CELL APPLICATIONS, INC.

Mouse G-CSF ELISA Kit

Cat. No. CL0361
96-wells

Target Protein Species	Mouse
Range	31.2pg/ml-2000pg/ml
Specificity	No detectable cross-reactivity with any other cytokine.

COMPONENTS

Kit Component	Amount
96-well plate precoated with anti-mouse G-CSF antibody	1 Plate
Protein Standard: Lyophilized recombinant mouse G-CSF	2 tubes, 10 ng/tube
Sample Diluent Buffer	30 ml
Biotinylated Antibody (Anti-mouse G-CSF)	130 µl (100x)
Antibody Diluent Buffer	12ml
Avidin-Biotin-Peroxidase Complex (ABC) Solution	130 µl (100x)
ABC Diluent Buffer	12 ml
Tetramethyllbenzidine (TMB) Color Developing Agent	10 ml
TMB Stop Solution	10 ml

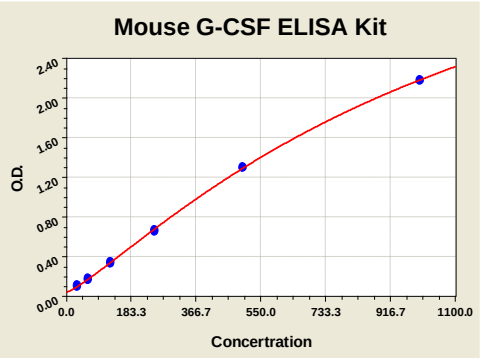
Washing Buffer (not provided): TBS or PBS

0.01M TBS: Add 1.2g Tris, 8.5g NaCl; 450µl of purified acetic acid or 700µl of concentrated hydrochloric acid to 900ml H_2O and adjust pH to 7.2-7.6. Adjust the total volume to 1L.

0.01M PBS: Add 8.5g sodium chloride, 1.4g Na_2HPO_4 and 0.2g NaH_2PO_4 to 900ml distilled H_2O and adjust pH to 7.2-7.6. Adjust the total volume to 1L.

Storage

Store at 4°C. Cell Applications, Inc. recommends using the kit within 6 months of order.



X	pg/ml	0.0	31.2	62.5	125	250	500	1000	2000
Y	O.D.450	0.038	0.116	0.184	0.354	0.672	1.308	2.185	2.962

Figure 1: G-CSF Standard Curve. Using the Mouse G-CSF ELISA Kit, O.D. data was graphed against G-CSF protein concentration. The TMB reaction was incubated at 37°C for 14 min.

BACKGROUND

G-CSF belongs to family of colony-stimulating factors, which also includes GM-CSF, IL-3 and M-CSF. It is a potent hematopoietic factor that enhances survival and drives differentiation of myeloid lineage cells, resulting in the generation of neutrophilic granulocytes. The fully differentiated neutrophilic granulocytes are also functionally activated by G-CSF. G-CSF is a mitogen for some human myeloid leukemia cells and also for some carcinoma cell lines. G-CSF synergises with some other cytokines, including GM-CSF and IL4. Biochemically, G-CSF is an O-glycosylated 19.6 kDa glycoprotein with a pI of 5.5. The biologically active form is a monomer. G-CSF is secreted by monocytes, macrophages, and neutrophils after cell activation. It is produced also by stromal cells, fibroblasts, and endothelial cells. The synthesis of G-CSF can be induced by bacterial endotoxins, TNF, IL1 and GM-CSF. Prostaglandin E2 inhibits the synthesis of G-CSF. In epithelial, endothelial, and fibroblastic cells secretion of G-CSF is induced by IL17.[1] G-CSF receptor (G-CSF-R, CD114) is expressed on all cells of the neutrophils and granulocytes lineage. It is expressed also in placenta cells, endothelial cells and various carcinoma cell lines. G-CSF-R-mediated activation of JAK tyrosine kinases and signal transducers and activators of transcription (STAT) proteins as well as activation of the ras-MAP kinase route results in induction of gene transcription.[2]

