STAT3 [pY705] ELISA Kit

Catalog Number KH00481 (96 tests)

Pub. No. MAN0003940 **Rev.** 6.0 (32)

CAUTION! This kit contains materials with small quantities of sodium azide. Sodium azide reacts with lead and copper plumbing to form explosive metal azides. Upon disposal, flush drains with a large volume of water to prevent azide accumulation. Avoid ingestion and contact with eyes, skin and mucous membranes. In case of contact, rinse affected area with plenty of water. Observe all federal, state, and local regulations for disposal.

Note: For safety and biohazard guidelines, see the "Safety" appendix in the *ELISA Technical Guide* (Pub. no. MAN0006706). Read the Safety Data Sheets (SDSs) and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.

Product description

The Invitrogen™ STAT3 [pY705] ELISA Kit is a solid-phase sandwich Enzyme-Linked Immunosorbent Assay (ELISA). This assay is designed to detect and quantify the level of STAT3 [pY705] in lysates of human, mouse, and rat cells and tissues. The assay will recognize both natural and recombinant STAT3 [pY705].

Contents and storage

Upon receipt, store the kit at 2°C to 8°C.

Contents	Cat. No. KH00481 (96 tests)
STAT3 [pY705] Standard; contains 0.1% sodium azide.	2 vials
Standard Diluent Buffer; contains 0.1% sodium azide, red dye [1]	25 mL
Antibody Coated Plate, 96-well plate	1 plate
STAT3 [pY705] Detection Antibody; contains 0.1% sodium azide, blue dye [1]	11 mL
Anti-Rabbit IgG HRP (100X); contains 3.3 mM thymol	0.125 mL
HRP Diluent; contains 3.3 mM thymol, yellow dye [1]	25 mL
Wash Buffer Concentrate (25X)	100 mL
Stabilized Chromogen, Tetramethylbenzidine (TMB)	25 mL
Stop Solution	25 mL
Adhesive Plate Covers	3

[1] To avoid pipetting mistakes, colored Standard Diluent Buffer, Detection Antibody, and HRP Diluent are provided to monitor the addition of solution to each well. Dyes do not interfere with test results.

Materials required but not supplied

- Distilled or deionized water
- Calibrated adjustable precision pipettes and glass or plastic tubes for diluting solutions; beakers, flask and cylinders for preparation of reagents
- Microtiter plate reader with software capable of measurement at or near 450 nm
- Plate washer–automated or manual (squirt bottle, manifold dispenser, or equivalent)

Before you begin

IMPORTANT! Reagents are lot-specific. Do not mix or interchange different reagent lots from various kit lots.

- Review the **Procedural guidelines** and **Plate washing directions** in the *ELISA Technical Guide* available at **thermofisher.com**.
- Allow reagents to reach room temperature before use. Mix to redissolve any precipitated salts.

Prepare 1X Wash Buffer

1. Dilute 16 mL of Wash Buffer Concentrate (25X) with 384 mL of deionized or distilled water. Label as 1X Wash Buffer.
2. Store the concentrate and 1X Wash Buffer in the refrigerator. Use the diluted buffer within 14 days.

Prepare Cell Extraction Buffer

Note: See the *ELISA Technical Guide* for detailed information on preparing Cell Extraction Buffer.

1. Prepare Cell Extraction Buffer.

   Cell Extraction Buffer consists of 10 mM Tris (pH 7.4), 100 mM NaCl, 1 mM EDTA, 1 mM EGTA, 1 mM NaF, 20 mM $Na_4P_2O_7$, 2 mM Na_3VO_4, 1% Triton™ X-100, 10% glycerol, 0.1% SDS, and 0.5% deoxycholate.
2. Immediately before use, add PMSF (0.3 M stock in DMSO) to 1 mM and 50 µL protease inhibitor cocktail (e.g., Sigma Cat. No. P-2714) for each 1 mL of Cell Extraction Buffer.

Prepare cell lysate

1. Collect cells by centrifugation (non-adherent cells) or scraping from culture flasks (adherent cells), then wash cells twice with cold PBS.
2. Remove and discard the supernatant and collect the cell pellet. The pellet can be stored at −80°C and lysed at a later date if desired.
3. Lyse the cell pellet in Cell Extraction Buffer for 30 minutes, on ice. Vortex at 10-minute intervals.

