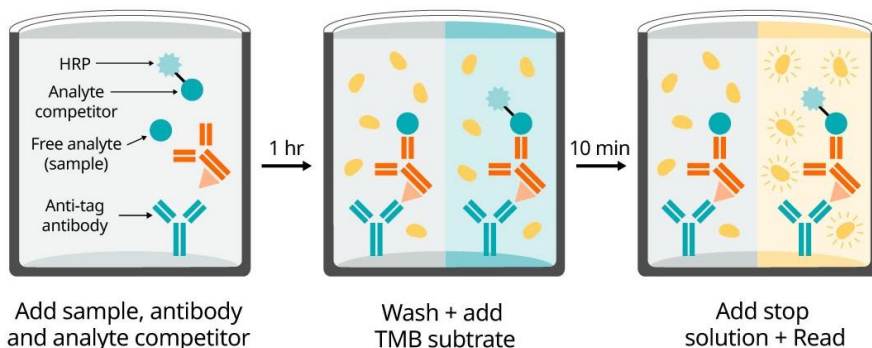


ab322565 – His-tag SimpleStep ELISA® Kit

For the quantitative measurement of His-tag in serum, plasma (citrate), plasma (EDTA), plasma (heparin), urine, cell culture supernatant, cell extract, and tissue extract.
For research use only - not intended for diagnostic use.

For overview, typical data and additional information please visit: www.abcam.com/ab322565



Add sample, antibody and analyte competitor

Wash + add TMB substrate

Add stop solution + Read

90 minutes

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.

Materials Supplied

Item	Quantity 1 x 96 tests	Quantity 10 x 96 tests	Storage Condition
His-tag CaptSure™ Conjugate 50X	80 µL	10 x 80 µL	+4°C
His-tag HRP Conjugate 50X	80 µL	10 x 80 µL	+4°C
His-tag Lyophilized Standard	2 Vials	10 x 2 Vials	+4°C
Antibody Diluent 5BI	8 mL	10 x 8 mL	+4°C
Cell Extraction Buffer PTR 5X	10 mL	2 x 50 mL	+4°C
Cell Extraction Enhancer Solution 50X	1 mL	10 x 1 mL	+4°C
Denaturant	0.5 mL	10 x 0.5 mL	+4°C
Sample Diluent NS	12 mL	-	+4°C
Wash Buffer PT 10X	20 mL	200 mL	+4°C
TMB Development Solution	12 mL	120 mL	+4°C
Stop Solution	12 mL	120 mL	+4°C
SimpleStep Pre-Coated 96-Well Microplate	96 wells	10 x 96 wells	+4°C
Plate Seal	1	10	+4°C

Sample Diluent NS is provided but not necessary for this product.

Materials Required, Not Supplied

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

Microplate reader capable of measuring absorbance at 450 or 600 nm.

Deionized water.

Multi- and single-channel pipettes.

Tubes for standard dilution.

Plate shaker for all incubation steps.

Method for determining total protein concentration in sample (BCA assay recommended).

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. The CaptSure and HRP Conjugates have only been tested for stability in the provided 50X formulation.

The provided Cell Extraction Enhancer Solution 50X and the Denaturant may precipitate when stored at +4°C. To dissolve, warm briefly at +37°C and mix gently. The Cell Extraction Enhancer Solution 50X and the Denaturant can be stored at room temperature to avoid precipitation.

1X Cell Extraction Buffer PTR: 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.

1X Cell Extraction Buffer PTR + Enhancer: Prepare 1X Cell Extraction Buffer PTR by diluting Cell Extraction Buffer PTR 5X and 50X Cell Extraction Enhancer Solution to 1X with deionized water. To make 10 mL 1X Cell Extraction Buffer PTR combine 7.8 mL deionized water, 2 mL Cell Extraction Buffer PTR 5X and 200 µL Cell Extraction Enhancer Solution 50X. Mix thoroughly and gently. If required protease inhibitors can be added.

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.

CaptSure Conjugate Solution: Prepare CaptSure Conjugate Solution by diluting the 50X CaptSure Conjugate in Antibody Diluent 5BI. To make 2 mL of the Capture Conjugate Solution combine 40 µL 50X CaptSure Conjugate with 1.96 mL Antibody Diluent 5BI. Mix thoroughly and gently.

