LumiAb™

Human EGF
Chemiluminescent ELISA Kit

Catalog #: Lum-8111

Detection and Quantification of Human EGF Concentrations in Cell Lysates, Sera and Plasma.

Please read the provided manual as suggested experimental protocols may have changed.

Research Purposes Only. Not Intended for Diagnostic or Clinical Procedures.

CONTENTS PAGE

INTRODUCTION

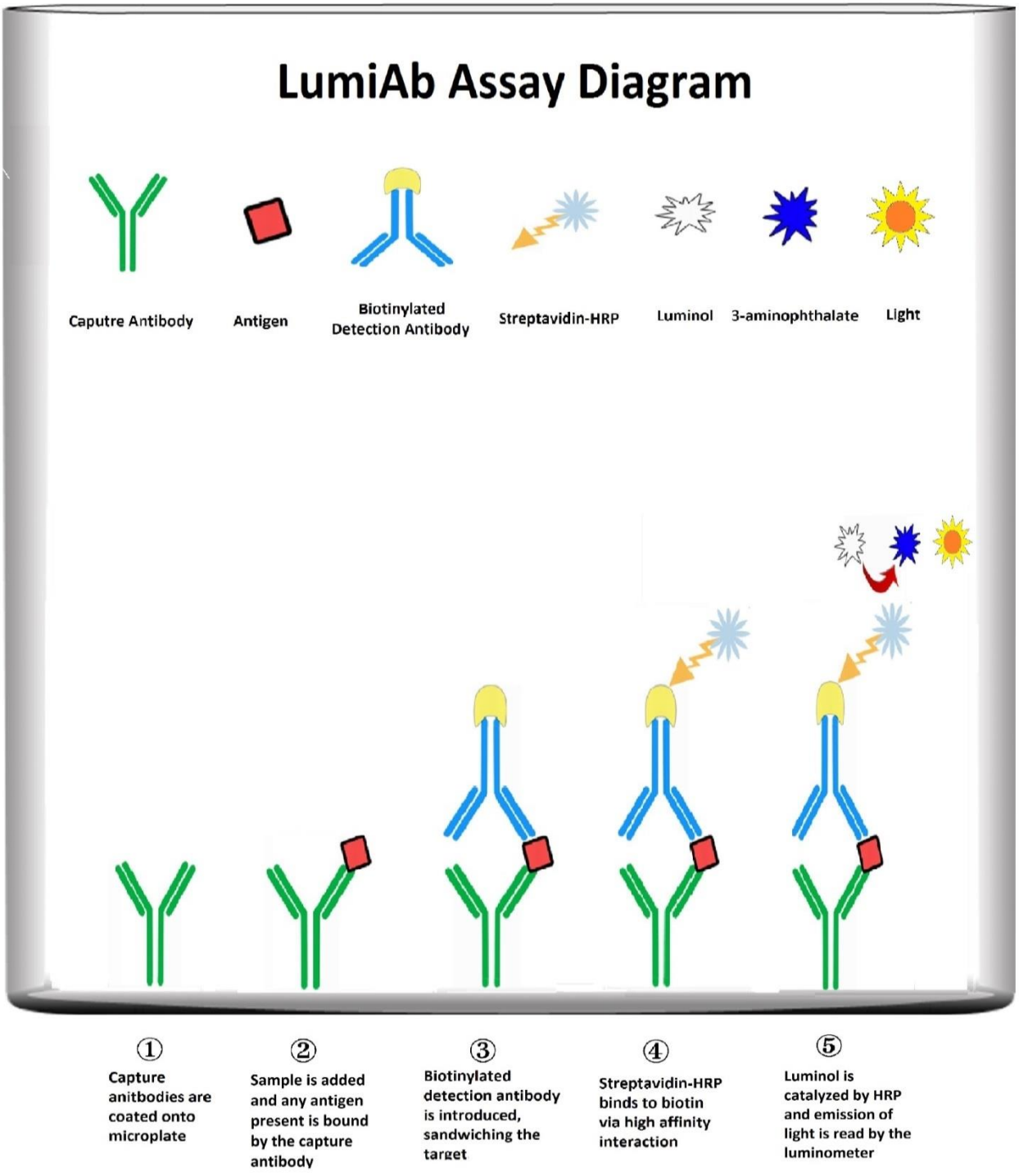
Human EGF, or Epidermal Growth Factor, is a 1207 amino acid residue protein encoded by the EGF gene located on chromosome 4 at locus 4q25. Typically, defects in this gene are the cause of hypomagnesaemia type 4 and dysregulation of the gene have been associated with the growth and progression of certain cancers. The 1207 amino acid precursor molecule is proteolytically cleaved to generate the 53 residue EGF peptide while removing the 22 residue signal sequence and 1185 residue pro-EGF chain. EGF acts as a potent mitogenic factor via its high affinity binding with the cell surface EGF-Receptor and together, the interaction between the two plays an important role in the growth, proliferation and differentiation of numerous cell types. Further, EGF stimulates the growth of various epidermal and epithelial tissues in vivo and in vitro and of some fibroblasts in cell culture. EGF has magnesiotropic characteristics that stimulate Mg2+ reabsorption in the renal distal convoluted tubule via engagement of EGF-R and activation of the Mg2+ channel, TRPM6.