   Note: The volume of Cell Extraction Buffer used depends on the number of cells in the cell pellet, and expression levels of STAT3 [pY705]. Researchers must optimize the extraction procedures for their own applications.
4. Transfer the lysate into microcentrifuge tubes and centrifuge at 13,000 rpm for 10 minutes at 4°C.
5. Transfer the supernatant into clean microcentrifuge tubes. Samples can be stored at −80°C (avoid multiple freeze-thaw cycles).

Sample preparation guidelines

- Refer to the *ELISA Technical Guide* at **thermofisher.com** for detailed sample preparation procedures.
- Collect samples in pyrogen/endotoxin-free tubes.
- Freeze samples after collection if samples will not be tested immediately. Avoid multiple freeze-thaw cycles of frozen samples. Thaw completely and mix well (do not vortex) prior to analysis.
- Avoid the use of hemolyzed or lipemic sera. If large amounts of particulate matter are present in the sample, centrifuge or filter sample prior to analysis.

Pre-dilute samples

Sample concentrations should be within the range of the standard curve. Because conditions may vary, each investigator should determine the optimal dilution for each application.

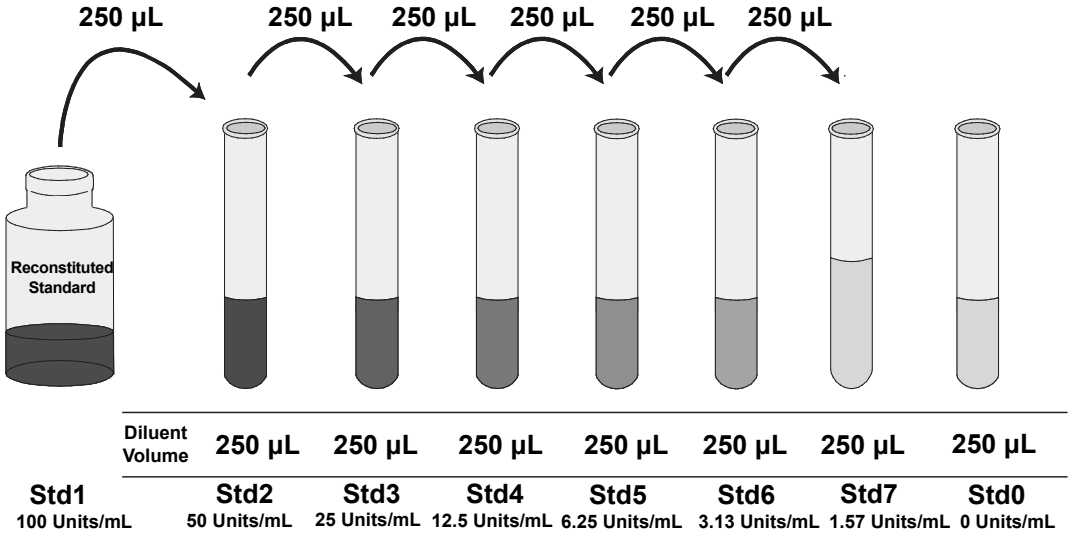
- Perform sample dilutions with Standard Diluent Buffer.
- Dilute samples prepared in Cell Extraction Buffer 10-fold or greater in Standard Diluent Buffer.

Dilute standards

Note: Use glass or plastic tubes for diluting standards.

Note: The STAT3 [pY705] Standard is prepared using purified, recombinant, phosphorylated STAT3 protein. One Unit of standard is equivalent to the amount of STAT3 [pY705] derived from 5 pg of STAT3 that was phosphorylated by activated JAK.

1. Reconstitute STAT3 [pY705] Standard to 100 Units/mL with Standard Dilution Buffer. Refer to the standard vial label for instructions. Swirl or mix gently and allow the contents to sit for 10 minutes to ensure complete reconstitution. Label as 100 Units/mL STAT3 [pY705]. **Use the standard within 1 hour of reconstitution.**
2. Add 250 µL Reconstituted Standard to one tube containing 250 µL Standard Diluent Buffer and mix. Label as 50 units/mL STAT3 [pY705].
3. Add 250 µL Standard Diluent Buffer to each of 6 tubes labeled as follows: 25, 12.5, 6.25, 3.13, 1.57, and 0 Units/mL STAT3 [pY705].
4. Make serial dilutions of the standard as shown in the following dilution diagram. Mix thoroughly between steps.
5. Remaining reconstituted standard should be discarded or frozen in aliquots at –80°C for further use. Standard can be frozen and thawed one time only without loss of immunoreactivity.



Prepare 1X Anti-Rabbit IgG HRP solution

Note: Prepare 1X Anti-Rabbit IgG HRP solution within 15 minutes of usage.

