

# **ab126456 – STAT1 (pY701) ELISA Kit**

## **Instructions for Use**

For the quantitative measurement of Human and Mouse phosphorylated STAT1 (Tyr701) concentrations in cell lysates.

This product is for research use only and is not intended for diagnostic use.

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# 1. Introduction

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ab126456 is a very rapid, convenient and sensitive assay kit that can monitor the activation or function of important biological pathways in Human and Mouse cell lysates. By determining phosphorylated STAT1 protein in your experimental model system, you can verify pathway activation in your cell lysates. You can simultaneously measure numerous different cell lysates without spending excess time and effort in performing a Western Blotting analysis.

This Sandwich ELISA kit is an in vitro enzyme-linked immunosorbent assay for the measurement of Human and Mouse phospho-STAT1 (Tyr701). An anti-pan-STAT1 antibody has been coated onto a 96-well plate. Samples are pipetted into the wells and STAT1 present in a sample is bound to the wells by the immobilized antibody. The wells are washed and rabbit anti-phospho-Stat1 (Tyr701) antibody is used to detect phosphorylated STAT1. After washing away unbound antibody, HRP-conjugated anti-rabbit IgG is pipetted to the wells. The wells are again washed, a TMB substrate solution is added to the wells and color develops in proportion to the amount of STAT1 (Tyr701) bound. The Stop Solution changes the color from blue to yellow, and the intensity of the color is measured at 450 nm.

## 2. Assay Summary

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Prepare all reagents, samples and standards as instructed.



Add 100  $\mu$ l sample or positive control to each well. Incubate 2.5 hours at room temperature or over night at 4°C.



Add 100  $\mu$ l prepared primary antibody to each well. Incubate 1.0 hours at room temperature.



Add 100  $\mu$ l prepared 1X HRP-conjugated anti-rabbit IgG solution. Incubate 1 hour at room temperature.



Add 100  $\mu$ l TMB One-Step Substrate Reagent to each well. Incubate 30 minutes at room temperature.



Add 50  $\mu$ l Stop Solution to each well. Read at 450 nm immediately.

### 3. Kit Contents

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- Pan STAT1 Microplate: 96 wells (12 strips x 8 wells) coated with anti-pan-STAT1.
- 20X Wash Buffer: 25 mL of 20X concentrated solution.
- 5X Assay Diluent: 15 mL of 5X concentrated buffer. For diluting cell lysate sample, detection antibody and HRP-conjugated anti-rabbit IgG solution.
- Phospho Detection Antibody STAT1 (Tyr701): 2 vials of rabbit anti-phospho-Stat1 (each vial is enough to assay half microplate).
- HRP-conjugated anti-rabbit IgG 500X concentrate: 1 vial of 500X concentrated HRP-conjugated anti-rabbit IgG.
- TMB One-Step Substrate Reagent: 12 mL of 3,3',5,5'-tetramethylbenzidine (TMB) in buffered solution.
- Stop Solution: 8 mL of 0.2 M sulfuric acid.
- 2X Cell Lysis Buffer: 5 mL of 2X cell lysis buffer (not including protease and phosphatase inhibitors).
- Positive Control: 1 vial of lyophilized powder from A431 cell lysate.

## 4. Storage and Handling

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Upon receipt, the kit should be stored at  $-20^{\circ}\text{C}$ . After initial use, 20X Wash Buffer, 5X Assay Diluent, TMB One-Step Substrate Reagent, Stop Solution and 2X Cell Lysis Buffer should be stored at  $4^{\circ}\text{C}$  to avoid repeated freeze-thaw cycles. Return unused wells to the pouch containing desiccant pack reseal along entire edge and store at  $-20^{\circ}\text{C}$ . Reconstituted Positive Control should be stored at  $-70^{\circ}\text{C}$ .

## 5. Additional Materials Required

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- Microplate reader capable of measuring absorbance at 450nm.
- Protease and Phosphatase inhibitors.
- Shaker.
- Precision pipettes to deliver 2  $\mu$ l to 1 ml volumes.
- Adjustable 1-25 ml pipettes for reagent preparation.
- 100 ml and 1 L graduated cylinders.
- Distilled or deionized water.
- Tubes to prepare sample dilutions.

## 6. Preparation of Samples

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- 2X Cell Lysis Buffer should be diluted 2-fold with deionized or distilled water before use. We recommend adding protease and phosphatase inhibitors (not provided) to Cell Lysis Buffer prior to sample preparation.

