0.25
15.6	0.15
7.8	0.09
0	0.04

Inter-assay precision

Samples were assayed 48 times in multiple assays to determine precision between assays.

Parameters	Sample 1	Sample 2	Sample 3
Mean (pg/mL)	48.8	119.1	194.1
Standard Deviation	1.9	5.2	10.1
% Coefficient of Variation	3.9	4.4	5.2

Intra-assay precision

Samples of known human IL-4 concentration were assayed in replicates of 16 to determine precision within an assay.

Parameters	Sample 1	Sample 2	Sample 3
Mean (pg/mL)	47.9	119.3	199.6
Standard Deviation	1.4	3.5	6.1
% Coefficient of Variation	3.0	2.9	3.1

Expected values

Human whole blood was stimulated from 24 to 72 hours with various agents, diluted 1:10, and evaluated for human IL-4 production.

Stimulation Agent	IL-4 production (pg/mL)
1 µg/mL PHA	14 – 26
25 µg/mL LPS + 5 µg/mL PHA	18 – 40
0.1 µg/mL Ionomycin + 3 ng/mL PMA	32 – 70

Linearity of dilution

Human serum containing 352 pg/mL of measured human IL-4 was serially diluted in Standard Diluent Buffer over the range of the assay. Linear regression analysis of samples versus the expected concentration yielded a correlation coefficient of 0.99.

Recovery

The recovery of human IL-4 added to human serum and human plasma averaged 99%. The recovery of human IL-4 added to cell culture medium containing both 1% and 10% fetal bovine serum averaged 85%.

Limited product warranty

Life Technologies Corporation and/or its affiliate(s) warrant their products as set forth in the Life Technologies' General Terms and Conditions of Sale found on Life Technologies' website at www.thermofisher.com/us/en/home/global/terms-and-conditions.html. If you have any questions, please contact Life Technologies at www.thermofisher.com/support.

Sensitivity

The analytical sensitivity of the assay is <2.0 pg/mL human IL-4. This was determined by adding two standard deviations to the mean O.D. obtained from 30 assays from the zero standard.

Specificity

Buffered solutions of a panel of substances at 50 ng/mL were assayed with the Human IL-4 ELISA Kit. The following substances were tested and found to have no cross-reactivity: **human** IL-1 α , IL-1 β , IL-1ra, IL-2, IL-3, IL-6, IL-7, IL-8, IL-10, IFN- α , IFN- γ , GM-CSF, OSM, MIP-1 α , MIP-1 β , LIF, MCP-1, G-CSF, PF-4, β TG, GRO, IP-10, TNF- α , TNF- β , TGF- β and SCF.

Product label explanation of symbols and warnings

 REF	Catalog Number	 LOT	Batch code		Temperature limitation		Use by		Manufacturer		Consult instructions for use		Caution, consult accompanying documents
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Manufacturer's address: Bender MedSystems GmbH | Campus Vienna Biocenter 2 | 1030 Vienna, Austria

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