The Anti-Rabbit IgG HRP (100X) is in 50% glycerol, which is viscous. To ensure accurate dilution:

1. For each 8-well strip used in the assay, pipet 10 µL Anti-Rabbit IgG HRP (100X) solution, wipe the pipette tip with clean absorbent paper to remove any excess solution, and dispense the solution into a tube containing 1 mL of HRP Diluent. Mix thoroughly.
2. Return the unused Anti-Rabbit IgG HRP (100X) solution to the refrigerator.

Perform ELISA (Total assay time: 4 hours)

IMPORTANT! Perform a standard curve with each assay.

- Allow all components to reach room temperature before use. Mix all liquid reagents prior to use.
- Determine the number of 8-well strips required for the assay. Insert the strips in the frames for use. Re-bag any unused strips and frames, and store at 2°C to 8°C for future use.

1 Bind antigen

a. Add 100 µL of standards, controls, or samples (see "Pre-dilute samples"on page 2) to the appropriate wells. Leave the wells for chromogen blanks empty.
b. Cover the plate with a plate cover and incubate 2 hours at room temperature.
c. Thoroughly aspirate the solution and wash wells 4 times with 1X Wash Buffer.

2 Add detector antibody

a. Add 100 µL of STAT3 [pY705] Detection Antibody solution into each well except the chromogen blanks.
b. Cover the plate with a plate cover and incubate 1 hour at room temperature.
c. Thoroughly aspirate the solution and wash wells 4 times with 1X Wash Buffer.

3 Add IgG HRP

a. Add 100 µL Anti-Rabbit HRP into each well except the chromogen blanks.
b. Cover the plate with plate cover and incubate for 30 minutes at room temperature.
c. Thoroughly aspirate the solution and wash wells 4 times with 1X Wash Buffer.

4 Add Stabilized Chromogen

a. Add 100 µL Stabilized Chromogen to each well. The substrate solution begins to turn blue.
b. Incubate for 30 minutes at room temperature in the dark.

Note: TMB should not touch aluminum foil or other metals.

5 Add Stop Solution

Add 100 µL Stop Solution to each well. Tap the side of the plate to mix. The solution in the wells changes from blue to yellow.

Read the plate and generate the standard curve

1. Read the absorbance at 450 nm. Read the plate within 2 hours after adding the Stop Solution.
2. Use curve-fitting software to generate the standard curve. A 4 parameter algorithm provides the best standard curve fit. Optimally, the background absorbance may be subtracted from all data points, including standards, unknowns and controls, prior to plotting.
3. Read the concentrations for unknown samples and controls from the standard curve. Multiply value(s) obtained for sample(s) by the appropriate factor to correct for the sample dilution.

   Note: Dilute samples producing signals greater than the upper limit of the standard curve in Standard Diluent Buffer and reanalyze. Multiply the concentration by the appropriate dilution factor.

Performance characteristics

Standard curve example

The following data were obtained for the various standards over the range of 0 to 100 Units/mL STAT3 [pY705].

Standard STAT3 [pY705] (Units/mL)	Optical Density (450 nm)
100	2.79
50	1.86
25	1.11
12.5	0.62
6.25	0.39
3.13	0.29
1.57	0.24
0	0.20

Inter-assay precision

Samples were assayed 48 times in multiple assays to determine precision between assays.

Parameters	Sample 1	Sample 2	Sample 3
Mean (Units/mL)	35.5	16.1	7.9
Standard Deviation	1.3	0.4	0.6
% Coefficient of Variation	3.6	2.6	7.2

Intra-assay precision

Samples of known STAT3 [pY705] concentration were assayed in replicates of 16 to determine precision within an assay.

Parameters	Sample 1	Sample 2	Sample 3
Mean (Units/mL)	35.0	16.0	8.3
Standard Deviation	1.2	0.3	0.5
% Coefficient of Variation	3.5	2.1	6.1

Recovery

To evaluate recovery, Cell Extraction Buffer was diluted 1:10 with Standard Diluent Buffer to bring the SDS concentration to <0.01%. STAT3 [pY705] Standard was spiked into this. The average recovery was 93%.

Linearity of dilution

HeLa cells were grown in tissue culture medium containing 10% fetal bovine serum, treated with 50 ng/mL IFN-α for 15 minutes and lysed with Cell Extraction Buffer. This lysate was diluted in Standard Diluent Buffer over the range of the assay and measured for STAT3 [pY705]. Linear regression analysis of sample values versus the expected concentration yielded a correlation coefficient of 0.99.