Cell lysates - Rinse cells with PBS, making sure to remove any remaining PBS before adding the 1X Cell Lysis Buffer. Solubilize cells at  $4 \times 10^7$  cells/ml in 1X Cell Lysis Buffer. Pipette up and down to resuspend and incubate the lysates with shaking at 2 - 8°C for 30 minutes. Microcentrifuge at 13,000 rpm for 10 minutes at 2 - 8°C and transfer the supernates into a clean test tube. Lysates should be used immediately or aliquoted and stored at -70°C. Avoid repeated freeze-thaw cycles. Thawed lysates should be kept on ice prior to use.

For the initial experiment we recommend a serial dilution, such as 5-fold to 100-fold dilution for your cell lysates with 1X Assay Diluent before use.

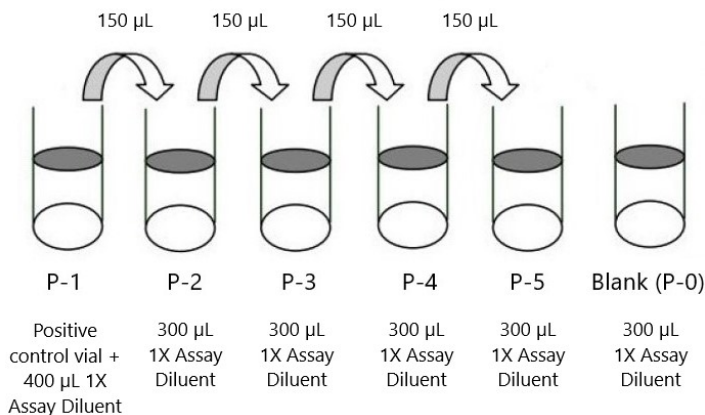
*Note: The fold dilution of sample used depends on the abundance of phosphorylated proteins and should be determined empirically. More of the sample can be used if signals are too weak. If signals are too strong, the sample can be diluted further.*



## 7. Preparation of Reagents

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- Bring all reagents and samples to room temperature (18 - 25°C) before use.
1. 5X Assay Diluent should be diluted 5-fold with deionized or distilled water before use.
  2. Preparation of Positive Control: Briefly spin the Positive Control vial and add 400  $\mu\text{L}$  of 1X Assay Diluent to prepare Positive Control (P-1) solution. Mix gently to allow the powder to dissolve thoroughly. If a precipitate is seen in the solution after mixing, this can be removed by a quick centrifuge of the vial, and then pipetting the supernate only for the assay. Pipette 300  $\mu\text{L}$  1X Assay Diluent into each tube. Use the Positive Control (P-1) to produce a dilution series (shown below). Mix each tube thoroughly before the next transfer. 1X Assay Diluent serves as the blank control (P-0).



4. If the 20X Wash Buffer contains visible crystals, warm to room temperature and mix gently until dissolved. Dilute 20 mL of 20X Wash Buffer into deionized or distilled water to yield 400 mL of 1X Wash Buffer.
5. Briefly spin the Phospho Detection Antibody STAT1 (Tyr701) before use. Add 100  $\mu$ L of 1X Assay Diluent into the vial to prepare a detection antibody concentrate. Pipette up and down to mix gently (the concentrate can be stored at 4°C for 5 days or at -80°C for one month). The anti-phospho-Stat1 (Tyr701) antibody should be diluted 55-fold with 1X Assay Diluent and used in step 7 of Assay Method.
6. Briefly spin the HRP-conjugated anti-rabbit IgG 500X concentrate before use. Pipette up and down to mix gently. HRP-conjugated anti-rabbit IgG 500X concentrate should be diluted 500-fold with 1X Assay Diluent.

*For example: Briefly spin the vial. Add 10  $\mu$ l of HRP-conjugated anti-rabbit IgG 500X concentrate into a tube with 5.0 mL 1X Assay Diluent, pipette up and down to mix gently to prepare a 500-fold diluted HRP-conjugated anti-rabbit IgG solution. Mix well.*

7. 2X Cell Lysis Buffer should be diluted 2-fold with deionized or distilled water before use (recommend addition of protease and phosphatase inhibitors).

## 8. Assay Method

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1. Bring all reagents to room temperature (18 - 25°C) before use. It is recommended that all samples or Positive Control should be run at least in duplicate.
2. Add 100  $\mu$ L of each sample or positive control into appropriate wells. Cover well with plate holder and incubate for 2.5 hours at room temperature or over night at 4°C with shaking.
3. Discard the solution and wash 4 times with 1X Wash Solution. Wash by filling each well with 1X Wash Buffer (300  $\mu$ L) using a multi-channel pipette or autowasher. Complete removal of liquid at each step is essential to good performance. After the last wash, remove any remaining Wash Buffer by aspirating or decanting. Invert the plate and blot it against clean paper towels.
4. Add 100  $\mu$ L of prepared Phospho Detection Antibody STAT1 (Tyr701) (Preparation of Reagents step 5) to each well. Incubate for 1 hour at room temperature with shaking.
5. Discard the solution. Repeat the wash as in step 3.
6. Add 100  $\mu$ L of prepared 1X HRP-conjugated anti-rabbit IgG solution (see Preparation of Reagents step 6) to each well. Incubate for 1 hour at room temperature with shaking.

