Human IL-2 ELISA Kit

EH2IL2 EH2IL22 EH2IL25

Number	Description
EH2IL2	**Human Interleukin-2 (IL-2) ELISA,** sufficient reagents for 96 determinations
EH2IL22	**Human Interleukin-2 (IL-2) ELISA,** sufficient reagents for 2 × 96 determinations
EH2IL25	**Human Interleukin-2 (IL-2) ELISA,** sufficient reagents for 5 × 96 determinations

Kit Contents	EH2IL2	EH2IL22	EH2IL25
Antibody Coated Plate, 96-well plate	1 each	2 each	5 each
Lyophilized Recombinant Human IL-2 Standards	2 vials	4 vials	10 vials
Standard Diluent	14mL	2 × 14mL	5 × 14mL
Biotinylated Antibody Reagent	8mL	2 × 8mL	5 × 8mL
30X Washer Buffer	50mL	2 × 50mL	5 × 50mL
Streptavidin-HRP Concentrate	75µL	2 × 75µL	5 × 75µL
Streptavidin-HRP Dilution Buffer	14mL	2 × 14mL	5 × 14mL
TMB Substrate	13mL	2 × 13mL	5 × 13mL
Stop Solution, contains 0.16M sulfuric acid	13mL	2 × 13mL	5 × 13mL
Adhesive plate covers	6 each	12 each	30 each

For research use only. Not for use in diagnostic procedures.

Storage: Upon receipt, store at 2-8ºC.

Table of Contents

Introduction

The Invitrogen™ Human Interleukin-2 (IL-2) ELISA is an *in vitro* enzyme-linked immunosorbent assay for the quantitative measurement of human IL-2 in serum, plasma, urine and culture supernatants.

Procedure Summary

1. Add 50µL of Standards or samples to each well in duplicate.

2. Add 50µL of Biotinylated Antibody Reagent to each well.

3. Cover plate and incubate at room temperature (20-25°C) for 3 hours.

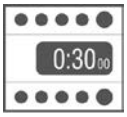
4. Wash plate THREE times.

5. Add 100µL of prepared Streptavidin-HRP Solution to each well.

6. Cover plate and incubate at room temperature for 30 minutes.

7. Wash plate THREE times.

8. Add 100µL TMB Substrate to each well.



9. Develop the plate in the dark at room temperature for 30 minutes.

10. Stop reaction by adding 100µL of Stop Solution to each well.

11. Measure absorbance on a plate reader at 450nm minus 550nm.

12. Calculate the results using graph paper or curve-fitting statistical software.

Additional Materials Required

- Precision pipettors with disposable plastic tips to deliver 5-1000µL and plastic pipettes to deliver 5-15mL
- A glass or plastic two-liter container to prepare Wash Buffer
- A squirt wash bottle or an automated 96-well plate washer
- 1.5mL polypropylene or polyethylene tubes to prepare standards — do not use polystyrene, polycarbonate or glass tubes
- Disposable reagent reservoirs
- 15mL plastic tube to prepare Streptavidin-HRP Solution
- A standard ELISA reader for measuring absorbance at 450nm and 550nm. If a 550nm filter is not available, the absorbance can be measured at 450nm only. Refer to the instruction manual supplied with the instrument being used.
- Graph paper or a computerized curve-fitting statistical software package

Precautions

- **All samples and reagents must be at room temperature (20-25°C) before use in the assay.**
- Review all instructions carefully and verify components against the Kit Contents list (page 1) before beginning the assay.
- Do not use a water bath to thaw samples. Thaw samples at room temperature.
- When preparing standard curve and sample dilution in culture medium, use the same medium used to culture the cells. For example, if RPMI with 10% fetal calf serum (FCS) was used to culture cells, then use RPMI with 10% FCS to dilute the standard and samples. Do NOT use RPMI without serum supplement.
- If using a multichannel pipettor, always use a new disposable reagent reservoir.
- Use new disposable pipette tips for each transfer to avoid cross-contamination.
- Use a new adhesive plate cover for each incubation step.
- Once reagents have been added to the plate, take care NOT to let plate DRY at any time during the assay.
- Avoid microbial contamination of reagents.

