

## Human G-CSF ELISA Kit

**Catalog Number:** EA100235

### Assay Principle

The OriGene Human CSF3 Pre-Coated ELISA (Enzyme-Linked Immunosorbent Assay) kit is a solid phase immunoassay specially designed to measure Human CSF3 with a 96-well strip plate that is pre-coated with antibody specific for CSF3. The detection antibody is a biotinylated antibody specific for CSF3. The capture antibody is monoclonal antibody from mouse, the detection antibody is polyclonal antibody from goat. The kit contains recombinant Human CSF3 with immunogen: Expression system for standard: E.coli; Immunogen sequence: T31-O204. The kit is analytically validated with ready to use reagents.

To measure Human CSF3, add standards and samples to the wells, then add the biotinylated detection antibody. Wash the wells with PBS or TBS buffer, and add Avidin-Biotin-Peroxidase Complex (ABC-HRP). Wash away the unbound ABC-HRP with PBS or TBS buffer and add TMB. TMB is substrate to HRP and will be catalyzed to produce a blue color product, which changes into yellow after adding acidic stop solution. The density of the yellow product is linearly proportional to Human CSF3 in the sample. Read the density of the yellow product in each well using a plate reader, and benchmark the sample wells' readings against the standard curve to determine the concentration of Human CSF3 in the sample.

### Overview

<b>Product Name</b>	Human CSF3 ELISA
<b>Reactive Species</b>	Human
<b>Size</b>	96wells/kit, with removable strips.
<b>Description</b>	Sandwich High Sensitivity ELISA kit for Quantitative Detection of Human TGFB3. 96wells/kit, with removable strips.
<b>Sensitivity</b>	<4 pg/ml *The sensitivity or the minimum detectable dose (MDD) is the lower limit of target protein that can be detected by the kit. It is determined by adding two standard deviations to the mean O.D. value of twenty (20) blank wells and calculating the corresponding concentration.
<b>Detection Range</b>	31.2 pg/ml – 2000 pg/ml
<b>Storage Instructions</b>	Store at 4°C for 6 months, at -20°C for 12 months. Avoid multiple freeze-thaw cycles (Shipped with wet ice.)
<b>Uniprot ID</b>	P09919

## Technical Details

<b>Capture/Detection Antibodies</b>	The capture antibody is monoclonal antibody from mouse, the detection antibody is polyclonal antibody from goat.
<b>Specificity</b>	Natural and recombinant Human CSF3
<b>Immunogen</b>	Expression system for standard: <i>E.coli</i> ; Immunogen Sequence: T31-P204
<b>Cross Reactivity</b>	There is no detectable cross-reactivity with other relevant proteins.

## Notice Before Application

Please read the following instructions before starting the experiment.

1. To inspect the validity of experiment operation and the appropriateness of sample dilution proportion, pilot experiment using standards and a small number of samples is recommended.
2. Before using the Kit, spin tubes and bring down all components to the bottom of tubes.
3. Don't let 96-well plate dry, for dry plate will inactivate active components on plate.
4. Don't reuse tips and tubes to avoid cross contamination.
5. Avoid using the reagents from different batches together.

## Kit Components/Materials Provided

Description	Quantity	Volume
Anti-Human CSF3 Pre-coated 96-well strip microplate	1	12 strips of 8 wells
Human CSF3 Standard	2	10 ng/tube
Human CSF3 Biotinylated antibody (100x)	1	130 $\mu$ l
Avidin-Biotin-Peroxidase Complex (100x)	1	130 $\mu$ l
Sample Diluent	1	30ml
Antibody Diluent	1	12ml
Avidin-Biotin-Peroxidase Diluent	1	12ml
Color Developing Reagent (TMB)	1	10ml
Stop Solution	1	10ml
Plate Sealers	4	Piece
Wash Buffer	1	Powder pack for 1000 ml

## Required Materials That Are Not Supplied

Microplate Reader capable of reading absorbance at 450nm.

Automated plate washer (optional)

1000ml of 1X wash buffer (TBS or PBS)

Pipettes and pipette tips capable of precisely dispensing 0.5 µl through 1 ml volumes of aqueous solutions.

Multichannel pipettes are recommended for large amount of samples.

Deionized or distilled water.

