

# **CD28:B7-1[Biotinylated] Inhibitor Screening ELISA Kit**

**Pack Size: 96 tests**

**Catalog Number: EP-150**

**IMPORTANT: Please carefully read this manual before performing your experiment.**

***For Research Use Only. Not For Use In Diagnostic Or Therapeutic Procedures***

## **INTENDED USE**

This kit is designed for screening of inhibitors of binding between human CD28 and human B7-1.

It is intended for research use only (RUO).

## **PRINCIPLE OF THE ASSAY**

This inhibitor screening ELISA kit is designed to facilitate the identification and characterization of new CD28 pathway inhibitors. The assay takes advantage of our in house-developed binding of biotinylated human B7-1 to immobilized human CD28 in a functional ELISA assay, and employs a simple colorimetric ELISA platform. Briefly, we provide you with a human CD28 protein, a Biotinylated human B7-1, an anti-CD28 neutralizing antibody (as method verified Std.), and Streptavidin-HRP reagent. Your experiment will include 4 simple steps:

- 1) Coat the plate with human CD28.
- 2) Add your molecule of interest to the tests.
- 3) Add human B7-1-Biotin to bind the coated human CD28.
- 4) Add Streptavidin-HRP followed by TMB or other colorimetric HRP substrate.

Finally, the half maximal inhibitory concentration (IC<sub>50</sub>) of your compound to CD28:B7-1 binding will be determined by comparing OD readings among different experimental groups.

## **MATERIALS PROVIDED**

**TABLE 1. MATERIALS PROVIDED (pls modify according to COA)**

Catalog	Components	Size (96 tests)	Format	Storage	
EP150-C01	High-bind Plate	1 plate	Solid	2-8°C	
EP150-C02	Human CD28	20 µg	Powder	2-8°C	-70°C after reconstitution, avoid freeze-thaw cycles
EP150-C03	Biotinylated Human B7-1	50 µg	Powder	2-8°C	
EP150-C04	Anti-CD28 Neutralizing Antibody	20 µg	Powder	2-8°C	
EP150-C05	Streptavidin-HRP	5 µg	Powder	2-8°C, avoid light	
EP150-C06	Coating Buffer	12 mL	Liquid	2-8°C	
EP150-C07	10xWashing Buffer	50 mL	Liquid	2-8°C	
EP150-C08	Blocking Buffer	50 mL	Liquid	2-8°C	
EP150-C09	Substrate Solution	12 mL	Liquid	2-8°C, avoid light	
EP150-C10	Stop Solution	7 mL	Liquid	2-8°C	

### **REAGENTS/EQUIPMENT NEEDED BUT NOT SUPPLIED**

Single or dual wavelength microplate reader with 450 nm/630nm filter;

Centrifuge;

37 °C Incubator;

Single channel or multichannel pipettes with 10 µL, 200 µL and 1000 µL precision;

10 µL, 200 µL and 1000 µL pipette tips;

Test Tubes;

Graduated cylinder;

Deionized or distilled water for dilution;

### **STORAGE AND VALIDITY INSTRUCTIONS**

Unopened kit should be stored at 2°C -8°C upon receiving. Find the expiration date on the outside packaging and do

not use reagents past their expiration date.

The kit should be stored as TABLE 1 after the reconstitution of lyophilized materials. The shelf life is 30 days from the date of opening.

*Note:*

- a. Do not use reagents past their expiration date.
- b. Find the expiration date on the outside packaging.