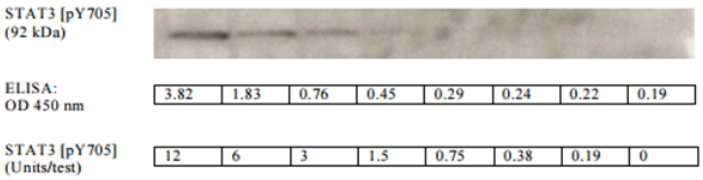
Dilution	Cell Lysate		
	Measured (Units/mL)	Expected	
		(Units/mL)	%
Neat	24.2	24.2	100
1/2	12.5	12.1	103
1/4	6.6	6.1	109
1/8	3.2	3.0	107
1/16	1.78	1.5	117

Sensitivity

The analytical sensitivity of this assay is <0.9 Units/mL STAT3 [pY705]. This was determined by adding two standard deviations to the mean O.D. obtained when the zero standard was assayed 30 times, and calculating the corresponding concentration.

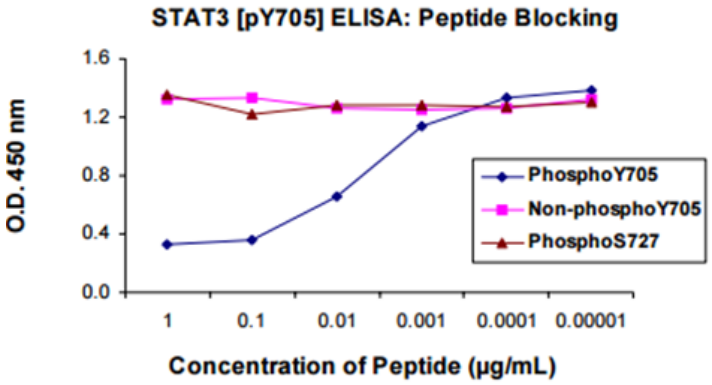
The sensitivity of this ELISA was compared to Western blotting using known quantities of STAT3 [pY705]. The data presented below show that the sensitivity of the ELISA is approximately 5 times greater than that of western blotting. The bands shown in the western blot data were developed using rabbit anti-STAT3 [pY705] and an alkaline phosphatase conjugated anti-rabbit IgG followed by chemiluminescent substrate and autoradiography.

Detection of STAT3 [pY705] by ELISA vs Western Blot:



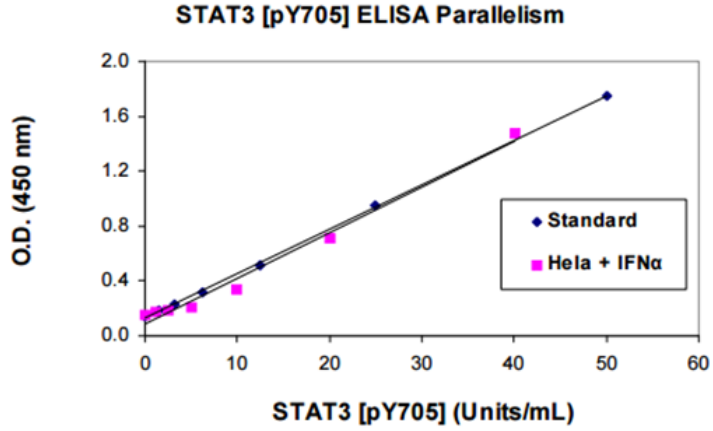
Specificity

The specificity of this assay for STAT3 [pY705] phosphorylated at tyrosine 705 was confirmed by peptide competition. The data presented below show that the phospho-peptide containing the phosphorylated tyrosine 705 blocked the ELISA signal. The same STAT3 sequences without phosphate groups did not block the ELISA signal.



Parallelism

Natural STAT3 [pY705] from IFN-α -treated HeLa cell lysate was serially diluted in Standard Diluent Buffer. The optical density of each dilution was plotted against the STAT3 [pY705] standard curve. The standard accurately reflectsSTAT3 [pY705] content in samples.



Limited product warranty

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Product label explanation of symbols and warnings

REF	Catalog Number	LOT	Batch code		Temperature limitation		Use by		Manufacturer		Consult instructions for use		Caution, consult accompanying documents

Manufacturer's address: Bender MedSystems GmbH | Campus Vienna Biocenter 2 | 1030 Vienna, Austria

The information in this guide is subject to change without notice.