Source: Entrez Gene: EGF epidermal growth factor [Homo sapiens]; Swiss-Prot: P01133

ASSAY PRINCIPLES

The LumiAb™ Human EGF Chemiluminescent ELISA Kit contains the components necessary for quantitative determination of natural or recombinant Human EGF concentrations within any experimental sample including cell lysates, serum and plasma. This particular immunoassay utilizes the quantitative technique of a “Sandwich” Enzyme-Linked Immunosorbent Assay (ELISA) where the target protein (antigen) is bound in a “sandwich” format by the primary capture antibodies coated to each well-bottom and the secondary detection antibodies added subsequently by the investigator. The capture antibodies coated to the bottom of each well are specific for a particular epitope on Human EGF while the user-added detection antibodies bind to epitopes on the captured target protein. Amid each step of the procedure, a series of wash steps must be performed to ensure the elimination of non-specific binding between proteins to other proteins or to the solid phase. After incubation and “sandwiching” of the target antigen, a peroxidase enzyme is conjugated to the constant heavy chain of the secondary antibody (either covalently or via Avidin/Streptavidin-Biotin interactions), allowing for a sensitive luminescent reaction to ensue upon substrate addition. When the Peroxide Enhancer solution is added, the reaction catalyzed by peroxidase yields light that is representative of the antigen concentration. After a brief incubation, the microplate can be read with a luminometer, allowing for generation of a standard curve and subsequent determination of protein concentration.

ASSAY FORMAT



ASSAY RESTRICTIONS

- This ELISA kit is intended for research purposes only, NOT diagnostic or clinical procedures of any kind.
- Materials included in this kit should NOT be used past the expiration date on the kit label.
- Reagents or substrates included in this kit should NOT be mixed or substituted with reagents or substrates from any other kits.
- Variations in pipetting technique, washing technique, operator laboratory technique, kit age, incubation time or temperature may cause differences in binding affinity of the materials provided.
- The assay is designed to eliminate interference and background by other cellular macromolecules or factors present within any biological samples. However, the possibility of background noise cannot be fully excluded until all factors have been tested using the assay kit.
- Individual results may vary due to differences in technique, plasticware and water sources.

MATERIALS INCLUDED

Component	Quantity Per Plate	Container
Microstrips Coated w/ Capture Antibody	12 x 8-Well Microstrips	-
Protein Standard	Lyophilized	Red
100^{x} Biotinylated Detection Antibody	Lyophilized	Yellow
400^{x} Streptavidin-HRP	30 µl	Blue
Wash Buffer (15^{x})	50 ml	Clear
Assay Diluent	50 ml	Clear
Enhancer Solution	8 ml	Brown
Peroxide Solution	8 ml	Clear
Adhesive Plate Sealers	2 Sheets	-
Technical Manual	1 Manual	-

ADDITIONAL MATERIALS REQUIRED

The following materials and/or equipment are NOT provided in this kit but are necessary to successfully conduct the experiment:

- Luminometer able to measure total light output
- Micropipettes with capability of measuring volumes ranging from 1 µl to 1 ml
- Distilled, deionized, and or purified water (recommended TOC 1-50 ppb, MΩ-cm 18.0)
- Squirt bottle, manifold dispenser, multichannel pipette reservoir or automated microplate washer
- Graph paper or computer software capable of generating or displaying logarithmic functions
- Absorbent paper or vacuum aspirator
- Test tubes or microfuge tubes capable of storing ≥1 ml
- Bench-top centrifuge (optional)
- Bench-top vortex (optional)
- Orbital shaker (optional)

HEALTH AND SAFETY PRECAUTIONS

- Reagents provided in this kit may be harmful if ingested, inhaled or absorbed through the skin. Please carefully review the MSDS for each reagent before conducting the experiment.