500ml graduated cylinders.

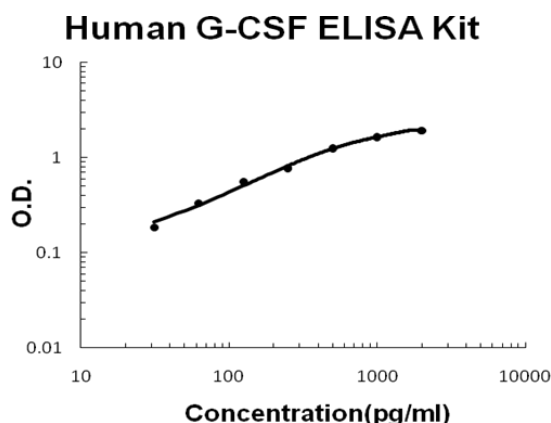
Test tubes for dilution.

## Human CSF3 ELISA Kit (EA100366) Standard Curve Example

Highest O.D. value might be higher or lower than in the example. The experiment result is statistically significant if the highest O.D. value is no less than 1.0.

Concentration (pg/ml)	0	31.2	62.5	125	250	500	1000	2000
O.D.	0.001	0.105	0.187	0.435	0.746	1.475	1.817	2.357

### Human CSF3 ELISA Kit standard curve



A standard curve is provided for demonstration only. A standard curve should be generated for each set of samples assayed.

## Intra/Inter Assay Variability

OriGene spend great efforts in documenting lot to lot variability and make sure our assay kits produce robust data that are reproducible.

**Intra-Assay Precision (Precision within an assay):** Three samples of known concentration were tested on one plate to assess intra-assay precision.

**Inter-Assay Precision (Precision across assays):** Three samples of known concentration were tested in separate assays to assess inter-assay precision.

### Intra-Assay Precision

Sample	1	2	3
n	16	16	16
Mean(pg/ml)	62	237	1001
Standard deviation	3.96	16.26	45.04
CV(%)	6.4 %	6.4 %	4.5 %

### Inter-Assay Precision

	1	2	3
n	24	24	24
Mean	64	230	966
Standard deviation	4.99	18.17	59.89
CV(%)	7.8 %	7.9 %	6.2 %

## Reproducibility

To assay reproducibility, three samples with differing target protein concentrations were assayed using four different lots.

Lots	Lot1 (pg/ml)	Lot2 (pg/ml)	Lot3 (pg/ml)	Lot4 (pg/ml)	Mean (pg/ml)	Standard Deviation	CV (%)
Sample 1	62	57	60	56	58	2.38	4.1 %
Sample 2	237	209	236	225	226	11.27	4.9 %
Sample 3	1001	964	888	983	959	43.02	4.4 %

\*number of samples for each test n=16.

## Preparation Before The Experiment

Item	Preparation
All reagents	Bring all reagents to 37°C prior to use. The assay can also be done at room temperature however we recommend doing it at 37°C for best consistency with our QC results. Also the TMB incubation time estimate (15-25min) is based on 37°C.
Wash buffer	Prepare 1000ml of wash buffer by adding 1000 ml of distilled H2O to the provided powder.
Biotinylated Anti-Human CSF3 antibody	It is recommended to prepare this reagent immediately prior to use by diluting the Human CSF3 Biotinylated antibody (100x) 1:100 with Antibody Diluent. Prepare 100 µl by adding 1 µl of Biotinylated antibody (100x) to 99 µl of Antibody Diluent for each well. Mix gently and thoroughly and use within 2 hours of generation.
Avidin-Biotin-Peroxidase Complex	It is recommended to prepare this reagent immediately prior to use by diluting the Avidin-Biotin-Peroxidase Complex (100x) 1:100 with Avidin-Biotin-Peroxidase Diluent. Prepare 100 µl by adding 1 µl of Avidin-Biotin-Peroxidase Complex (100x) to 99 µl of Avidin-Biotin-Peroxidase Diluent for each well. Mix gently and thoroughly and use within 2 hours of generation.
Human CSF3 Standard	It is recommended that the standards be prepared no more than 2 hours prior to performing the

	experiment. Use one 10 ng of lyophilized Human CSF3 standard for each experiment. Gently spin the vial prior to use. Reconstitute the standard to a stock concentration of 10 ng/ml using 1ml of sample diluent. Allow the standard to sit for a minimum of 10 minutes with gentle agitation prior to making dilutions.
Microplate	The included microplate is coated with capture antibodies and ready-to-use. It does not require additional washing or blocking. The unused well strips should be sealed and stored in the original packaging.

