

Angiotensin Converting Enzyme 2 (ACE2) ELISA Kit 96T

Generic protocol - use the protocol shipped
with your kit for your experiments. Separate kits are
available for Ferret, Monkey, Mouse, Rat, Canine and
Cat

FIVEphoton Biochemicals

**For research use only.
Not for diagnostics.**

Part No. ACE2-ELISA

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Store: 4°C. Expiration: 6 months.

Safety: Stop solution contains acid. Avoid contact and inhalation. Wear eye protection.

ACE2 ELISA Kit

Part No. ACE2-ELISA

For research only. Not for diagnostic applications.

Storage: 2-8°C, 6 months

Safety: Stop solution contains acid. Avoid eye and skin contact

Overview: Please familiarize yourself with this protocol prior to performing the assay. It is recommended that the researcher overviews the literature to identify detailed methods for sample preparation; sample isolation methods discussed in this protocol serve only as a general guide. Blanks, standards and samples should be measured at least in duplicate to account for pipetting error.

This kit measures ACE2 in sandwich ELISA format. The ELISA plate is provided pre-coated with an anti-ACE2 monoclonal antibody. The experimenter mixes the samples with a provided polyclonal anti-ACE2 antibody labeled with biotin and with the provided streptavidin-HRP solution. The sample-antibody-biotin-streptavidin-HRP mixture is then added to the ELISA plate, which is incubated for 60 min at 37°C. Unbound biotin-linked antibody is washed away and color reagents are added that change the color of the solution to blue. The blue solution then turns yellow after addition of stop solution. The absorbance of the resulting yellow solution at 450nm corresponds to the concentration of ACE2 in the samples.

Sample Preparation: The below is provided only as a general guide. Prior to performing the assay, the researcher should identify sample preparation methods for their experiment.

1. Note that samples containing NaN₃ may inhibit Horse Radish Peroxidase (HRP) and the color reaction.
2. If possible, assay the sample immediately after isolation. Otherwise store samples at -80°C without freeze-thawing cycles.
3. **Serum:** Allow serum to clot for 10-20 minutes at room temperature. Centrifuge at 2000-3000 RPM for 20 minutes. Collect the supernatant carefully. If particulates are detected after storage, centrifuge again and collect the supernatant for assays. A significant dilution (for example, 200-1000X fold) of serum in a sample diluent solution (1% BSA in PBS pH 7.4 – made by experimenter, not provided with the kit) may be required to maintain assay specificity.
4. **Blood plasma:** In accordance with the requirements of sample collection, EDTA or sodium citrate should be used as the anti-coagulant. Add EDTA or sodium citrate and mix 10-20 minutes. Centrifuge at 2000-3000 RPM for approximately 20 minutes. Collect the supernatants carefully. If particulates are detected after storage, centrifuge again and collect the supernatant for assays. A significant dilution (for example, 200-1000X fold) of plasma in a sample diluent solution (1% BSA in PBS pH 7.4 – made by experimenter, not provided with the kit) may be required to maintain assay specificity.
5. **Urine:** Collect by sterile tube. Centrifuge at 2000-3000 RPM for approximately 20 minutes. Collect the supernatants carefully. When particulates appear due to storage, centrifuge again and collect the supernatant to

assay.

6. Cell culture supernatant: Collect in sterile tubes when examining secreted components. Centrifuge at 2000-3000 RPM for approximately 20 minutes to sediment cells. Collect the supernatants carefully.

7. Intracellular and membrane bound components. To assay intracellular components, use a non-denaturing cell lysis buffer to lyse membranes and solubilize cytoplasmic and membrane bound components. Add ice cold lysis buffer with protease inhibitors to cells. Keep the tube in ice for 30 min. Tap the tube several times during this period to mechanically shear membranes. Centrifuge cellular debris in a microcentrifuge at 18000 rpm for 15 min. Collect the supernatant to assay.

8. Tissue sample: Use a homogenization protocol in a non-denaturing buffer to release protein components. Add protease inhibitors and keep the solution ice cold during the homogenization steps. Centrifuge debris and assay the supernatant.

Do not use denaturing cell lysis buffers such as RIPA for protein extraction.

9. Samples can be aliquoted and stored at -80°C for later use.

Table 1. Materials supplied. Store all materials at 4°C. If particulates are observed in any of the reagents, centrifuge and use the clarified supernatant for the assay.

1	Standard : (64ng/ml)	0.5ml	7	Chromogen Solution A	6ml
2	Standard diluent (1%IgG-free BSA in PBS pH 7.4)	3 ml	8	Chromogen Solution B	6ml
3	Anti-QA monoclonal antibody coated ELISA plate (96T)	12 wellx 8 strips	9	Stop Solution	6ml
4	Streptavidin-HRP	6 ml	10	Instruction Manual	1
5	30xwash solution	20 ml	11	Closure Membrane	2
6	Anti-QA polyclonal antibody labeled with biotin (detection antibody)	1ml	12	Sealed bags	1

Materials required but not supplied

Sample dilution buffer (1% IgG-free BSA in PBS pH 7.4)

37°C incubator

Standard absorbance plate reader

Precision pipettes and disposable pipette tips

De-ionized water

Disposable tubes for sample dilution

Absorbent paper

Important notes and preparation for the assay

Make a solution that is 1% IgG-free BSA in PBS pH 7.4 for dilution of samples (i.e. "sample dilution solution").

Equilibrate the ELISA plate strips and other reagents used in the assay to room temperature for at least 30

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minutes. The plate strips should be kept in a zip lock bag to prevent drying of the wells. Store unused sections of the ELISA plate in a sealed bag at 4°C.

Use new pipettes tips at each step to prevent contamination.