**REAGENT PREPARATION**

1. Restore all reagents and samples to room temperature (20-25°C) before use.
2. Reconstitute the provided lyophilized materials to stock solutions with sterile deionized water as recommended in Tab.2, Solubilize for 15 to 30 minutes at room temperature with occasional gentle mixing. Avoid vigorous shaking or vortex. The reconstituted stock solutions should be stored at -70°C. **Avoid freeze-thaw cycles.**

*Note: Streptavidin-HRP stock solution should be protected from light.*

TABLE 2. RECONSTITUTION METHODS FOR 96 TESTS

Catalog	Components	Amount	Stock Solution Con.	Reconstitution Buffer and Vol.
EP150-C02	Human CD28	20 µg	100 µg/mL	200 µL, water
EP150-C03	Biotinylated Human B7-1	50 µg	100 µg/mL	500 µL, water
EP150-C04	Anti-CD28 Neutralizing Antibody	20 µg	100 µg/mL	200 µL, water
EP150-C05	Streptavidin-HRP	5 µg	50 µg/mL	100 µL, water

**RECOMMENDED PROTOCOL**

**1. Working solution preparation**

1.1 Preparation of 1×Washing Buffer:

Dilute 50 mL 10×Washing Buffer with ultrapure water/deionized water to 500 mL.

1.2 Preparation of Dilution Buffer:

10 mL Blocking Buffer (EP150-C08) add 30 mL 1×Washing Buffer.

**2. Coating**

1) Dilute Human CD28 stock solution (100 µg/mL) to 1 µg/mL with Coating Buffer to make Human CD28 working solution.

2) Add 100 µL of Human CD28 working solution (1 µg/mL) to each well and leave a couple of wells uncoated for No-Coating Control, seal the plate with microplate sealing film and incubate overnight (or 16 hours) at 4°C.

### 3. Washing

Remove the remaining solution by aspiration, add 300 µL of 1×Washing Buffer to each well, gently tap the plate for 1 minute, remove any remaining 1×Washing Buffer by aspirating or decanting, invert the plate and blot it against paper towels. Repeat the washing step above for three times.

*Note: For best results, the complete removal of the Human CD28 solution is essential. The use of a manifold dispenser or an auto-washer may be necessary.*

### 4. Blocking

Add 300 µL Blocking Buffer to each well, seal the plate with microplate sealing film and incubate at 37°C for 1.5 hours.

### 5. Washing

Repeat step 3. At the same time, you can start to prepare your samples.

### 6. Add Samples

1) Make serial dilution of the samples as appropriate.

2) If you intend to use the provided Anti-CD28 Neutralizing Antibody as a reference (Std.), you may dilute the antibody as recommended in Figure 1.

3) Add 50 µL of sample solution to each well according to our recommendation (Figure 2) or your own plate setup.

4) For No-Coating Control wells, please add 50 µL Dilution Buffer.

### 7. Binding

1) Dilute Biotinylated Human B7-1 stock solution (100 µg/mL) to 8 µg/mL with Dilution Buffer to make Biotinylated Human B7-2 working solution.

2) For No-binding control wells, please add 50 µL Dilution Buffer.

3) For all other wells, please add 50 µL Biotinylated Human B7-1 working solution to the wells and mix the samples

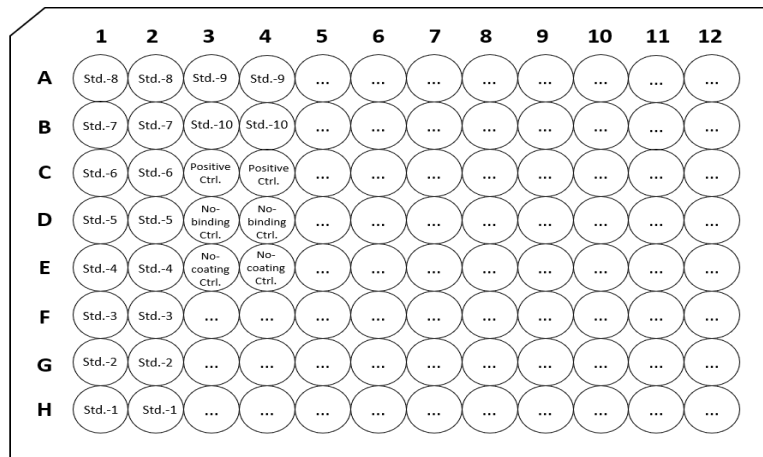
by gently tapping the plate. Seal the plate with microplate sealing film and incubate at 37°C for 1 hour.