## Dilution of Human CSF3 Standard

1. Number tubes 1-8. Final Concentrations to be Tube # 1 – 2000 pg/ml, # 2 – 1000 pg/ml, # 3 – 500 pg/ml, # 4 – 250 pg/ml, # 5 – 125 pg/ml, # 6 – 62.5 pg/ml, # 7 – 31.25 pg/ml, # 8 – 0.0 (Blank – Sample diluent serves as the zero standard).
2. To generate standard #1, add 200 µl of the reconstituted standard stock solution of 10 ng/ml and 800 µl of sample diluent to tube #1 for a final volume of 1000 µl. Mix thoroughly.
3. Add 300 µl of sample diluent to tubes # 2-7.
4. To generate standard #2, add 300 µl of standard #1 from tube #1 to tube #2 for a final volume of 600 µl. Mix thoroughly.
5. To generate standard #3, add 300 µl of standard #2 from tube #2 to tube #3 for a final volume of 600 µl. Mix thoroughly.
6. Continue the serial dilution for tube #4-7.
7. Tube #8 is a blank standard to be used with every experiment.

## Sample Preparation and Storage

These sample collection instructions and storage conditions are intended as a general guideline and the sample stability has not been evaluated.

Sample Type	Procedure
Cell culture supernatants	Clear sample of particulates by centrifugation, assay immediately or store samples at -20°C.
Serum	Use a serum separator tube (SST) and allow serum to clot at room temperature for about four hours. Then, centrifuge for 15 min at approximately 1,000 xg. assay immediately or store samples at -20°C.
Plasma	Collect plasma using heparin, EDTA or citrate as an anticoagulant. Centrifuge for 15 min at approximately 1,000 xg. assay immediately or store samples at -20°C. Note: it is important to not use anticoagulants other than the ones described above to treat plasma for other anticoagulants could block the antibody binding site.

## Sample Dilution

The target protein concentration should be estimated and appropriate sample dilutions should be selected such that the final protein concentration lies near the middle of the linear dynamic range of the assay.

It is recommended to prepare 150 µl of sample for each replicate to be assayed. The samples should be diluted with sample diluent and mixed gently.

## Assay protocol

*It is recommended that all reagents and materials be equilibrated to 37°C/room temperature prior to the experiment (see Preparation Before The Experiment if you have missed this information).*

1. Prepare all reagents and working standards as directed previously.
2. Remove excess microplate strips from the plate frame and seal and store them in the original packaging.
3. Add 100 µl of the standard, samples, or control per well. Add 100 µl of the sample diluent buffer into the control well (Zero well). At least two replicates of each standard, sample, or control is recommended.
4. Cover with the plate sealer provided and incubate for 120 minutes at RT (or 90 min. at 37 °C).
5. Remove the cover and discard the liquid in the wells into an appropriate waste receptacle. Invert the plate on the benchtop onto a paper towel and tap the plate to gently blot any remaining liquid. It is recommended that the wells are not allowed to completely dry at any time.
6. Add 100 µl of the prepared 1x Biotinylated Anti-Human CSF3 antibody to each well.
7. Cover with plate sealer and incubate for 90 minutes at RT (or 60 minutes at 37°C).
8. Wash the plate 3 times with the 1x wash buffer.
  - a. Discard the liquid in the wells into an appropriate waste receptacle. Then, invert the plate on the benchtop onto a paper towel and tap the plate to gently blot any remaining liquid. It is recommended that the wells are not allowed to completely dry at any time.
  - b. Add 300 µl of the 1x wash buffer to each assay well. (For cleaner background incubate for 60 seconds between each wash).
  - c. Repeat steps a-b 2 additional times.
9. Add 100 µl of the prepared 1x Avidin-Biotin-Peroxidase Complex into each well. Cover with the plate sealer provided and incubate for 40 minutes at RT (or 30 minutes at 37°C).
10. Wash the plate 5 times with the 1x wash buffer.
  - a. Discard the liquid in the wells into an appropriate waste receptacle. Then, invert the plate on the benchtop onto a paper towel and tap the plate to gently blot any remaining liquid. It is recommended that the wells are not allowed to completely dry at any time.
  - b. Add 300 µl of the 1x wash buffer to each assay well. (For cleaner background incubate for 60 seconds between each wash).
  - c. Repeat steps a-b 4 additional times.
11. Add 90 µl of Color Developing Reagent to each well. Cover with the plate sealer provided and incubate in the dark for 30 minutes at RT (or 15-25 minutes at 37°C). (The optimal incubation time must be empirically determined. A guideline to look for is blue shading the top four standard wells, while the remaining standards remain clear.)
12. Add 100 µl of Stop Solution to each well. The color should immediately change to yellow.
13. Within 30 minutes of stopping the reaction, the O.D. absorbance should be read with a microplate reader at 450nm.