STORAGE INFORMATION

Note: If used frequently, reagents may be stored at 4°C.

Unopened Kits: Store at 4°C for 6 months.

Component	Storage Time	Storage Information
Microstrips Coated w/ Capture Antibody	6 Months	4°C
400^{x} Streptavidin-HRP		
Wash Buffer (15^{x})		
Assay Diluent		
Enhancer Solution		
Peroxide Solution		
Protein Standard	Lyophilized: 6 Months Reconstituted: 1 Month	4°C
Biotinylated Detection Antibody		
Adhesive Plate Sealers	-	-
Technical Manual	-	-

SAMPLE STORAGE AND PREPARATION

If samples are to be used within 24 hours, aliquot and store at 4°C. If samples are to be used over a long period of time, aliquot and store between -20°C and -80°C, depending on the duration of storage.

Note: Samples containing a visible precipitate or pellet must be clarified prior to use in the assay.

Caution: Avoid repeated freeze/thaw cycles to prevent loss of biological activity of proteins in experimental samples.

Cell Lysate and Supernatants

Remove large cell components via centrifugation and perform the assay. Cell lysates and supernatants require a dilution using Assay Diluent. A serial dilution may be performed to determine a suitable dilution factor for the sample.

Serum

Allow samples to clot in a serum separator tube (SST) for 30 minutes. After sufficient clotting, centrifuge at 1000 x g for 15 minutes and remove serum from SST in preparation for the assay. A serial dilution may be performed to determine a suitable dilution factor for the sample. For serum sample dilutions refer to Serum and Plasma Sample Dilution Protocol.

Plasma

Use heparin, citrate or EDTA as an anticoagulant to gather plasma from original biological sample. After collection of the plasma, centrifuge for 15 minutes at 1000 x g. This step must be performed within 30 minutes of plasma collection. A serial dilution may be performed to determine a suitable dilution factor for the sample. For plasma sample dilutions refer to Serum and Plasma Sample Dilution Protocol.

Serum and Plasma Sample Dilution Protocol

a. Dilute the serum or plasma samples with PBS supplemented with 10-50% animal serum (Serum/Plasma Diluent).

b. Reconstitute and dilute the Protein Standards using the Serum/Plasma Diluent, instead of Assay Diluent, so it reflects the environment of the samples being measured.

c. Reconstitute the Biotin-Conjugated Detection Antibody in Assay Diluent and dilute the Streptavidin-HRP in Assay Diluent. Do not use the Serum/Plasma Diluent to reconstitute or dilute the Detection Antibody or Streptavidin-HRP.

SAMPLE EXPERIMENT LAYOUT

	1	2	3	4	5	6
A	Standard (High Point)	Standard (High Point)	Standard (High Point)	Sample	Sample	Sample
B	Standard (1:2)	Standard (1:2)	Standard (1:2)	Sample	Sample	Sample
C	Standard (1:4)	Standard (1:4)	Standard (1:4)	Sample	Sample	Sample
D	Standard (1:8)	Standard (1:8)	Standard (1:8)	Sample	Sample	Sample
E	Standard (1:16)	Standard (1:16)	Standard (1:16)	Sample	Sample	Sample
F	Standard (1:32)	Standard (1:32)	Standard (1:32)	Sample	Sample	Sample
G	Standard (1:64)	Standard (1:64)	Standard (1:64)	Sample	Sample	Sample
H	Negative Control	Negative Control	Negative Control	Sample	Sample	Sample

IMMUNOASSAY PROTOCOL

Note: Spin down the Protein Standard, Biotin-Conjugated Detection Antibody vials before opening. If possible, all incubation steps should be performed on an orbital shaker to equilibrate solutions when added to the microplate wells. Also, all provided solutions should be at ambient temperature prior to use.

Reconstitution of Provided Materials

1. Reconstitute the lyophilized Biotin-Conjugated Detection Antibody with 100 µl of Assay Diluent for a concentration of 100^{x}.

