ab327050 – Human Tau SimpleStep ELISA® Kit, Chemiluminescent

For the quantitative measurement of Tau in human serum, plasma (heparin), plasma (EDTA), cell culture supernatant, CSF, cell extract, and tissue extract.
For research use only - not intended for diagnostic use.
Patent pending.

For overview, typical data and additional information please visit: www.abcam.com/ab327050

Storage and Stability: Store kit at 2-8°C immediately upon receipt. Refer to list of materials supplied for storage conditions of individual components. Observe the storage conditions for individual prepared components in the Standard Preparation and Reagent preparation sections.

Limitations: All data, except typical standard curve and sensitivity were collected using the colorimetric version of this kit ((ab273617).

Materials Supplied

Item	Quantity 1 x 96 tests	Quantity 10 x 96 tests	Storage Condition
Human Tau Capture Antibody 10X	600 µL	10 x 600 µL	+4°C
Human Tau Detector Antibody 10X	600 µL	10 x 600 µL	+4°C
Human Tau Lyophilized Recombinant Protein	2 Vials	10 x 2 Vials	+4°C
Antibody Diluent 5BI	6 mL	10 x 6 mL	+4°C
Cell Extraction Buffer PTR 5X	10 mL	2 x 50 mL	+4°C
Sample Diluent NS	50 mL	2 x 250 mL	+4°C
Wash Buffer PT 10X	20 mL	200 mL	+4°C
ChemiHRP Reagent A	3 mL	50 mL	+4°C
ChemiHRP Reagent B	3 mL	50 mL	+4°C
SimpleStep Pre-Coated Black 96-Well Microplate	96 Wells	10 x 96 Wells	+4°C
Plate Seal	1	10	+4°C

Materials Required, Not Supplied

These materials are not included in the kit, but will be required to successfully utilize this assay:

Luminometer capable of reading strip plates with the following settings: 0.5-1 second/well read time; summation mode (all wavelengths).
Method for determining protein concentration (BCA assay recommended).
Deionized water.
Multi- and single-channel pipettes.
Tubes for standard dilution.
Orbital microplate shaker for all incubation steps: capable of 750 rpm shaking speed.
Optional: Phenylmethylsulfonyl Fluoride (PMSF) (or other protease inhibitors).

Reagent Preparation

Equilibrate all reagents to room temperature (18-25°C) prior to use. The kit contains enough reagents for 96 wells. The sample volumes below are sufficient for 48 wells (6 x 8-well strips); adjust volumes as needed for the number of strips in your experiment.

Prepare only as much reagent as is needed on the day of the experiment. Capture and Detector Antibodies have only been tested for stability in the provided 10X formulations.

1X Wash Buffer PT: Prepare 1X Wash Buffer PT by diluting Wash Buffer PT 10X with deionized water. To make 50 mL 1X Wash Buffer PT combine 5 mL Wash Buffer PT 10X with 45 mL deionized water. Mix thoroughly and gently.

Additional Wash Buffer Availability

Customers who wish to increase wash stringency through up to 6 total wash cycles, longer wash soak times, higher wash volumes, or the use of automated plate washing systems may purchase 10X Wash Buffer PT (ab206977) separately. This wash buffer can be used to prepare larger volumes of wash solution and is particularly beneficial for laboratories performing high-throughput testing or implementing automated washing workflows.

Use of bulk wash buffer may also be advantageous when evaluating assay optimization strategies, including wash cycle counts up to 6 total washes or extended wash incubations designed to further reduce background signal and improve assay sensitivity.

1X Cell Extraction Buffer PTR (For cell and tissue extracts only): Prepare 1X Cell Extraction Buffer PTR by diluting Cell Extraction Buffer PTR 5X to 1X with deionized water. To make 10 mL 1X Cell Extraction Buffer PTR combine 8 mL deionized water and 2 mL Cell Extraction Buffer PTR 5X. Mix thoroughly and gently. If required protease inhibitors can be added.

Antibody Cocktail: Prepare Antibody Cocktail by diluting the capture and detector antibodies in Antibody Diluent 5BI. To make 3 mL of the Antibody Cocktail combine 300 µL 10X Capture Antibody and 300 µL 10X Detector Antibody with 2.4 mL Antibody Diluent 5BI. Mix thoroughly and gently.