- Vigorous plate washing is essential.
- Avoid exposing reagents to excessive heat or light during storage and incubation.
- Discard unused ELISA components after assay completion. Do not mix reagents from different kit lots.
- Do not use glass pipettes to measure TMB Substrate. Take care not to contaminate the solution; if the solution is blue before use, DO NOT USE IT.
- Individual components may contain antibiotics and preservatives. Wear gloves while performing the assay to avoid contact with samples and reagents. Please follow proper disposal procedures.

Additional Precautions for the 2- and 5-plate Kits

- Dispense, pool and equilibrate to room temperature only the reagent volumes required for the number of plates being used. Do not combine leftover reagents with those reserved for additional plates.

Sample Preparation

Sample Handling

- Serum; EDTA, heparin, and sodium citrate plasma; urine; or culture supernatants may be tested in this assay.
- 50µL per well of serum, plasma, urine or culture supernatant are required.
- Store samples to be assayed within 24 hours at 2-8°C. For long-term storage, aliquot and freeze samples at -70°C. Avoid repeated freeze-thaw cycles when storing samples.
- Gradually equilibrate samples to room temperature before beginning assay. Do not use a heated water bath to thaw or warm samples.
- Mix samples by gently inverting tubes.
- If samples are clotted, grossly hemolyzed, lipemic or contaminated, or if there is any question about the integrity of a sample, make a note on the template and interpret results with caution.
- Samples and standards must be assayed in duplicate each time the assay is performed.

Sample Dilution

- If the IL-2 concentration possibly exceeds the highest point of the standard curve (i.e., 1500pg/mL), prepare one or more 10-fold dilutions of the sample. When testing **culture supernatants,** prepare serial dilutions using culture medium. When testing **serum, plasma or urine,** prepare serial dilutions using the Standard Diluent provided. A 10-fold dilution is prepared by adding 50µL of sample to 450µL of appropriate diluent. Mix thoroughly between dilutions.

Reagent Preparation

For procedural differences when using partial plates, look for **(PP)** throughout these instructions.

Wash Buffer

Note: Wash Buffer must be at room temperature before use in the assay. Do not use Wash Buffer if it becomes visibly contaminated during storage.

1. Label a clean glass or plastic two-liter container “Wash Buffer.” The 30X Wash Buffer may have a cloudy appearance.
2. Add the entire contents of the 30X Wash Buffer (50mL) bottle to the container. Dilute buffer to a final volume of 1.5L with ultrapure water and mix thoroughly.

   (PP) When using partial plates, store the reconstituted Wash Buffer at 2-8°C.

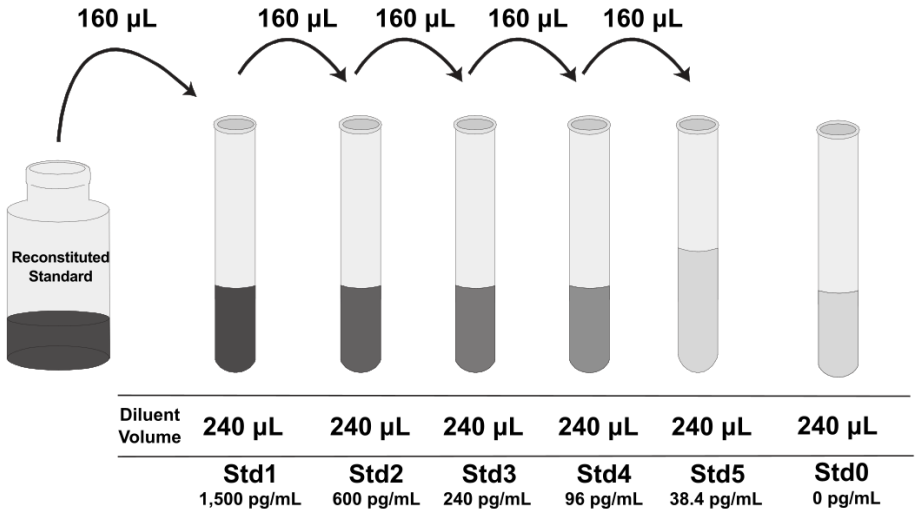
Standards

- **(PP)** Reconstitute and use one vial of the lyophilized Standard per partial plate.
- Prepare Standards just before use and use within one hour of reconstitution. Do not store reconstituted standards.