**Note: The working solution should be prepared immediately before use and should not be stored.**

**FIG.1 PREPARATION OF 1:1 SERIAL DILUTIONS OF THE Anti-CD28 Neutralizing Antibody**

Tubes/ Solution Code	Anti-CD28 Neutralizing Antibody stock solution	Std.-1	Std.-2	Std.-3	Std.-4	Std.-5	Std.-6	Std.-7	Std.-8	Std.-9	Std.-10
Operating		200 µL	200 µL	200 µL	200 µL	200 µL	200 µL	200 µL	200 µL	200 µL	200 µL
Solution Con.	100 µg/mL	5 µg/mL	2.5 µg/mL	1.25 µg/mL	0.625 µg/mL	0.312 µg/mL	0.156 µg/mL	0.078 µg/mL	0.039 µg/mL	0.0195 µg/mL	0.01 µg/mL
Dilution Buffer Vol.		380 µL	200 µL	200 µL	200 µL	200 µL	200 µL	200 µL	200 µL	200 µL	200 µL

**FIG.2 PLATE LAYOUT**



**8. Washing**

Repeat step 3.

**9. Add Streptavidin-HRP**

1) Dilute Streptavidin-HRP stock solution (50 µg/mL) to 0.1 µg/mL with Dilution Buffer to make Streptavidin-HRP working solution.

2) For all wells, add 100 µL Streptavidin-HRP working solution, seal the plate with microplate sealing film and incubate at 37°C for 1 hour, avoid light.

## 10. Washing

Repeat step 3.

## 11. Substrate Reaction

Add 100  $\mu$ L **Substrate Solution** to each well. Seal the plate with microplate sealing film and incubate at 37°C for 20 minutes. Avoid light.

## 12. Termination

Add 50  $\mu$ L **Stop Solution** to each well, and gently shake the plate to allow thorough mixing.

*Note: the color in the wells should change from blue to yellow.*

## 13. Data Recording

Read the absorbance at 450 nm using UV/Vis microplate spectrophotometer.

*Note: Subtracting the value read at OD<sub>450nm</sub> with OD<sub>630nm</sub> can be used to reduce the background noise.*

## SIMPLIFIED PROTOCOL

TABLE. 3 ASSAY PROTOCOL

Steps Code	Steps	Reagents & Instruments	Reaction Conditions	Samples	No-binding Ctrl.	No-coating Ctrl.	Positive Ctrl.
1	Working fluid preparation	N/A	N/A	N/A	N/A	N/A	N/A
2	Coating	Human CD28 Working Solution	4°C for overnight	100 $\mu$ L	100 $\mu$ L	—	100 $\mu$ L
3	Washing	1X Wash Buffer	Wash for 3 times	300 $\mu$ L	300 $\mu$ L	300 $\mu$ L	300 $\mu$ L
4	Blocking	Blocking Buffer	37°C for 1.5 hours	300 $\mu$ L	300 $\mu$ L	300 $\mu$ L	300 $\mu$ L
5	Washing	1X Wash Buffer	Wash for 3 times	300 $\mu$ L	300 $\mu$ L	300 $\mu$ L	300 $\mu$ L
6	Add Samples	Samples	—	50 $\mu$ L	—	—	—
		Dilution Buffer		—	50 $\mu$ L	50 $\mu$ L	50 $\mu$ L
7	Binding	Biotinylated Human B7-1 Working Solution	Mix by gentle tapping, incubate at 37°C for 1 hours	50 $\mu$ L	—	50 $\mu$ L	50 $\mu$ L
		Dilution Buffer		—	50 $\mu$ L	—	—