In vitro G-CSF enhances the antibody-dependent cell-mediated cytotoxicity of granulocytes against tumor cells. G-CSF induces the synthesis of receptors for fMLP (Formyl-Met-Leu-Phe) which, in turn, induces the prolonged production of oxygen radicals and the release of arachidonic acid. G-CSF also increases the synthesis of Fc-receptors for IgA. Unlike GM-CSF, G-CSF does not induce the expression of cellular markers such as CD11A and CD11C. The main and most important clinical application of G-CSF is probably the treatment of transient phases of leukopenia following chemotherapy and/or radiotherapy. A combination of IL4 with G-CSF has been shown to lead to synergistic suppression of the growth of some human leukemic cell lines.[3] G-CSF can be used to expand the myeloid cell lineage. It has been shown that the pretreatment with recombinant human G-CSF prior to marrow harvest can improve the graft by increasing the total number of myeloid lineage restricted progenitor cells, resulting in stable but not accelerated myeloid engraftment of autologous marrow.[4]

ELISA OVERVIEW

Cell Applications ELISA Kits are based on standard sandwich enzyme-linked immunosorbent assay technology. Freshly prepared standards, samples, and solutions are recommended for best results.

1. Prepare test samples.
2. Prepare a protein standard of the target protein.
3. Add test samples and standards to the pre-coated 96-well plate. Do not wash.
4. Add biotinylated detection antibodies. Wash.
5. Add Avidin-Biotin-Peroxidase Complex (ABC) Solution. Wash.
6. Add Tetramethyllbenzidine (TMB) Color Developing Agent, containing HRP substrate.
7. Add TMB Stop Solution
8. Subject the plate to analysis.

NOTES:

- Before using the kit, quick spin tubes to bring down all solution to the bottom of tube.
- Duplicate assay wells are recommended for both standard and sample testing.
- Do not let the 96-well plate dry, this will lead to inactivation of plate components.
- When diluting samples and reagents, ensure that they are mixed completely and evenly.
- Pre-warm diluted ABC and TMB solutions at 37°C for 30 min before use to avoid variable temperature effects.
- For washes, use TBS or PBS. Do not touch well walls.
- A protein standard is included in the kit. A protein standard detection curve should be generated with each experiment, no more than 2 hours prior to the experiment.
- The user will determine sample dilution fold by estimation of target protein amount in samples.

References

1. Basu, S. et al: Int J Mol Med. 10:3-10, 2002
2. Ward, A.C. et al: Blood 93:113-24, 1999
3. Touw, I.P. & van de Geijn, G.J.: Front Biosci. 12:800-15, 2007
4. Ward, A.C.: Front Biosci.12:608-18, 2007

PROTOCOL

I. Plate Washing

Discard the solution in the plate without touching the side walls. Blot the plate onto paper towels or other absorbent material. Soak each well with at least 0.3 ml PBS or TBS buffer for 1~2 minutes. Repeat this process two additional times for a total of three washes.

II. Preparation of Test Samples

Test Sample Processing

- **Cell culture supernate, tissue lysate or body fluids**: Remove particulates by centrifugation.
- **Serum**: Allow the serum to clot in a serum separator tube (about 2 hours) at room temperature. Centrifuge at approximately 1000 X g for 10 min.
- **Plasma**: Collect plasma using heparin, EDTA, citrate as an anticoagulant. Centrifuge for 10 min at 1000 x g within 30 min of collection. Analyze immediately or aliquot and store frozen at -20°C.

Sample Dilution Guideline

Estimate the concentration of the target protein in the sample and select a proper dilution factor such that the diluted target protein concentration falls within the standard curve range. Depending on the sample, several trial dilutions may be necessary. Dilute the sample using the provided diluent buffer, mixing well. Suggested working dilutions of samples are as follows:

Target Protein Concentration Range	Sample Working Dilution	Sample Vol.	Diluent Buffer Vol.
20-200 ng/ml	1:100	1 µl	99 µl
2-20 ng/ml	1:10	10 µl	90 µl
31.2-2000 pg/ml	1:2	50 µl	50 µl
≤31.2 pg/ml	n/a	100µl	n/a

If samples will be assayed within 24 hours, store at 2-8°C. For long-term storage, aliquot and freeze samples at -20°C. Avoid repeated freeze-thaw cycles.

III. Preparation of Reagents

Reconstitution of the Standard

The standard solutions should be prepared no more than 2 hours prior to the experiment. Two tubes of the standard are included in each kit. Use one tube for each experiment.