1. When testing **culture supernatant samples,** reconstitute standard with ultrapure water. Reconstitution volume is stated on the standard vial label. The standard will dissolve in approximately 1 minute. Mix by gently inverting the vial. Use the sample culture medium to prepare standard curve dilutions.

   When testing **serum, plasma or urine samples,** reconstitute standard with ultrapure water. Reconstitution volume is stated on the standard vial label. The standard will dissolve in approximately 1 minute. Mix by gently inverting vial. Use the Standard Diluent provided to prepare standard curve serial dilutions.

   When testing **serum, plasma or urine and cell culture supernatant samples on the same plate,** validate the media to establish if the same standard curve can be used for the different sample types. Prepare a standard curve (including a zero/blank) using culture medium to reconstitute and dilute the standard. Use medium containing serum or other protein to maximize stability of the IL-2. Perform this curve in parallel with a standard curve prepared with the Standard Diluent provided. If OD values are with in 10% of the mean for both curves, then the assay may be performed with Standard Diluent, whether testing culture supernatant, urine, plasma or serum samples.
2. Label six tubes, one for each standard curve point: 1500pg/mL, 600pg/mL, 240pg/mL, 96pg/mL, 38.4pg/mL, and 0pg/mL 1:2.5 serial dilutions for the standard curve as follows:
3. Pipette 240µL of appropriate diluent into each tube.
4. Pipette 160µL of the reconstituted standard into the first tube (i.e., 1500pg/mL) and mix.
5. Pipette 160µL of this dilution into the second tube (i.e., 600pg/mL) and mix.
6. Repeat the serial dilutions (using 160µL) three more times to complete the standard curve points.



Assay Procedure

A. Sample and Biotinylated Antibody Reagent Incubation

- **(PP)** Determine the number of strips required and leave these strips in the plate frame. Tightly seal unused strips in the provided foil pouch with desiccant and store at 2-8°C. After completing assay, retain plate frame for second partial plate. When using the second partial plate, place strips securely in the plate frame.
- Use the Data Template provided to record locations of the zero standard (blank or negative control), IL-2 standards and test samples. Perform five standard points and one blank in duplicate with each series of unknown samples.

- If using a multichannel pipettor, use a new reagent reservoir to add the Biotinylated Antibody Reagent. The Reagent may have a cloudy appearance. Remove from the vial only the amount required for the number of strips being used. Take care not to touch the samples in wells with the pipette tip when adding the Biotinylated Antibody Reagent.

1. Add 50µL of reconstituted standards or samples in duplicate to each well.

   Note: If the human IL-2 concentration in any test sample possibly exceeds the highest point on the standard curve, 1500pg/mL, see Sample Preparation – Sample Dilution section.

2. Add 50µL of Biotinylated Antibody Reagent to each well. Mix well by gently tapping the plate several times.
3. Add 50µL of Standard Diluent to all wells that do not contain standards or samples.
4. Carefully cover plate with an adhesive plate cover. Ensure all edges and strips are sealed tightly by running your thumb over edges and down each strip. Incubate for three (3) hours at room temperature, 20-25°C.
5. Carefully remove adhesive plate cover. Wash plate as described in the Plate Washing section below.

B. Plate Washing

1. Gently squeeze the long sides of plate frame before washing to ensure all strips securely remain in the frame.
2. Empty plate contents. Use a squirt bottle to vigorously fill each well completely with Wash Buffer, then empty plate contents. Repeat procedure two additional times for a total of THREE washes. Blot plate onto paper towels or other absorbent material.

   Note: For automated washing, aspirate all wells and wash THREE times with Wash Buffer, overfilling wells with Wash Buffer. Blot plate onto paper towels or other absorbent material.

C. Streptavidin-HRP Solution Preparation and Incubation

- Prepare Streptavidin-HRP Solution **immediately before use.** Do not prepare more solution than required.
- Use a 15mL plastic tube to prepare Streptavidin-HRP Solution.
- If using a multichannel pipettor, **use new reagent reservoir and pipette tips** when adding the prepared Streptavidin-HRP Solution.

1. Briefly centrifuge Streptavidin-HRP Concentrate to force entire contents to the bottom of the vial.
2. **(PP)** Use only the Streptavidin-HRP Solution amount required for the number of strips being used. For each strip, mix 2.5µL of Streptavidin-HRP Concentrate with 1mL of Streptavidin-HRP Dilution Buffer. Store Streptavidin-HRP Concentrate reserved for additional strips at 2-8°C.