Lumi HRP Development Solution: Just prior to use, prepare Lumi HRP Development Solution by mixing equal volume of the ChemiHRP Reagent A and the ChemiHRP Reagent B. To make 3 mL of the Lumi HRP Development Solution combine 1.5 mL of ChemiHRP Reagent A and 1.5 mL of ChemiHRP Reagent B. Mix thoroughly and gently by inversion or slow pipetting (Avoid shaking or vortexing). Protect the prepared solution from light until use.

Standard Preparation

Always prepare a fresh set of standards for every use. Discard working standard dilutions after use as they do not store well. The following section describes the preparation of a standard curve for duplicate measurements (recommended).

1. Reconstitute the **Tau** protein standard by adding the volume indicated on the protein vial label. For **serum, plasma, cerebrospinal fluid, and cell culture supernatant samples measurements**, use Sample Diluent NS. For **cell and tissue extracts samples measurements**,

use 1X Cell Extraction Buffer PTR. Hold at room temperature for 10 minutes and mix thoroughly and gently. This is the 47,543 pg/mL **Stock Standard** Solution.

2. Label nine tubes, Standards 1–9.
3. Use the same Sample Diluent as used to resuspend the Stock Standard to prepare the standard curve. Add 257 µL of Sample Diluent into tube number 1 and 150 µL of Sample Diluent into numbers 2-9.
4. Use the **Stock Standard** to prepare the following dilution series. Standard #9 contains no protein and is the Blank control:

Standard #	Dilution Sample	Volume to Dilute (µL)	Volume of Diluent (µL)	Starting Conc. (pg/mL)	Final Conc. (pg/mL)
1	**Stock Standard**	60	257	47,543	9,000
2	Standard#1	75	150	9,000	3,000
3	Standard#2	75	150	3,000	1,000
4	Standard#3	75	150	1,000	333.3
5	Standard#4	75	150	333.3	111.1
6	Standard#5	75	150	111.1	37.04
7	Standard#6	75	150	37.04	12.35
8	Standard#7	75	150	12.35	4.12
9	Blank Control	0	150	0	0

Sample Preparation

Typical Sample Dynamic Range	
Sample Type	**Range**
Serum*	≤50%
Plasma – EDTA*	≤25%
Plasma – Heparin*	≤25%
Cell Culture Media*	≤50%
Cerebrospinal Fluid*	≤50%
SH-SY5Y Mock Treated Cell Extract	1-80 µg/mL
SH-SY5Y Staurosporine Treated Cell Extract	1-80 µg/mL
Human Brain Tissue Extract	0.1-3.5 µg/mL

*Based on spiked sample.

Serum Samples should be collected into a serum separator tube. After clot formation, centrifuge samples at 2,000 x g for 10 minutes and collect serum. Dilute samples at least 1:2 into Sample Diluent NS and assay. Store un-diluted serum at -20°C or below. Avoid repeated freeze-thaw cycles.

Plasma Collect plasma using EDTA or heparin. Centrifuge samples at 2,000 x g for 10 minutes. Dilute samples at least 1:4 into Sample Diluent NS and assay. Store un-diluted plasma samples at -20°C or below for up to 3 months. Avoid repeated freeze-thaw cycles. Note: This kit is incompatible with plasma (citrate) samples.

Cell Culture Supernatants Centrifuge cell culture media at 2,000 x g for 10 minutes to remove debris. Collect supernatants. Dilute samples at least 1:2 into Sample Diluent NS and assay. Store un-diluted samples at -20°C or below. Avoid repeated freeze-thaw cycles.

Cerebrospinal Fluid (CSF) Dilute samples at least 1:2 into Sample Diluent NS and assay. Store un-diluted samples at -20°C or below. Avoid repeated freeze-thaw cycles.

Preparation of extracts from cell pellets Collect non-adherent cells by centrifugation or scrape to collect adherent cells from the culture flask. Typical centrifugation conditions for cells are 500 x g for 5 minutes at 4°C. Rinse cells twice with PBS. Solubilize pellet at $2x10^7$ cell/mL in chilled 1X Cell Extraction Buffer PTR. Incubate on ice for 20 minutes. Centrifuge at 18,000 x g for 20 minutes at 4°C. Transfer the supernatants into clean tubes and discard the pellets. Assay samples immediately or aliquot and store at -80°C. The sample protein concentration in the extract may be quantified using a protein assay. Dilute samples to desired concentration in 1X Cell Extraction Buffer PTR.