HRP Conjugate Solution: Prepare HRP Conjugate Solution by diluting the 50X HRP Conjugate in Antibody Diluent 5BI. To make 2 mL of the HRP Conjugate Solution combine 40 µL 50X HRP Conjugate with 1.96 mL Antibody Diluent 5BI. Mix thoroughly and gently.

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 His-tag standard sample by adding the volume of 1X Cell Extraction PTR + Enhancer indicated on the standard vial label. Hold at room temperature for 10 minutes. Mix thoroughly and gently. This is the 20,000 ng/mL **Stock Standard** Solution.
2. Label eight tubes, Standards 1– 8.
3. Add 270 μ L of 1X Cell Extraction PTR + Enhancer into tube number 1 and 180 μ L of 1X Cell Extraction PTR + Enhancer into numbers 2-8.
4. Use the **Stock Standard** to prepare the following dilution series. Standard #8 contains no standard and is the Blank control:

Standard #	Dilution Sample	Volume to Dilute (μ L)	Volume of Diluent (μ L)	Starting Conc. (ng/mL)	Final Conc. (ng/mL)
1	Stock Standard	90	270	20,000	5,000
2	Standard#1	180	180	5,000	2,500
3	Standard#2	180	180	2,500	1,250
4	Standard#3	180	180	1,250	625
5	Standard#4	180	180	625	312.5
6	Standard#5	180	180	312.5	156.25
7	Standard#6	180	180	156.25	78.13
8	Blank Control	0	180	N/A	N/A

Sample Preparation

Typical Sample Dynamic Range	
Sample Type	Range
Serum	0.56 – 4.5%
Plasma – Citrate	0.56 – 4.5%
Plasma – EDTA	0.56 – 4.5%
Plasma – Heparin	0.56 – 4.5%
Urine	0.56 – 4.5%
HEK293T Cell Culture Supernatant	0.28 – 4.5%
Jurkat Cell Culture Supernatant	0.28 – 4.5%

HEK293T Cell Extract	0.63 - 10 μ g/mL
CHO Cell Extract	1.25 - 20 μ g/mL
Mouse Brain Extract	2.25 - 36 μ g/mL
Mouse Heart Extract	6.88 - 110 μ g/mL
Mouse Liver Extract	5.63 - 90 μ g/mL
E. coli Cell Extract	0.94 - 7.5 μ g/mL
LB Broth Media	0.28 – 4.5%
Yeast Extraction Buffer	0.14 – 2.25%
Lauryl Maltoside Buffer	0.04 – 0.7%
Urea Buffer	7.2 - 115 mM
Imidazole	1.4 - 22.4 mM

Note: The following dilution schemes have built-in required sample denaturation and 20-fold dilution of the Denaturant. The required steps are exemplified below.

Tube #	Sample to Dilute	Volume to Dilute (μ L)	Volume of 1X Cell Extraction PTR + Enhancer (μ L)	Volume of Denaturant (μ L)	Volume of 1X Cell Extraction PTR (μ L)	Starting Dilution	Final Concentration
1	Neat sample	85	0	5	0	Neat	94.4%
2	Tube #1	10	0	0	190	94.4%	4.7%

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. To 17 volume parts of serum samples, add 1 volume part of Denaturant. Mix thoroughly and gently. Incubate samples at room temperature for 10 minutes. Dilute samples 20-fold in 1X Cell Extraction Buffer PTR. Mix thoroughly and gently. Dilute samples further to desired concentration in 1X Cell Extraction Buffer PTR + Enhancer and assay. Store un-diluted serum at -20°C or below. Avoid repeated freeze-thaw cycles.

Plasma Collect plasma using citrate, EDTA or heparin. Centrifuge samples at 2,000 x g for 10 minutes. To 17 volume parts of plasma samples, add 1 volume part of Denaturant. Mix thoroughly and gently. Incubate samples at room temperature for 10 minutes. Dilute samples 20-fold in 1X Cell Extraction Buffer PTR. Mix thoroughly and gently. Dilute samples further to desired concentration in 1X Cell Extraction Buffer PTR + Enhancer and assay. Store un-diluted plasma samples at -20°C or below for up to 3 months. Avoid repeated freeze-thaw cycles.

Urine Centrifuge urine at 2,000 x g for 10 minutes to remove debris. To 17 volume parts of urine samples, add 1 volume part of Denaturant. Mix thoroughly and gently. Incubate samples at room temperature for 10 minutes. Dilute samples 20-fold in 1X Cell Extraction Buffer PTR. Mix thoroughly and gently. Dilute samples further to desired concentration in 1X Cell Extraction Buffer PTR + Enhancer and assay. Store un-diluted urine samples at -20°C or below. Avoid repeated freeze-thaw cycles.