7. Discard the solution. Repeat the wash as in step 3.
8. Add 100  $\mu\text{L}$  of TMB One-Step Substrate Reagent to each well. Incubate for 30 minutes at room temperature in the dark with shaking.
9. Add 50  $\mu\text{L}$  of Stop Solution to each well. Read at 450 nm immediately.

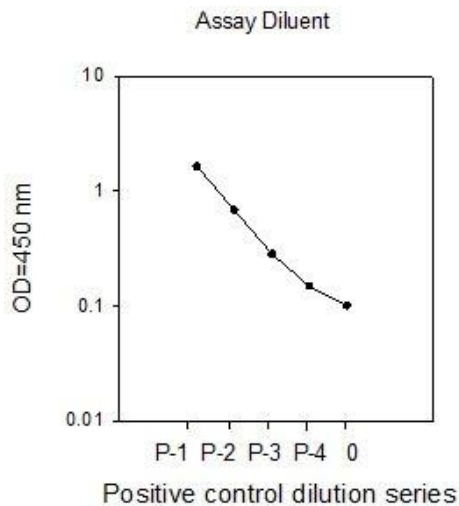
## 9. Data Analysis

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Calculate the mean absorbance for each set of duplicate positive controls and samples, and then subtract the average zero (blank) optical density. The data below is provided for **demonstration purposes only**.

### i. Positive Control

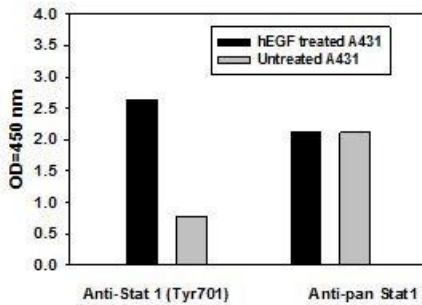
A431 cells were treated with recombinant Human EGF at 37°C for 20 min. Solubilize cells at  $4 \times 10^7$  cells/mL in Cell Lysis Buffer. Serial dilutions of lysates were analyzed in this ELISA. Please see step 3 of Preparation of Reagents for detail.



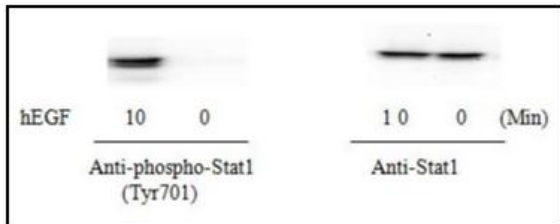
**ii. Recombinant Human EGF Stimulation of A431 Cell Lines**

A431 cells were treated or untreated with 100 ng/mL recombinant Human EGF for 10 min. Cell lysates were analyzed using this phospho ELISA and Western Blot.

**a) ELISA**



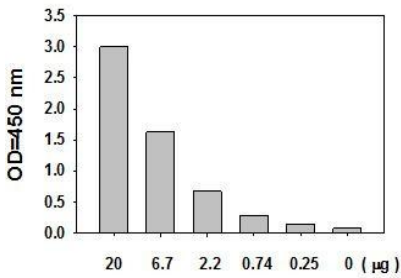
**b) Western Blot Analysis**



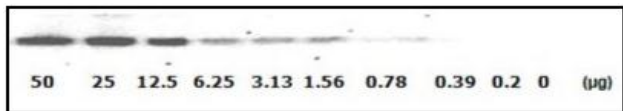
**iii. Sensitivity**

A431 cells were treated with 100 ng/mL recombinant Human EGF for 20 minutes to induce phosphorylation of STAT1. Serial dilutions of lysates were analyzed in this ELISA and by Western blot. Immunoblots were incubated with anti-phospho-STAT1 (Tyr701).

**a) ELISA**



**b) Western Blot Analysis**



## 10. Troubleshooting

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<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
Sample signals	Too low: Sample concentration is too low.	Increasing sample concentration.
	Too high: Sample concentration is too high.	Reduce sample concentration.
Large CV	Inaccurate pipetting	Check pipettes
High background	Plate is insufficiently washed.	Review the manual for proper washing. If using an automated plate washer, check that all ports are unobstructed.
	Contaminated wash buffer.	Make fresh wash buffer.



Positive Control: Low signal	Improper storage of the ELISA kit.	Upon receipt, the kit should be stored at -20°C. Store the positive control at -70°C after reconstitution.
	Stop solution	Stop solution should be added to each well before measurement and read OD immediately.
	Improper primary or secondary antibody dilution.	Ensure correct dilution.





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