Preparation of extracts from adherent cells by direct lysis (alternative protocol) Remove growth media and rinse adherent cells 2 times in PBS. Solubilize the cells by addition of chilled 1X Cell Extraction Buffer PTR directly to the plate (use 750 µL - 1.5 mL 1X Cell Extraction Buffer PTR per confluent 15 cm diameter plate). Scrape the cells into a microfuge tube and incubate the lysate on ice for 15 minutes. Centrifuge at 18,000 x g for 20 minutes at 4°C. Transfer the supernatants into clean tubes and discard the pellets. Assay samples immediately or aliquot and store at -80°C. The sample protein concentration in the extract may be quantified using a protein assay. Dilute samples to desired concentration in 1X Cell Extraction Buffer PTR.

Preparation of extracts from tissue homogenates Tissue lysates are typically prepared by homogenization of tissue that is first minced and thoroughly rinsed in PBS to remove blood (dounce homogenizer recommended). Homogenize 100 to 200 mg of wet tissue in 500 µL – 1 mL of chilled 1X Cell Extraction Buffer PTR. For lower amounts of tissue adjust volumes accordingly. Incubate on ice for 20 minutes. Centrifuge at 18,000 x g for 20 minutes at 4°C. Transfer the supernatants into clean tubes and discard the pellets. Assay samples immediately or aliquot and store at -80°C. The sample protein concentration in the extract may be quantified using a protein assay. Dilute samples to desired concentration in 1X Cell Extraction Buffer PTR.

Plate Preparation

The 96 well plate strips included with this kit are supplied ready to use. It is not necessary to rinse the plate prior to adding reagents.

Unused plate strips should be immediately returned to the foil pouch containing the desiccant pack, resealed and stored at 4°C.

For each assay performed, a minimum of two wells must be used as the zero control.

For statistical reasons, we recommend each sample should be assayed with a minimum of two replicates (duplicates).

Differences in well absorbance or "edge effects" have not been observed with this assay.

Assay Procedure

Equilibrate all materials and prepared reagents to room temperature prior to use.
We recommend that you assay all standards, controls and samples in duplicate.

1. Prepare all reagents, working standards, and samples as directed in the previous sections.
2. Remove excess microplate strips from the plate frame, return them to the foil pouch containing the desiccant pack, reseal and return to 4°C storage.
3. Add 50 µL of all sample or standard to appropriate wells.
4. Add 50 µL of the Antibody Cocktail to each well.
5. Seal the plate and incubate for 30 minutes at room temperature on a plate shaker set to 750 rpm.
6. Wash each well 3 times with 350 µL 1X Wash Buffer PT per wash. Completely aspirate or decant the contents of each well before each wash, then immediately dispense 350 µL 1X Wash Buffer PT into each well. Allow the wash buffer to remain in the wells for at least 30 seconds during each wash cycle. After the final wash, carefully invert the plate and tap firmly on clean absorbent paper towels to remove residual liquid. Complete removal of wash buffer is essential to minimize background and maximize assay performance.

   Best Practice Recommendations: For applications requiring the lowest limits of detection or highest precision, consider the following optimization strategies:
   - Increase the number of wash cycles beyond the standard protocol, up to a maximum of 6 total wash cycles.
   - Extend wash soak times to 60 to 120 seconds.
   - Verify complete aspiration during each wash cycle.
   - Ensure automated plate washers are properly calibrated and aligned.
   - Use sufficient wash volume to completely fill each well during every wash step.

   These modifications can help reduce nonspecific background, improve signal-to-noise ratio, enhance low-end sensitivity, and improve replicate precision.
   Important: Complete well filling, adequate soak time, thorough aspiration, and effective residual liquid removal are among the most important factors influencing overall assay performance and reproducibility.
7. Add 50 µL of prepared Lumi HRP Development Solution to each well and incubate for 1 minute in the dark on a plate shaker set to 750 rpm. Further optimization of incubation time vs signal strength can be performed if needed. Avoid introducing bubbles into the wells.
8. Measure the produced light of each well using a microplate luminometer with the following settings: 0.5-1 second/well read time in summation mode (all wavelengths). Relative light unit (RLU) readings may vary between luminometer models. It is recommended to configure instrument settings according to the manufacturer's specifications. Note: Relative light unit (RLU) values may change over the course of the 15-minute reading window.
9. Analyze the data as described below.