Cell Culture Supernatants Centrifuge cell culture media at 2,000 x g for 10 minutes to remove debris. Collect supernatants. To 17 volume parts of cell supernatant samples, add 1 volume part of Denaturant. Mix thoroughly and gently. Incubate samples at room temperature for 10 minutes.

Dilute samples 20-fold in 1X Cell Extraction Buffer PTR. Mix thoroughly and gently. Dilute samples further to desired concentration in 1X Cell Extraction Buffer PTR + Enhancer and assay. Store undiluted 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 2x10⁷ 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. At this point, extract samples can be aliquoted and stored at -80°C. The sample protein concentration in the extract may be quantified using a protein assay. To 17 volume parts of cell extract samples, add 1 volume part of Denaturant. Mix thoroughly and gently. Incubate samples at room temperature for 10 minutes. Dilute samples 20-fold in 1X Cell Extraction Buffer PTR. Mix thoroughly and gently. Dilute samples further to desired concentration in 1X Cell Extraction Buffer PTR + Enhancer and assay.

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. At this point, extract samples can be aliquoted and stored at -80°C. The sample protein concentration in the extract may be quantified using a protein assay. To 17 volume parts of cell extract samples, add 1 volume part of Denaturant. Mix thoroughly and gently. Incubate samples at room temperature for 10 minutes. Dilute samples 20-fold in 1X Cell Extraction Buffer PTR. Mix thoroughly and gently. Dilute samples further to desired concentration in 1X Cell Extraction Buffer PTR + Enhancer and assay.

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. At this point, extract samples can be aliquoted and stored at -80°C. The sample protein concentration in the extract may be quantified using a protein assay. To 17 volume parts of cell extract samples, add 1 volume part of Denaturant. Mix thoroughly and gently. Incubate samples at room temperature for 10 minutes. Dilute samples 20-fold in 1X Cell Extraction Buffer PTR. Mix thoroughly and gently. Dilute samples further to desired concentration in 1X Cell Extraction Buffer PTR + Enhancer and assay.

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, resealed and return to 4°C storage.
3. Add 60 µL of all sample or standard to appropriate wells.
4. Add 30 µL of the CaptSure Conjugate Solution to each well.
 - a. Optional – for non-specific binding wells, add 30 µL of Antibody Diluent 5BI in lieu of CaptSure Conjugate Solution.
5. Add 30 µL of the HRP Conjugate Solution to each well.
6. Seal the plate and incubate for 1 hour at room temperature on a plate shaker set to 400 rpm.
7. Wash each well with 3 x 350 µL 1X Wash Buffer PT. Wash by aspirating or decanting from wells then dispensing 350 µL 1X Wash Buffer PT into each well. Wash Buffer PT should remain in wells for at least 30 seconds. Complete removal of liquid at each step is essential for good performance. After the last wash invert the plate and tap gently against clean paper towels to remove excess liquid.
8. Add 100 µL of TMB Development Solution to each well and incubate for 10 minutes in the dark on a plate shaker set to 400 rpm.

Given variability in laboratory environmental conditions, optimal incubation time may vary between 5 and 20 minutes.

Note: The addition of Stop Solution will change the color from blue to yellow and enhance the signal intensity about 3X. To avoid signal saturation, proceed to the next step before the high concentration of the standard reaches a blue color of O.D.600 equal to 1.0.
9. Add 100 µL of Stop Solution to each well. Shake plate on a plate shaker for 1 minute to mix. Record the OD at 450 nm. This is an endpoint reading.
10. Alternative to 8 – 9: Instead of the endpoint reading at 450 nm, record the development of TMB Substrate kinetically. Immediately after addition of TMB Development Solution begin recording the blue color development with elapsed time in the microplate reader prepared with the following settings:

Mode	Kinetic
Wavelength:	600 nm
Time:	up to 20 min
Interval:	20 sec - 1 min
Shaking:	Shake between readings

Note that an endpoint reading can also be recorded at the completion of the kinetic read by adding 100 µL Stop Solution to each well and recording the OD at 450 nm.

Download our ELISA guide for technical hints, results, calculation, and troubleshooting tips:

www.abcam.com/protocols/the-complete-elisa-guide

For technical support contact information, visit: www.abcam.com/contactus

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Additional information

ASSAY SPECIFICITY

This kit is designed for the quantification of C-terminal and N-terminal His-tagged proteins. This kit has been tested with 6X, 8X, and 10X length His-tagged proteins.