2. Reconstitute the Protein Standard with 83 µl of Assay Diluent for a concentration of .25ug/ml. **Note:** If working with serum or plasma, see page 9 prior to reconstitution.

3. Dilute the 15x Wash Buffer to 1x Wash Buffer using 14 volumes of ddH_2O and 1 volume of 15x Wash Buffer.

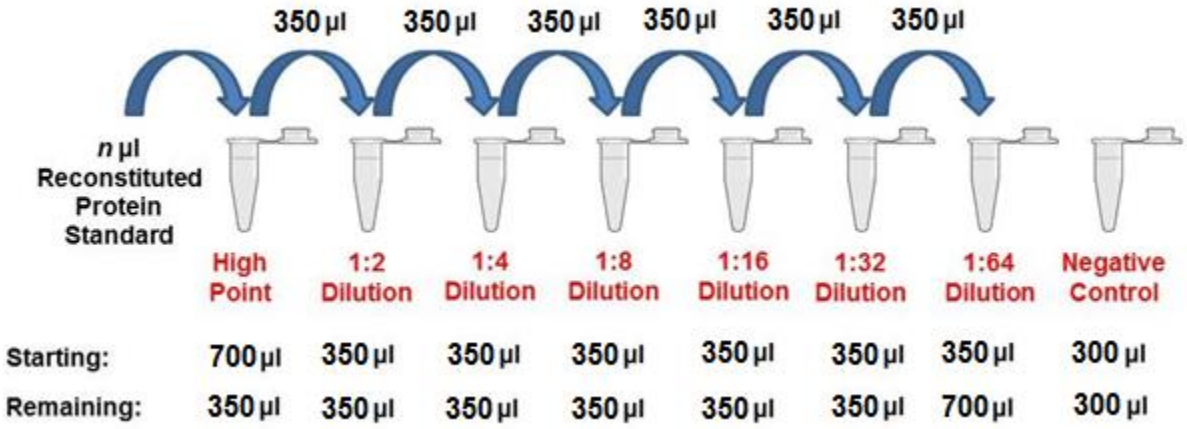
Addition of Known Standard and Unknown Sample to Immunoassay

The LumiAb™ Human EGF ELISA Kit allows for the detection and quantification of endogenous levels of natural and/or recombinant Human EGF proteins as low as 4 pg/ml.

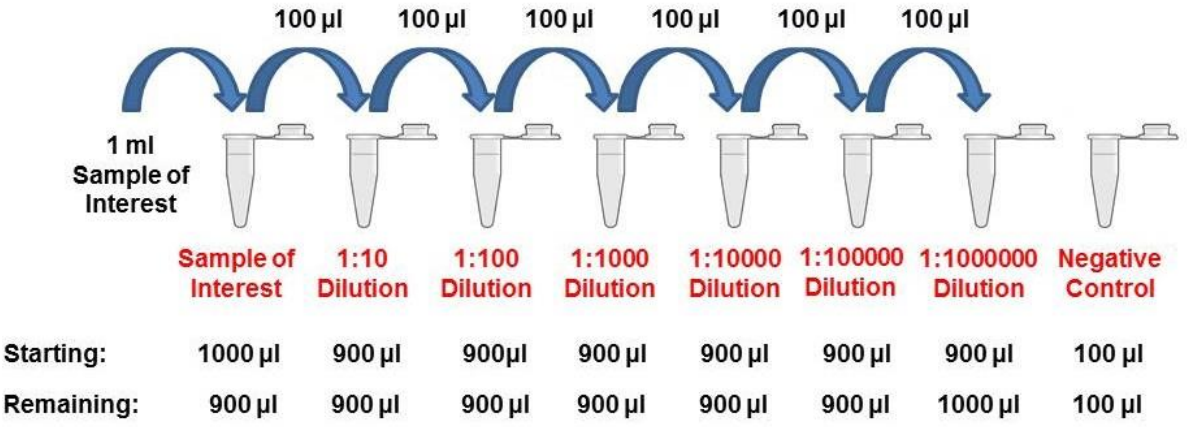
1. Prepare the appropriate diluent for the sample type. Ensure that the Protein Standard is reconstituted and diluted with the same diluent as the sample. Dilute Protein Standard within the range 250 pg/ml to 4 pg/ml in a series of microfuge tubes using the appropriate diluent. Mix each tube thoroughly by inverting several times or by vortexing lightly to ensure proper equilibration. Add 100 µl of each serial dilution step into the wells of a specified row or column of the 96-well microtiter plate in duplicate or triplicate and incubate at room temperature for 2 hours. Unknown Samples of Interest can be serial diluted with the appropriate diluent to the concentrations within the detection range of this assay kit and added to the plate at 100 µl per well. See next page for illustration. Blank Control is defined as 100 ul of diluent used to dilute samples and standard per well. Seal the plate.

