KAMIYA BIOMEDICAL COMPANY

Human BDNF ELISA

For the quantitative determination of BDNF in human cell culture supernates, cell lysates, serum and plasma (heparin, EDTA, citrate)

Cat. No. KT-1153

For Research Use Only. Not for diagnostic use in the U.S.

PRODUCT INFORMATION

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INTENDED USE
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INTRODUCTION
Brain-derived neurotrophic factor (BDNF) is a prosurvival factor induced by cortical neurons that is necessary for survival of striatal neurons in the brain. It is a secreted protein with the molecular weight of 27.8 kDa, consisting of 247 amino acids. It is known to promote neuronal survival and differentiation. BDNF shares substantial amino acid sequence identity with nerve growth factor(NGF). BDNF and neurotrophin-3 (NT-3) are two recently cloned neurotrophic factors that are homologous to NGF. mRNA products of the BDNF and NT-3 genes are detected in the adult human brain, suggesting that these proteins are involved in the maintenance of the adult nervous system. BDNF and other neurotrophins are critically involved in long-term potentiation (LTP). BDNF-mediated LTP is induced postsynaptically. BDNF has trophic effects on serotonergic (5-HT) neurons in the central nervous system. BDNF has an essential maintenance function in the regulation of anxiety-related behavior and in food intake through central mediators in both the basal and fasted state. It plays a role in treating breathing disorders such as respiratory insufficiency after spinal injury. The mature form of BDNF is identical in all mammals examined, and the gene encoding human BDNF to chromosome 11, band p13.

PRINCIPLE
The Human BDNF Pre-Coated ELISA (Enzyme-Linked Immunosorbent Assay) kit is a solid phase immunoassay specially designed to measure Human BDNF with a 96-well strip plate that is pre-coated with antibody specific for BDNF. The detection antibody is a biotinylated antibody specific for BDNF. The capture antibody is a monoclonal antibody from mouse, the detection antibody is a biotinylated polyclonal antibody from goat. The kit contains recombinant Human BDNF with immunogen: Expression system for calibrator: sf21; Immunogen sequence: H129-R247. The kit is analytically validated with ready to use reagents.

To measure Human BDNF, add calibrators 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 unbounded 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 BDNF 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 calibration curve to determine the concentration of Human BDNF in the sample.

COMPONENTS
1. Anti-Human BDNF Pre-coated 96-well strip microplate: 1 (12 strips of 8 wells)

2. Human BDNF Calibrator: 10 ng/tube x 2

3. Human BDNF Biotinylated antibody (100X): 130 µL

4. Avidin-Biotin-Peroxidase Complex (100X): 130 µL

5. Sample Diluent: 30 mL

6. Antibody Diluent: 12 mL

7. Avidin-Biotin-Peroxidase Diluent: 12 mL

8. Color Developing Reagent (TMB): 10 mL

9. Stop Solution: 10 mL

10. Plate Sealers: 4

11. Wash Buffer Concentrate: Powder for 1,000 mL

MATERIALS REQUIRED BUT NOT PROVIDED

Microplate Reader capable of reading absorbance at 450 nm.
Automated plate washer (optional)
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.
500 mL graduated cylinders.
Test tubes for dilution.

REAGENT PREPARATION

All reagents: Bring all reagents to 37℃ prior to use. The assay can also be done at room temperature however we recommend doing it at 37℃ for best consistency with our QC results. Also the TMB incubation time estimate (15-20 min) is based on 37℃.

Wash buffer: Dissolve the included powder in 1,000 mL of deionized water.

Biotinylated Anti-Human BDNF antibody: It is recommended to prepare this reagent immediately prior to use by diluting the Human BDNF 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 BDNF Calibrator: It is recommended that the calibrators be prepared no more than 2 hours prior to performing the experiment. Use one 10 ng of lyophilized Human BDNF calibrator for each experiment. Gently spin the vial prior to use. Reconstitute the calibrator to a stock concentration of 10 ng/mL using 1 mL of sample diluent. Allow the calibrator 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 BDNF Calibrator

1. Number tubes 1-8. Final Concentrations to be Tube # 1 –2,000 pg/mL, #2 –1,000 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 – Sample Diluent serves as the zero calibrator (0 pg/mL).
2. To generate calibrator #1, add 200 µL of the reconstituted calibrator stock solution of 10 ng/mL and 800 µL of sample diluent to tube #1 for a final volume of 1,000 µL. Mix thoroughly.
3. Add 300 µL of sample diluent to tubes # 2-7.
4. To generate calibrator #2, add 300 µL of calibrator #1 from tube #1 to tube #2 for a final volume of 600 µL. Mix thoroughly.
5. To generate calibrator #3, add 300 µL of calibrator #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.