The standard in this kit is a recombinant C-terminal 6X His-tagged protein with the molecular weight of 24 kDa.

The pmol/mL concentration of His-tag in the sample can be calculated by dividing the ng/mL concentration by the molecular weight (kDa) of the His-tagged protein of interest.

Native signal was detected in bacterial cell extract expressing a His-tagged protein.

Spiked experiments were used to validate serum, plasma (heparin), plasma (EDTA), plasma (citrate), cell culture supernatant, urine, cell extract, and tissue extract sample types.

Saliva, milk, CSF samples have not been tested with this kit.

This kit is incompatible with guanidine HCl.

CROSS REACTIVITY

2,000 nM of L-Histidine was tested for cross reactivity. No cross reactivity was observed.

INTERFERENCE

2,000 nM of L-Histidine was tested for interference. No interference was observed.

SPECIES REACTIVITY

Validated in mouse and human samples, reactivity is species independent.

CALCULATION

- Optional: Non-specific binding (NSB) well subtracted values can be calculated by averaging the absorbance values for the NSB wells and subtracting the average NSB absorbance value from all other absorbance values.
- Create a standard curve by plotting the average absorbance value for each standard concentration (y-axis) against the target 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 microplate 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 analyte in the sample by interpolating absorbance values against the standard curve. Multiply the resulting value by the appropriate sample dilution factor, if used, to obtain the concentration of target analyte in the sample.
- Samples generating absorbance values lower than that of the highest concentration standard should be further diluted and reanalyzed. Similarly, samples which measure at an absorbance value greater than that of the lowest concentration standard should be retested in a less dilute form.

- Optional: The binding percentage, B/B_0 , can be calculated by dividing the average absorbance value for each standard or sample by the average absorbance of the zero standard (B_0).

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					
His-tag Concentration (pmol/mL)	His-tag Protein Concentration (ng/mL)	O.D. 450 nm		Mean O.D.	B/B ₀ (%)
		1	2		
NSB	NSB	0.037	0.037	0.037	-
0 (B ₀)	0 (B ₀)	2.672	2.612	2.642	100%
3.28	78.13	2.233	2.245	2.239	85%
6.56	156.3	1.999	2.010	2.005	76%
13.13	312.5	1.535	1.501	1.518	57%
26.25	625	1.061	1.030	1.045	40%
52.5	1,250	0.663	0.655	0.659	25%
105	2,500	0.390	0.376	0.383	14%
210	5,000	0.223	0.221	0.222	8%

Table 1. Example of His-tag standard curve in 1X Cell Extraction PTR + Enhancer. The His-tag standard curve was prepared as described in the Standard Preparation section. The table shows raw data values.

TYPICAL SAMPLE VALUES

Sensitivity:

The calculated minimal detectable dose (MDD) is 36.9 ng/mL. The MDD was determined by calculating the mean of zero standard replicates (n=24) and subtracting 2 standard deviations then extrapolating the corresponding concentration.

Recovery

3 concentrations of His-tag standard 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 (%)
4.5% Human Serum	102	99 - 109
4.5% Human Plasma – Citrate	103	95 - 108
4.5% Human Plasma – EDTA	110	106 - 114
4.5% Human Plasma – Heparin	102	98 - 106
4.5% Human Urine	98	95 - 104
4.5% Mouse Serum	106	102 - 110
4.5% Mouse Plasma – Citrate	107	105 - 109
4.5% Mouse Plasma – EDTA	115	111 - 119
4.5% Mouse Plasma – Heparin	107	103 - 111
4.5% Mouse Urine	96	90 - 100
4.5% HEK293T Cell Supernatant	95	92 - 96
4.5% Jurkat Cell Supernatant	94	93 - 95
10 µg/mL HEK293T Cell Extract	97	94 - 101
20 µg/mL CHO Cell Extract	96	93 - 99
36 µg/mL Mouse Brain Extract	100	99 - 102
110 µg/mL Mouse Heart Extract	103	99 - 106
90 µg/mL Mouse Liver Extract	103	96 - 107
3.75 µg/mL E. coli Cell Extract	88	81 - 100
4.5% LB Broth Media	97	95 - 99
2.25% Yeast Extraction Buffer	105	101 - 112
0.7% Lauryl Maltoside Buffer	99	93 - 106
115 mM Urea Buffer	105	101 - 111
22.4 mM Imidazole	103	100 - 110

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.