STANDARD AND SAMPLE SERIAL DILUTION

To obtain serial dilution high point, dilute reconstituted Protein Standard to the maximum concentration for serial dilution by adding *n* µl reconstituted Protein Standard to serial dilution high point tube and then raising the volume to 700 µl. Shown below is a diagram illustrating an example 2-fold serial dilution on a given reconstituted Protein Standard.



For samples of unknown protein concentrations, serial dilute the experimental sample using Assay Diluent to determine range of detection and acceptable dilutions. Shown below is a diagram illustrating a 10-fold serial dilution on a given Sample of Interest.



Addition of Detection Antibody to Capture Antibody-Bound Samples

2. Aspirate the protein standard solution out of the microplate wells. If your lab does not have a vacuum-based aspirator, you may dump the solutions from the microplate into a waste container and blot 3-4 times on a stack of paper towels until most or all of the liquid is removed from the wells. Add 300 µl of 1^x Wash Buffer to each well being used and gently shake for 3-4 minutes on an orbital shaker. Perform this wash step 4 times consecutively.

3. After the 4^{th} wash step, dilute the detection antibody solution 100^x to 1^x with Assay Diluent. Ensure that there is enough detection antibody solution for all wells being used. Mix the test tube either by inverting several times and vortexing to ensure proper equilibration. Ensure that there is enough detection antibody solution for all wells being used. Add 100 µl of the diluted detection antibody solution into each well andseal the plate and incubate at room temperature for 2 hours.

Conjugation of Streptavidin-HRP to Biotinylated Detection Antibody

4. Remove the detection antibody solution out of the microplate wells by either vacuum-based aspirator or paper towel blotting. Perform 4 consecutive wash steps with gentle shaking between each wash.

5. Dilute the 400^x Streptavidin-HRP with Assay Diluent to a 1^x Streptavidin-HRP solution.

6. After the 4^{th} wash step, add 100 µl of 1^x Streptavidin-HRP solution into each well and incubate at room temperature for 30 minutes. Avoid placing the plate in direct light.

Application of Liquid Substrate for Luminescent Reaction

7. Remove the 1^x Streptavidin-HRP solution out of the microplate wells by either vacuum-based aspirator or paper towel blotting. Perform 4 consecutive wash steps with gentle shaking between each wash. Prepare the Peroxide and Enhancer Solution by bringing it to room temperature without exposure to light as these may degrade the

substrate. Mix the Peroxide and Enhancer solution in a 1:1 ratio and store in room temperature until use.

8. After the 4th wash step, add 100 µl of the Peroxide/Enhancer solutions into each well and incubate at room temperature for light development for 5 minutes. Avoid placing the plate in direct light. The microplate is now ready to be read by the luminometer.