   For one complete 96-well plate, add 30µL of Streptavidin-HRP Concentrate to 12mL Streptavidin-HRP Dilution Buffer and mix gently.

3. Add 100µL of prepared Streptavidin-HRP Solution to each well.
4. Carefully attach a new adhesive plate cover, ensuring all edges and strips are tightly sealed. Incubate the plate for 30 minutes at room temperature, 20-25°C.
5. Carefully remove the plate cover and discard plate contents. Wash plate as described in the Plate Washing Section.

D. Substrate Incubation and Stop Step

- Use new disposable reagent reservoirs when adding TMB Substrate and Stop Solution.
- Dispense from bottle ONLY amount required, 100µL per well, for the number of wells being used. Do not use a glass pipette to measure the TMB Substrate Solution.
- **(PP)** Do not combine leftover substrate with that reserved for the second partial plate. Take care not to contaminate remaining TMB Substrate.

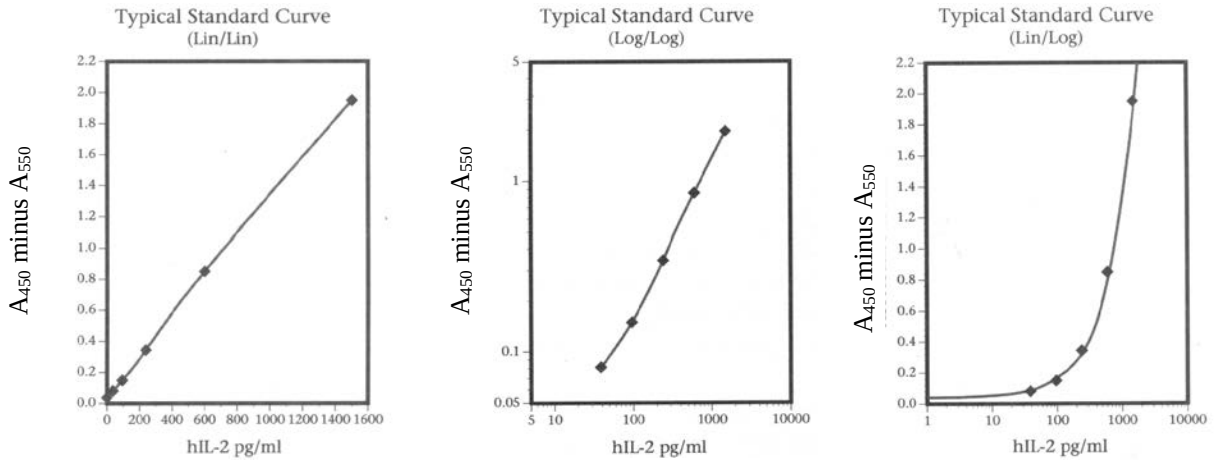
1. Pipette 100µL of TMB Substrate Solution into each well.
2. Allow color reaction to develop at room temperature in the dark for 30 minutes. Do not cover plate with aluminum foil or a plate sealer. The substrate reaction yields a blue solution that turns yellow when Stop Solution is added.
3. After 30 minutes, stop the reaction by adding 100µL of Stop Solution to each well.

E. Absorbance Measurement

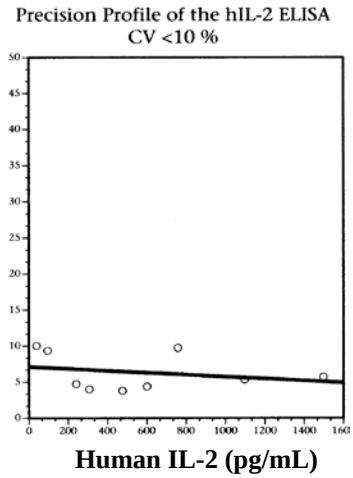
- Evaluate the plate within 30 minutes of stopping the reaction. Measure absorbance on an ELISA plate reader set at 450nm and 550nm. Subtract 550nm values from 450nm values to correct for optical imperfections in the microplate. If 550nm is not available, measure absorbance at 450nm only.
- **Note:** Omitting the 550nm measurement will result in higher absorbance values.