1. 10,000pg/ml of Mouse G-CSF standard solution: Add 1 ml sample diluent buffer into one tube, keep the tube at room temperature for 10 min and mix thoroughly.
2. 2000pg/ml of Mouse G-CSF standard solution: Add 0.2 ml of the above 10ng/ml G-CSF standard solution into 0.8 ml sample diluent buffer and mix thoroughly.
3. 1000pg/ml→31.2pg/ml of Mouse G-CSF standard solutions: Label 6 Eppendorf tubes with 1000pg/ml, 500pg/ml, 250pg/ml, 125pg/ml, 62.5pg/ml, 31.2pg/ml, respectively. Aliquot 0.3 ml of the sample diluent buffer into each tube. Add 0.3 ml of the above 2000pg/ml G-CSF standard solution into 1st tube and mix. Transfer 0.3 ml from 1st tube to 2nd tube and mix. Transfer 0.3 ml from 2nd tube to 3rd tube and mix, and so on.

Preparation of Biotinylated Antibody Working Solution

The solution should be prepared no more than 2 hours prior to the experiment.

1. The total volume should be: 0.1ml/well x (the number of wells). (Allowing 0.1-0.2 ml more than total volume)
2. Biotinylated antibody should be diluted in 1:100 with the antibody diluent buffer and mixed thoroughly.

Preparation of the Avidin-Biotin-Peroxidase Complex (ABC) Working Solution

The solution should be prepared no more than 1 hour prior to the experiment.

1. The total volume should be: 0.1ml/well x (the number of wells). (Allowing 0.1-0.2 ml more than total volume)
2. Avidin- Biotin-Peroxidase Complex (ABC) should be diluted in 1:100 with the ABC dilution buffer and mixed thoroughly.

IV. ELISA

The ABC working solution and TMB color developing agent must be kept warm at 37°C for 30 min before use. When diluting samples and reagents, they must be mixed completely and evenly. A standard detection curve should be prepared for each experiment. The user will decide sample dilution fold by crude estimation of target protein amount in samples.

1. Aliquot 0.1ml per well of the 2000pg/ml, 1000pg/ml, 500pg/ml, 250pg/ml, 125pg/ml, 62.5pg/ml, 31.2pg/ml Mouse G-CSF standard solutions into the precoated 96-well plate. Add 0.1ml of the sample diluent buffer into the control well (Blank well). Add 0.1ml of each properly diluted sample of human sera, plasma, body fluids, tissue lysates or cell culture supernatants to each empty well. **See "Sample Dilution Guideline"** for details. We recommend that each Mouse G-CSF standard solution and each sample is measured in duplicate.
2. Seal the plate with the cover and incubate at 37°C for 90 min.
3. Remove the cover, discard plate content, and blot the plate onto paper towels or other absorbent material. Do NOT let the wells completely dry at any time.
4. Add 0.1ml of biotinylated anti-Mouse G-CSF antibody working solution into each well and incubate the plate at 37°C for 60 min.
5. Wash the plate three times with 0.01M TBS or 0.01M PBS, and each time let washing buffer stay in the wells for 1 min. Discard the washing buffer and blot the plate onto paper towels or other absorbent material.
6. Add 0.1ml of prepared ABC working solution into each well and incubate the plate at 37°C for 30 min.
7. Wash plate 5 times with 0.01M TBS or 0.01M PBS, and each time let washing buffer stay in the wells for 1-2 min. Discard the washing buffer and blot the plate onto paper towels or other absorbent material.
8. Add 90 µl of prepared TMB color developing agent into each well and incubate plate at 37°C for 10-15 min (shades of blue can be seen in the wells with the four most concentrated Mouse G-CSF standard solutions; the other wells show no obvious color).
9. Add 0.1ml of prepared TMB stop solution into each well. The color changes into yellow immediately.
10. Read the O.D. absorbance at 450nm in a microplate reader within 30 min after adding the stop solution.

V. Calculating Protein Concentration

- For all wells, determine O.D.450(Relative):
  O.D.450(Relative) = O.D.450(Reading) – O.D.450(Blank)

- Plot the standard curve:
  Plot O.D.450(Relative) of each standard solution (Y) vs. the respective concentration of the standard solution (X). See **Figure 1** for a typical standard curve.

- The target protein concentration in samples can be interpolated from the standard curve. Multiply the interpolated concentration by the dilution factor to obtain the target protein concentration in the sample.