Do not use reagents from other ELISA kits.

Substrate B is light sensitive. Limit light exposure.

Manual Wash Method: Gently aspirate off the liquid in each well. Turn over the plate and pat-dry on absorbent paper. Add 100µl wash solution and let percolate in the wells for 3 minutes prior to aspirating. Repeat the wash steps 5 times with 30 second washes. Therefore 600ul wash solution is needed per well. An automatic washer can also be employed to wash the ELISA wells.

Very Important: Perform preliminary tests to identify the appropriate dilution of your samples to match the linear range of the ELISA kit. For example, remove a 8-well strip, prepare one well with standard at the most concentrated dilution and another well with standard at the most dilute concentration of the assay range listed on Table 2. Set one well as the blank well (see blank preparation below), and perform a dilution series of your representative samples at 10X diluted increments for the remaining five wells. Then perform the assay. **Identify the dilution factor for your samples that provides a measurement at approximately mid-point of the assay range for your samples. Dilute your samples with the sample dilution solution (1% IgG-free BSA in PBS pH 7.4) prior to applying the samples to the ELISA plate.**

Assay procedures

Blanks, standard and sample preparation: Prepare the blanks, standards and samples in a separate 96-well dish and transfer simultaneously to the ELISA plate. Do not prepare samples in the ELISA plate.

Assay procedure

1. Standard dilutions. Use Table 2 as a guide for dilutions of standards in the “standard diluent” provided with the kit (Table 1). Make dilutions in separate tubes or a separate multi-well dish, but NOT in the ELISA dish.

Table 2. Standard peptide dilutions for mouse ACE2 ELISA Kit (Standard Peptide Concentration, 128ng/ml. Assay range, 0.5 – 100ng/ml. For other species, use a similar series that is described in the protocol shipped with the kit.

Standard Concentration	Standard Number	Dilution Instructions
64 ng/ml	6	120µl original standard + 120µl standard diluent solution, mix
32 ng/ml	5	120µl standard No.7 + 120µl standard diluent solution, mix
16 ng/ml	4	120µl standard No.6 + 120µl standard diluent solution, mix
8 ng/ml	3	120µl standard No.5 + 120µl standard diluent solution, mix
4 ng/ml	2	120µl standard No.4 + 120µl standard diluent solution, mix
2 ng/ml	1	120µl standard No 3 + 120µl standard diluent solution, mix

2. **Blank, standard and sample preparation:** (Pre-mix solutions in a separate multiwell dish and transfer the solutions simultaneously to the ELISA dish. Do not pre-mix solutions in the ELISA dish).

- a) Blank wells: Set up two blank wells. Reproduce the ratio of the sample vehicle with the sample dilution solution (the BSA-PBS solution) for the blanks. For each blank well, prepare 40 μ l of "blank solution". Then add 10 μ l anti- ACE2-biotin detection antibody and 50 μ l Streptavidin-HRP solution. Mix gently, do not vortex.
- b) Standard solution wells: Prepare 50 μ l of diluted standard and 50 μ l Streptavidin-HRP solution for each standard well (detection antibody labeled with biotin has been added during manufacture in advance for the standards, therefore no detection antibody label with biotin is added to the standards).
- c) Sample well: For each well, prepare 10 μ l sample (that may have been previously diluted to meet the assay range) in 30 μ l sample diluent solution (1% BSA in PBS pH 7.4 – made by the experimenter), then add 10 μ l anti-ACE2-biotin detection antibody and 50 μ l Streptavidin-HRP solution. Mix gently, do not vortex.

Accurately transfer 100 μ l of the premixed solutions to the ELISA dish. (You may opt to prepare a slight surplus volume of standard, sample and blank solutions (for example 105 μ l) using these reagent ratios to assure 100 μ l of solution is accurately transferred to the ELISA plate). Seal the wells with the seal plate membrane and rotate the plate gently for 60 minutes at 37°C.

3. Preparation of wash solution: Dilute the 30X wash solution to 1X with dH₂O. Prepare 600 μ l 1X wash solution per well.

4. Wash: Carefully remove the seal plate membrane or zip lock bag that protects the wells from drying. Do not cross-contaminate liquid. Gently aspirate off all liquid from each well. Turn over the plate and pat-dry on absorbent paper. Add 100 μ l wash solution and let percolate in the wells for 3 minutes prior to aspirating again. Repeat the wash steps 5 times, now with 30 second washes. Therefore 600 μ l wash solution is needed per well. An automatic plate washer can also be employed. Blot dry the plate, but do not allow the wells to dry.

5. Color development: First add 50 μ l chromogen solution A to each well and then add 50 μ l chromogen solution B to each well. Rotate gently to mix solutions A and B. Incubated protected from light for 10 minutes at 37°C while rotating the ELISA plate.

6. Stop Solution: Add 50 μ l Stop Solution to each well to stop the reaction (the blue color changes into yellow).

7. Read samples at 450nm within 10 min of adding the stop solution: Set the blank wells as zero, and measure the absorbance (OD) of each well at 450nm.

Data Analysis

Compile a standard curve using the blank standard solutions and the corresponding OD values. You may wish to calculate a linear regression equation from the standard curve to determine the concentration of your samples. Take into account dilution factors in your calculation. Alternative methods of data analysis to calculate concentrations of your samples can also be employed.

Flow chart of the procedures

Separately prepare standards, blank and samples with detection antibody and HRP-streptavidin as required



Incubate with the ELISA plate for 1 hr at 37°C.



Wash the plate six times.



Add Chromogen solutions A and B. Incubate for 10 min at 37°C for color development.



Add stop solution



Measure OD value at 450nm within 10 min