Mode:	Luminescence
Instrument settings:	Endpoint
Detection Mode:	All wavelengths
Read Time:	0.5-1 sec
Read:	Top

Note For microplate readers with Pre-Read Optimization option, the Read Height as well as Microplate Optimization is recommended before the first read.

Download our ELISA guide for technical hints, results, calculation, and troubleshooting tips:
https://www.abcam.com/en-us/technical-resources/guides/elisa-guide

Technical Support
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Additional information

ASSAY SPECIFICITY
This kit is designed for the quantification of human Tau.

The standard protein in this kit is full length of human Tau-A isoform.

The kit is 100% reactive with human recombinant Tau-A isoform and 61% reactive with human recombinant Tau-F isoform.

Native signal was detected in cell extract and tissue extract sample types.

Spiked protein experiments were used to validate serum, plasma (EDTA), plasma (heparin), cell culture supernatant, and CSF sample types.

Urine, saliva, and milk samples have not been tested with this kit.

This kit is incompatible with plasma (citrate) samples.

CROSS REACTIVITY
7 ng/mL of recombinant human UCHL-1 and alpha synuclein were tested for cross reactivity. No cross reactivity was observed.

INTERFERENCE
50 ng/mL of recombinant human UCHL-1 and 2 ng/mL of recombinant human alpha synuclein were tested for interference with 2 ng/mL of recombinant human Tau. No interference was observed.

SPECIES REACTIVITY
Other species reactivity was determined by measuring 3.5 µg/mL brain tissue extract of various species, interpolating the protein concentrations from the human standard curve, and expressing the interpolated concentrations as a percentage of the protein concentration in human brain extract assayed at the same dilution.

Reactivity was determined for the following species: Mouse (133%), Rat (55%).

Other species reactivity not determined.

CALCULATION
- Preconfigured protocols are available when using SoftMax Pro software from Molecular Devices.
- Calculate the average chemiluminescence value for the blank control (zero) standards. Subtract the average blank control standard chemiluminescence value from all other chemiluminescence values.
- Create a standard curve by plotting the average blank control subtracted chemiluminescence value for each standard concentration (y-axis) against the target protein concentration (x-axis) of the standard. Use graphing software to draw the best smooth curve through these points to construct the standard curve.
- Note: Most chemiluminescence reader software or graphing software will plot these values and fit a curve to the data. A four-parameter curve fit (4PL) is often the best choice; however, other algorithms (e.g. linear, semi-log, log/log, 4-parameter logistic) can also be tested to determine if it provides a better curve fit to the standard values.
- Determine the concentration of the target protein in the sample by interpolating the blank control subtracted chemiluminescence values against the standard curve. Multiply the resulting value by the appropriate sample dilution factor, if used, to obtain the concentration of target protein in the sample.
- Samples generating chemiluminescence values greater than that of the highest standard should be further diluted and reanalyzed. Similarly, samples which measure at chemiluminescence values less than that of the lowest standard should be retested in a less dilute form.

TYPICAL DATA
Typical standard curve – data provided for demonstration purposes only. A new standard curve must be generated for each assay performed.

Standard Curve Measurements			
Concentration (pg/mL)	RLU		Mean RLU
	1	2	
0	252	278	265
4.12	584	546	565
12.35	1,953	1,651	1,802
37.04	8,141	8,419	8,280
111.1	29,714	36,426	33,070
333.3	145,521	154,649	150,085
1,000	593,862	664,557	629,210
3,000	2,701,565	2,688,947	2,695,256
9,000	9,061,645	9,126,032	9,093,839

Table 1. Example of human Tau standard curve in Sample Diluent NS. The Tau standard curve was prepared as described in the Standard Preparation section. The table shows raw data values.

Standard Curve Measurements			
Concentration (pg/mL)	RLU		Mean RLU
	1	2	
0	344	354	349
4.12	739	822	781
12.35	2,329	2,147	2,238
37.04	10,531	8,855	9,693
111.11	41,981	40,298	41,140
333.33	160,231	156,829	158,530
1,000	625,497	611,032	618,265
3,000	2,454,104	2,358,793	2,406,449
9,000	7,805,253	7,923,399	7,864,326

Table 2. Example of human Tau standard curve in 1X Cell Extraction Buffer PTR. The Tau standard curve was prepared as described in the Standard Preparation section. The table shows raw data values.