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.

Cell culture supernatants: Clear sample of particulates by centrifugation, assay immediately or store samples at -20℃.

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 x g. assay immediately or store samples at -20℃.

Plasma: Collect plasma using heparin, EDTA or citrate as an anticoagulant. Centrifuge for 15 min at approximately 1,000 x g. Assay immediately or store samples at -20℃.
*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.

Cell lysates: Lyse the cells, make sure there are no visible cell sediments. Centrifuge cell lysates at approximately 10,000 X g for 5 min. Collect the supernatant.

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℃/room temperature prior to the experiment (see Reagent Preparation if you have missed this information).
1. Prepare all reagents and working calibrators 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 calibrator, 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 calibrator, sample, or control is recommended.
4. Cover with the plate sealer provided and incubate for 120 minutes at RT (or 90 min. at 37℃).
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 BDNF antibody to each well.
7. Cover with plate sealer and incubate for 90 minutes at RT (or 60 minutes at 37℃).
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℃).
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 15-20 minutes at 37℃). (The optimal incubation time must be empirically determined. A guideline to look for is blue shading the top four calibrator wells, while the remaining calibrators 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 450 nm.

DATA ANALYSIS

Average the duplicate readings for each calibrator, sample, and control. Subtract the average zero calibrator O.D. reading.
It is recommended that a calibration 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.

Alternatively, plot the mean absorbance for each calibrator against the concentration. The measured concentration in the sample can be interpolated by using linear regression of each average relative OD against the calibration 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 calibration curve must be multiplied by the dilution factor.

OVERVIEW

Product Name Human BDNF ELISA
Reactive Species Human
Size 96 wells/kit, with removable strips.
Description Sandwich High Sensitivity ELISA kit for Quantitative Detection of Human BDNF. 96 wells/kit, with removable strips.
Sensitivity <15 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.
Detection Range 31.2 pg/mL-2,000 pg/mL
Storage Instructions Store at 4℃ for 6 months, at -20℃ for 12 months. Avoid multiple freeze-thaw cycles (Shipped with wet ice.)
Uniprot ID P23560

TECHNICAL DETAILS

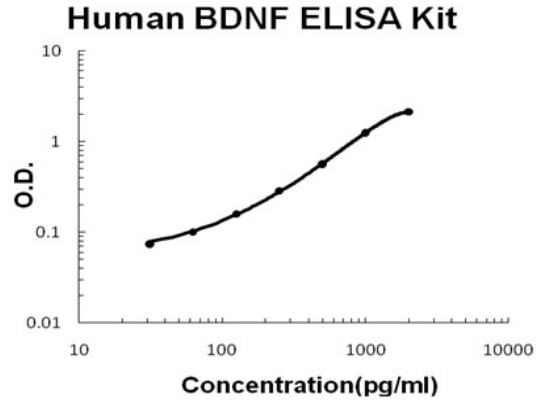
Capture/Detection Antibodies The capture antibody is monoclonal antibody from mouse, the detection antibody is a biotinylated polyclonal antibody from goat.
Specificity Natural and recombinant Human BDNF
Immunogen Expression system for calibrator: sf21; Immunogen sequence: H129-R247
Cross Reactivity There is no detectable cross-reactivity with other relevant proteins.

EXAMPLE CALIBRATION CURVE

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	1,000	2,000
O.D.	0.025	0.074	0.101	0.160	0.287	0.563	1.251	2.116

Human BDNF ELISA Kit calibration curve



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

INTRA/INTER ASSAY VARIABILITY

We spend great efforts in documenting lot to lot variability and making 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			Inter-Assay Precision		
Sample	1	2	3	1	2	3
n	16	16	16	24	24	24
Mean(pg/ml)	47	224	1022	44	244	926
Standard deviation	3.57	9.63	44.96	3.78	12.44	50
CV(%)	7.6%	4.3%	4.4%	8.6%	5.1%	5.4%

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	47	56	51	52	51	3.2	6.2%
Sample 2	224	188	221	204	209	14.44	6.9%
Sample 3	1022	1010	870	1050	988	69.65	7%

*number of samples for each test n=16.

PRECAUTION

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 calibrators 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.

FOR RESEARCH USE ONLY

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