## Data Analysis

*Average the duplicate readings for each standard, sample, and control. Subtract the average zero standard O.D. reading.*

*It is recommended that a standard curve be created using computer software to generate a four parameter logistic (4-PL) curve-fit. A free program capable of generating a four parameter logistic (4-PL) curve-fit can be found online at: [www.myassays.com/four-parameter-logistic-curve.assay](http://www.myassays.com/four-parameter-logistic-curve.assay)*

*Alternatively, plot the mean absorbance for each standard against the concentration. The measured concentration in the sample can be interpolated by using linear regression of each average relative OD against the standard curve generated using curve fitting software. This will generate an adequate but less precise fit of the data.*

*For diluted samples, the concentration reading from the standard curve must be multiplied by the dilution factor.*

## Background on CSF3

Granulocyte colony-stimulating factor (G-CSF) is a member of the CSF family of hormone-like glycoprotein that regulates hematopoietic cell proliferation and differentiation, and it almost exclusively stimulates the colony formation of granulocytes from committed precursor cells in semi-solid agar culture.<sup>1</sup> G-CSF is also termed colony stimulating factor-3, and a single gene of which codes for a 177 or 180 amino acid mature protein of molecular weight 19,600. Functionally, it specifically stimulates the proliferation and differentiation of the progenitor cells for granulocytes. The effect of G-CSF on myeloid leukemias is unique among colony stimulating factors in driving the leukemic cells from a self-renewing malignant state to a mature differentiated phenotype with the concomitant loss of tumorigenicity.<sup>2</sup> Besides, it also prevents cardiac remodeling after myocardial infarction by activating the Jak-Stat pathway in cardiomyocytes. The recombinant form of hG-CSF is capable of supporting neutrophil proliferation in a CFU-GM assay as well as early erythroid colonies and mixed colony formation. Human gene coding for G-CSF is assigned to the q21-q22 region of chromosome 17.<sup>3</sup> The standard product used in this kit is recombinant human G-CSF, consisting of 175 amino acids with the molecular mass of 18.8KDa.

### Reference

1. Nagata S, Tsuchiya M, Asano S, Kaziro Y, Yamazaki T, Yamamoto O, Hirata Y, Kubota N, Oheda M, Nomura H, et al. Molecular cloning and expression of cDNA for human granulocyte colony-stimulating factor. *Nature* 1986 Jan 30-Feb 5; 319 (6052), 415-8.
2. Harada M, Qin Y, Takano H, Minamino T, Zou Y, Toko H, Ohtsuka M, Matsuura K, Sano M, Nishi J, Iwanaga K, Akazawa H, Kunieda T, Zhu W, Hasegawa H, Kunisada K, Nagai T, Nakaya H, Yamauchi-Takahara K, Komuro I. G-CSF prevents cardiac remodeling after myocardial infarction by activating the Jak-Stat pathway in cardiomyocytes. *Nat Med* 2005 Mar; 11 (3):305-11. 2005 Feb 20.
3. Kanda N, Fukushige S, Murotsu T, Yoshida MC, Tsuchiya M, Asano S, Kaziro Y, Nagata S. Human gene coding for granulocyte-colony stimulating factor is assigned to the q21-q22 region of chromosome 17. *Somat Cell Mol Genet* 1987 Nov; 13 (6):679-84.