Generation of Standard Curve and Interpretation of Data

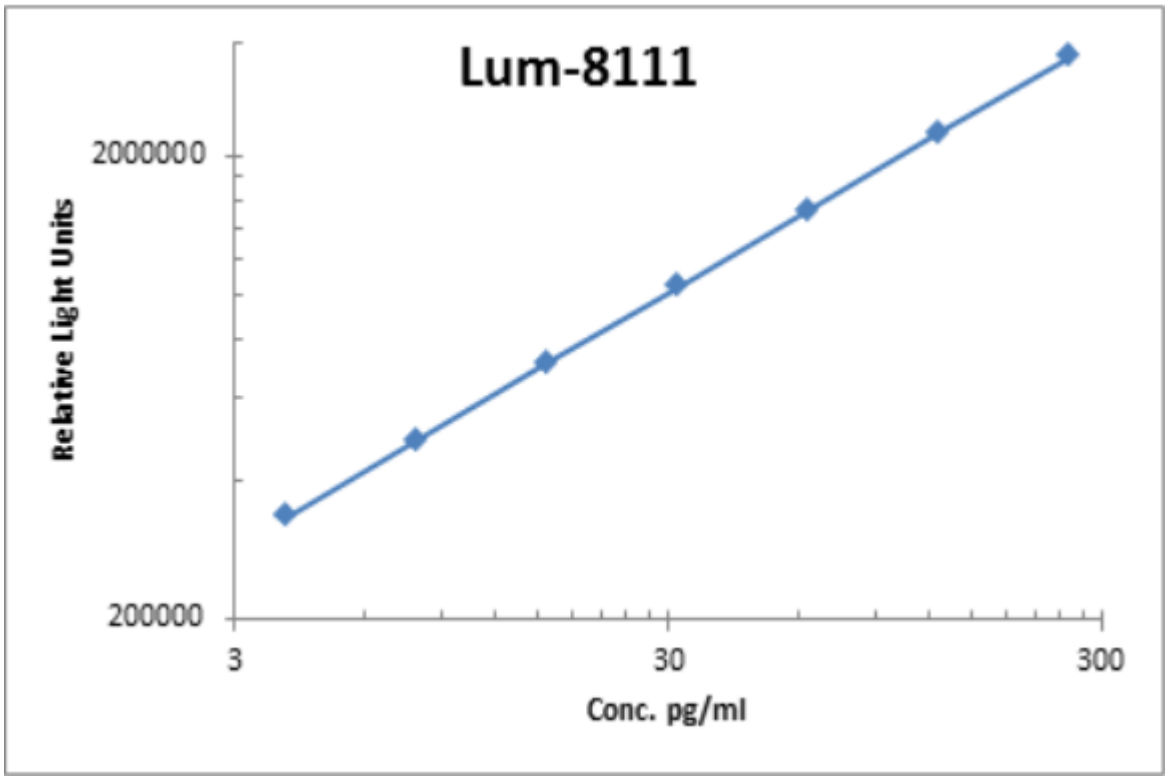
9. Average the duplicate or triplicate readings for each standard, control and sample and subtract the average zero standard light units.

Generate a standard curve by using Microsoft Excel or other computer software capable of establishing a 4-Parameter Logistic (4-PL) curve fit. If using Excel or an alternative graphing tool, plot the average optical density values in absorbance units (y-axis) against the known standard concentrations in pg/ml (x-axis).

Note: Only use the values in which a noticeable gradient can be established. Afterwards, generate a best fit curve or “trend-line” through the plotted points via regression analysis.

Note: Shown on the next page is an example of typical data produced by analysis of the standard sample.

The data and subsequent graph was obtained after performing a cytokine ELISA for Human EGF. Each known sample concentration was assayed in triplicate.



SUMMARIZED PROTOCOL

Reconstitute Biotinylated Detection Antibody and Protein Standard and dilute the 15x Wash Buffer as specified.

Perform serial dilution of Protein Standard and prepare samples as desired. See sample preparation section for instructions to dilute serum and plasma samples.

Add 100ul of Protein Standard, sample or control to each well and incubate for 2 hours at room temperature.

Aspirate Protein Standards, samples or controls out and wash plate 4 times.

Dilute Biotinylated Detection Antibody as specified. Add 100ul to each well and incubate for 2 hours at room temperature.

Aspirate Biotinylated Detection Antibody out and wash plate 4 times.

Dilute 400x Streptavidin-HRP as specified. Add 100ul of 1x Streptavidin-HRP to each well and incubate at room temperature for 30 minutes.

Aspirate 1x Streptavidin-HRP out and wash plate 4 times.

Add 100ul of the Peroxide/Enhancer Solution to each well and shake at room temperature for 5 minutes for light development.

SENSITIVITY

The Human EGF ELISA Kit allows for the detection and quantification of endogenous levels of natural and/or recombinant Human EGF proteins as low as 4 pg/ml.

CROSS REACTIVITY AND SPECIFICITY

The LumiAb™ Human EGF ELISA is capable of recognizing both recombinant and naturally produced Human EGF proteins. The antigens listed below were tested at 50 ng/ml and did not exhibit significant cross reactivity or interference.