8	Washing	1XWash Buffer	Wash for 3 times	300 µL	300 µL	300 µL	300 µL
9	Streptavidin-HRP	Streptavidin-HRP Working Solution	37°C for 1 hours	100 µL	100 µL	100 µL	100 µL
10	Washing	1XWash Buffer	Wash for 3 times	300 µL	300 µL	300 µL	300 µL
11	Substrate Reaction	Substrate Solution	37°C for 20 minutes	100 µL	100 µL	100 µL	100 µL
12	Termination	Stop Solution	Mix by gentle tapping	50 µL	50 µL	50 µL	50 µL
13	Data Recording	UV/Vis spectrophotometer	Measure absorbance at 450 nm, with the correction wavelength set at 630 nm				

**Note for TAB. 3:**

- 1) *Samples: Your samples of interest.*
- 2) *No-binding Ctrl.: Reaction without Biotinylated Human B7-1 added. The absorbance should be around 0.05(< 0.1) at 450 nm.*
- 3) *No-coating Ctrl.: Reaction without Human CD28 coated on the wells. The absorbance should be around 0.05(< 0.1) at 450 nm.*
- 4) *Positive Ctrl.: Determined the max value in 450nm absorbance, when out of inhibitors.*
- 5) *It is recommended that all samples, controls and standards should be done in duplicates.*

## **PRECAUTIONS**

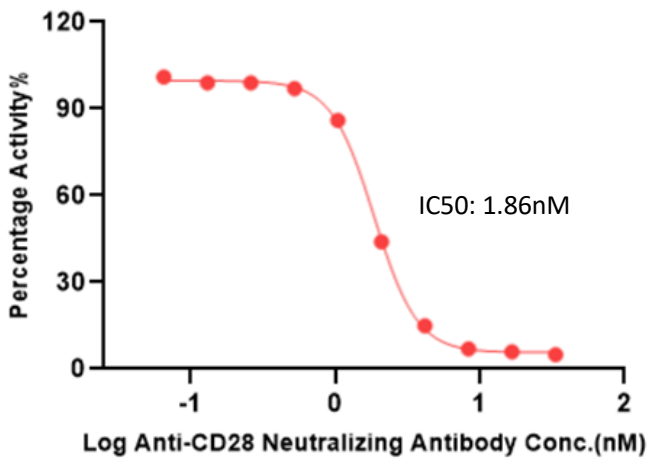
1. This kit is for research use only and is not for use in diagnostic or therapeutic applications.
2. This kit should be used according to the provided instructions.
3. Do not mix reagents from different lots.
4. All reagents should be balanced to room temperature (20°C-25°C) before use.
5. This kit should be stored at 2°C-8°C.
6. Please prepare the working solution of each component according to the needs of the experiment. Except for 1x Washing Buffer, all prepared working solution is for one-time use and cannot be stored.

## **METHOD VERIFICATION**

### **INHIBITION OF CD28:B7-1[Biotinylated] BINDING BY ANTI-CD28 NEUTRALIZING ANTIBODY**



Serial dilutions of Anti-CD28 Neutralizing antibody (Catalog # EP150-C04) (1:1 serial dilution, from 5 µg/mL to 0.01953125µg/mL) was added into CD28: Biotinylated B7-1 binding reactions. The assay was performed according to the protocol described below. Background was subtracted from data points prior to log transformation and curve fitting (QC tested).



Anti-CD28 Neutralizing Antibody conc.(µg/ml)	Anti-CD28 Neutralizing Antibody conc.(nM)	Mean Abs.(OD450)	Percentage Activity(%)
0.000	0.000	2.607	100%
0.010	0.065	2.635	101%
0.020	0.130	2.589	99%
0.039	0.260	2.577	99%
0.078	0.521	2.531	97%
0.156	1.042	2.252	86%
0.313	2.083	1.145	44%
0.625	4.167	0.387	15%
1.250	8.333	0.171	7%
2.500	16.667	0.144	6%
5.000	33.333	0.134	5%
No Coating		0.072	
No Binding		0.069	

For each experiment, a standard curve needs to be set for each micro-plate, and the specific OD value may vary depending on different laboratories, testers, or equipments. The example data is for reference only.