F. Calculation of Results

- Use the standard curve to determine IL-2 amount in an unknown sample. Generate the standard curve by plotting the average absorbance obtained for each Standard concentration on the vertical (Y) axis vs. the corresponding IL-2 concentration (pg/ml) on the horizontal (X) axis.
- Calculate results using graph paper or curve-fitting statistical software. The IL-2 amount in each sample is determined by interpolating from the absorbance value (Y axis) to human IL-2 concentration (X axis) using the standard curve.
- If the sample was diluted, multiply the obtained interpolated value by the dilution factor to calculate amount of IL-2 in the sample.
- Absorbance values obtained for duplicates should be within 10% of the mean value. Carefully consider duplicate values that differ from the mean by greater than 10%.



Performance Characteristics



Expected Values: Levels of human IL-2 obtained in normal serum, plasma and urine samples are reported in Table 1.

Sensitivity: < 6pg/mL
The Lower Limit of Detection (LLD)[1] was determined by assaying replicates of zero and the standard curve. The mean signal of zero + 2 standard deviations read in dose from the standard curve is the LLD. This value is the smallest dose that is not zero with 95% confidence.

Assay Range: 38.4-1500pg/mL
Suggested standard curve points are 1500, 600, 240, 96, 38.4 and 0pg/mL. If a different series of curve points is chosen, DO NOT exceed the highest point of the standard curve.

Specificity: This ELISA is specific for the measurement of natural and recombinant human IL-2 and does not cross-react with human IL-1α, IL-1β, IL-3, IL-4, IL-6, IL-7, IL-8, TNFα, TNFβ, GM-CSF, INFγ, or mouse IL-2.

Precision: The pooled coefficient of variation is plotted against human IL-2 concentration (pg/mL). The points represent samples evaluated in replicates of four in four different kit lots.

Reproducibility:
Intra-assay CV: <10%
Intra-assay CV: <10%

Calibration: Standards in this ELISA are calibrated to NIBSC reference standard lot 86/504. One (1) pg of internal standard = 2 NIBSC pg = 0.026 NIBSC units.

Recovery: Recombinant human IL-2 was into spiked into normal human serum, plasma, and urine samples as well as a control buffer. Mean recoveries are reported in Table 2.

Dilution Linearity: Eight different positive samples were serially diluted. The dilutions were evaluated in the ELISA and the "found" doses are plotted against the "expected" doses.

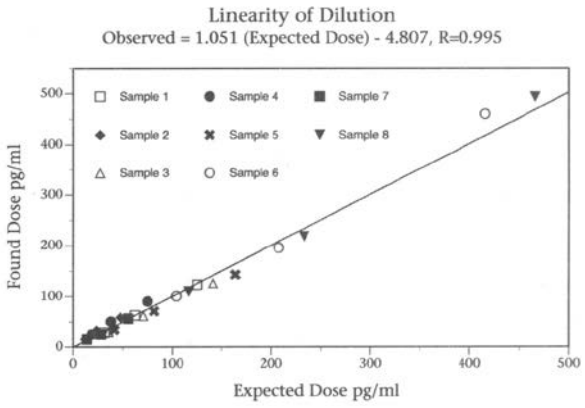


Table 2. Recovery of human IL-2.

Spike Level	Serum	Plasma	Urine
100pg/mL	100%	101%	nd
275pg/mL	99%	106%	nd
400pg/mL	90%	86%	nd
700pg/mL	nd*	nd	79%

*nd = not determined

Table 1. Expected levels of human IL-2.

Sample	Mean Level of Human IL-2	Range
Serum (n-4)	1.0pg/mL	0-4.0pg/mL
Plasma (n=4)	3.6pg/mL	0-6.5pg/mL
Urine (n=4)	14.3pg/mL	7.8-23.5pg/mL

Cited Reference

1. *Immunoassay: A Practical Guide*, Chan and Perlstein, Eds., 1987, Academic Press: New York, p71.

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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

Manufacturer's address: Bender MedSystems GmbH | Campus Vienna Biocenter 2 | 1030 Vienna, Austria
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Data Templates

	1	2	3	4	5	6	7	8	9	10	11	12
A												
B												
C												
D												
E												
F												
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