- Human: EGF-Receptor, FGF-Acidic, FGF-Basic, FGF-9, FGF-18, IL-17, TNF-RI, 4-1BBL, sCD40-L
- Murine: EGF, GM-CSF, TNF-alpha
- Rat: EGF, TNF-alpha

TECHNICAL SUPPORT

For troubleshooting, information or assistance, please go online to www.assaybiotechnology.com or contact us at:

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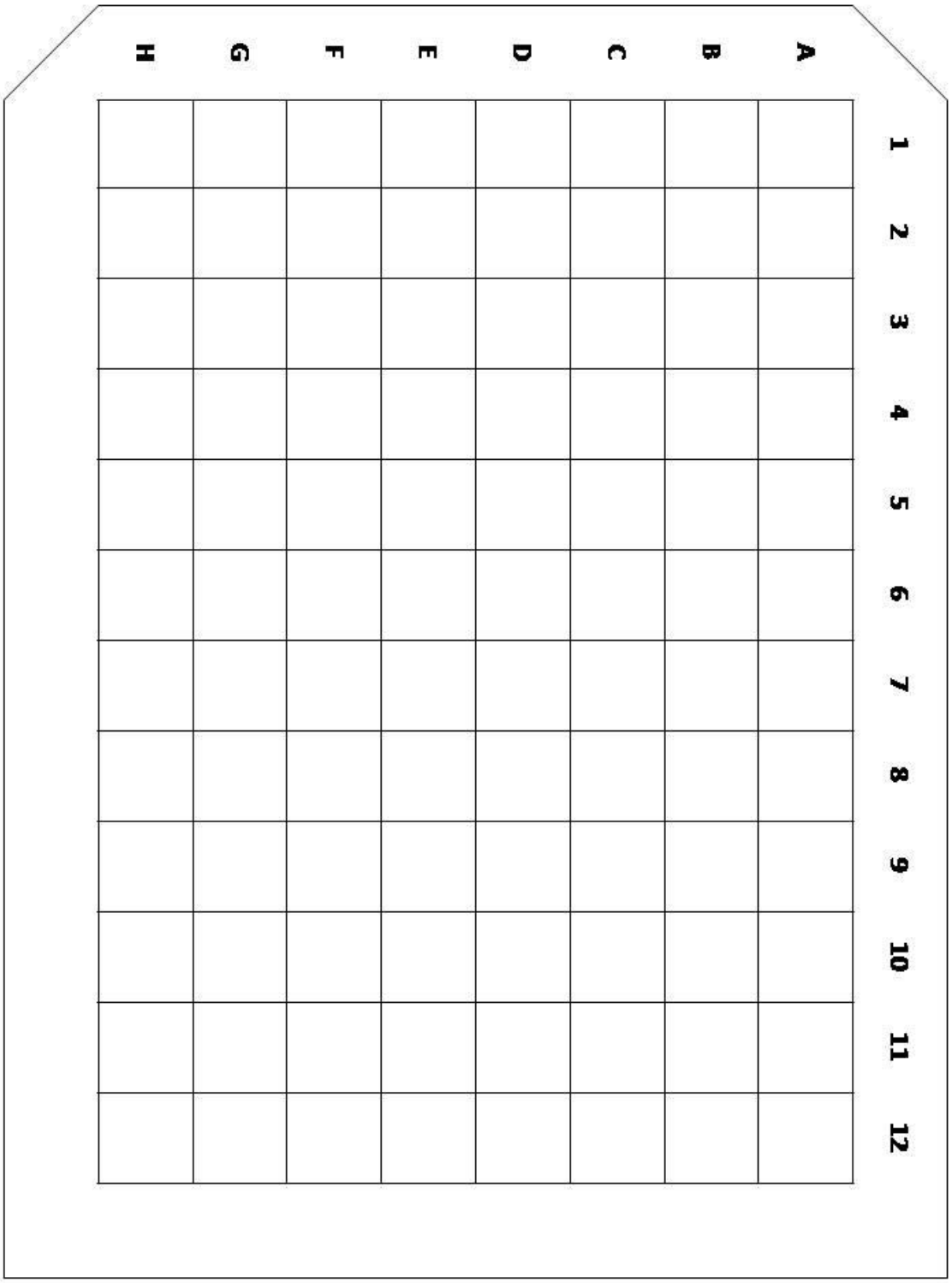
Manual Version 1.5

ELISA PLATE TEMPLATE



NOTES

Over 2,000 Assay Kits including Sandwich, Cell-Based and Transcription Factor ELISA Kits

Visit us at www.AssayBiotechnology.com