TYPICAL SAMPLE VALUES

Sensitivity:

The minimal detectable dose (MDD) was determined by calculating the mean of zero standard replicates and adding 2 standard deviations then extrapolating the corresponding concentration.

Sample Diluent Buffer	n=	Minimal Detectable Dose
Sample Diluent NS	16	1.58 pg/mL
1X Cell Extraction Buffer PTR	16	1.21 pg/mL

Recovery

Three concentrations of Tau were spiked in duplicate to the indicated biological matrix to evaluate signal recovery in the working range of the assay.

Sample Type	Average % Recovery	Range (%)
50% Serum	79	76 - 84
25% Plasma - EDTA	78	75 - 83
25% Plasma - Heparin	75	70 - 82
50% Cell Culture Media*	86	84 - 91
50% Cerebrospinal Fluid	90	89 - 90
25 µg/mL SH-SY5Y Mock Treated Extract	102	98 - 107
25 µg/mL SH-SY5Y Staurosporine Treated Extract	97	94 - 101
1.5 µg/mL Human Brain Tissue Extract	108	101 - 111

*Media is RPMI 1640 containing 10% fetal bovine serum.

Linearity of Dilution

Linearity of dilution is determined based on interpolated values from the standard curve. Linearity of dilution defines a sample concentration interval in which interpolated target concentrations are directly proportional to sample dilution.

Recombinant Tau was spiked into the following biological samples and then diluted in a 2-fold dilution series. Sample dilutions are made in Sample Diluent NS.

Dilution Factor	Interpolated value	50% Human Serum	25% Human Plasma (EDTA)	25% Human Plasma (Heparin)	50% Cell Culture Media	50% Human CSF
Undiluted	pg/mL	722	2,250	961	863	2,355
	% Expected value	100	100	100	100	100
2	pg/mL	414	1,152	518	495	1,236
	% Expected value	115	102	108	115	105
4	pg/mL	216	607	265	255	636
	% Expected value	120	108	110	118	108
8	pg/mL	109	320	125	131	316
	% Expected value	121	114	104	121	107
16	pg/mL	54.6	156	64.9	63.0	156
	% Expected value	121	111	108	117	106

50% pooled serum, 25% pooled plasma (EDTA, Heparin) and 50% pooled CSF samples from healthy donors was measured in duplicate using the colorimetric version of this kit (ab273617). All values were below the detectable range of the assay.

50% serum from ten individual healthy human female donors was measured in duplicate using the colorimetric version of this kit (ab273617). All values were below the detectable range of the assay.

50% post-mortem collected CSF from ten individual normal human donors was measured in duplicate using the colorimetric version of this kit (ab273617). The mean Tau concentration of dilution factor corrected values (to neat sample) was determined to be 10,944 pg/mL with a range of 877 – 30,938 pg/mL.

Native Tau was measured in the following biological samples and then diluted in a 2-fold dilution series. Sample dilutions are made in 1X Cell Extraction Buffer PTR.

Dilution Factor	Interpolated value	80 µg/mL SH-SY5Y Mock Treated Extract	80 µg/mL SH-SY5Y Stauropsporine Treated Extract	3.5 µg/mL Human Brain Extract
Undiluted	pg/mL	2,503	2,280	2,022
	% Expected value	100	100	100
2	pg/mL	1,198	1,092	939
	% Expected value	96	96	93
4	pg/mL	616.7	545.3	459.6
	% Expected value	99	96	91
8	pg/mL	316.9	281.0	220.7
	% Expected value	101	99	87
16	pg/mL	162.6	141.9	102.0
	% Expected value	104	100	81

Precision

Mean coefficient of variations of interpolated values of Tau from two concentrations of recombinant Tau protein spiked into human serum within the working range of the assay.

	Intra-assay	Inter-assay
n=	8	3
CV (%)	5.5	2.7

Download our ELISA guide for technical hints, results, calculation, and troubleshooting tips:
https://www.abcam.com/en-us/technical-resources/guides/elisa-guide

Technical Support

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