Native His-tagged protein was measured in the following biological sample in a 2-fold dilution series. Sample dilutions are made in 1X Cell Extraction Buffer PTR + Enhancer.

Dilution Factor	Interpolated value	7.5 µg/mL E. coli Cell Extract
Undiluted	ng/mL	1,779
	% Expected value	100
2	ng/mL	875
	% Expected value	98
4	ng/mL	467
	% Expected value	105
8	ng/mL	247
	% Expected value	111

Recombinant His-tag protein was spiked in in the following biological samples in a 2-fold dilution series. Sample dilutions are made in 1X Cell Extraction Buffer PTR + Enhancer.

Dilution Factor	Interpolated value	4.5% Human Serum	4.5% Human Plasma (Citrate)	4.5% Human Plasma (EDTA)	4.5% Human Plasma (Heparin)	4.5% Human Urine
Undiluted	ng/mL	1,986	2,003	2,032	1,792	1,953
	% Expected value	100	100	100	100	100
2	ng/mL	1,023	1,045	1,112	1,051	1,060
	% Expected value	103	104	109	117	109
4	ng/mL	515	486	567	484	498
	% Expected value	104	97	112	108	102
8	ng/mL	239	210	242	212	229
	% Expected value	96	84	95	95	94

Dilution Factor	Interpolated value	4.5% Mouse Serum	4.5% Mouse Plasma (Citrate)	4.5% Mouse Plasma (EDTA)	4.5% Mouse Plasma (Heparin)	4.5% Mouse Urine
Undiluted	ng/mL	1,883	3,096	2,861	2,076	2,174
	% Expected value	100	100	100	100	100
2	ng/mL	973	1,401	1,369	1,037	1,069
	% Expected value	103	90	96	100	98
4	ng/mL	539	673	712	531	505
	% Expected value	114	87	100	102	93
8	ng/mL	252	325	304	226	247
	% Expected value	107	84	85	87	91

Dilution Factor	Interpolated value	4.5% HEK293T Cell Supernatant	4.5% Jurkat Cell Supernatant
Undiluted	ng/mL	2,257	2,561
	% Expected value	100	100
2	ng/mL	1,119	1,216
	% Expected value	99	95
4	ng/mL	533	632
	% Expected value	94	99
8	ng/mL	255	291
	% Expected value	90	91
16	ng/mL	120	137
	% Expected value	85	86

Dilution Factor	Interpolated value	4.5% LB Broth Media	2.25% Yeast Extraction Buffer	0.7% Lauryl Maltoside Buffer	115 mM Urea Buffer	22.4 mM Imidazole
Undiluted	ng/mL	2,563	2,088	2,282	2,036	2,124
	% Expected value	100	100	100	100	100
2	ng/mL	1,213	1,035	1,116	1,027	1,057
	% Expected value	95	99	98	101	100
4	ng/mL	639	534	541	527	552
	% Expected value	100	102	95	104	104
8	ng/mL	332	247	266	257	245
	% Expected value	104	95	93	101	92
16	ng/mL	132	111	121	114	121
	% Expected value	83	85	85	89	91

Dilution Factor	Interpolated value	10 µg/mL HEK293T Cell Extract	20 µg/mL CHO Cell Extract	36 µg/mL Mouse Brain Extract	110 µg/mL Mouse Heart Extract	90 µg/mL Mouse Liver Extract
Undiluted	ng/mL	1,948	2,085	2,092	2,023	2,048
	% Expected value	100	100	100	100	100
2	ng/mL	1,064	1,061	993	979	974
	% Expected value	109	102	95	97	95
4	ng/mL	493	540	497	497	533
	% Expected value	101	104	95	98	104
8	ng/mL	243	268	243	226	261
	% Expected value	100	103	93	89	102
16	ng/mL	127	132	118	118	124
	% Expected value	105	101	90	93	97

Precision

Mean coefficient of variations of interpolated values of His-tag from two concentrations of bacterial cell extract within the working range of the assay.

	Intra-assay	Inter-assay
N=	8	3
CV (%)	5.6	4.8

Download our ELISA guide for technical hints, results, calculation, and troubleshooting tips:

www.abcam.com/protocols/the-complete-elisa-guide

For technical support contact information, visit: www.abcam.com/contactus

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Version 1a | 2025-03-25