

# Human Furin ELISA Kit

Catalog No. EA100575

Size 96T(8×12 divisible strips)

**For quantitative detection of Human Furin in cell culture supernates, tissue homogenates and cell lysates.**

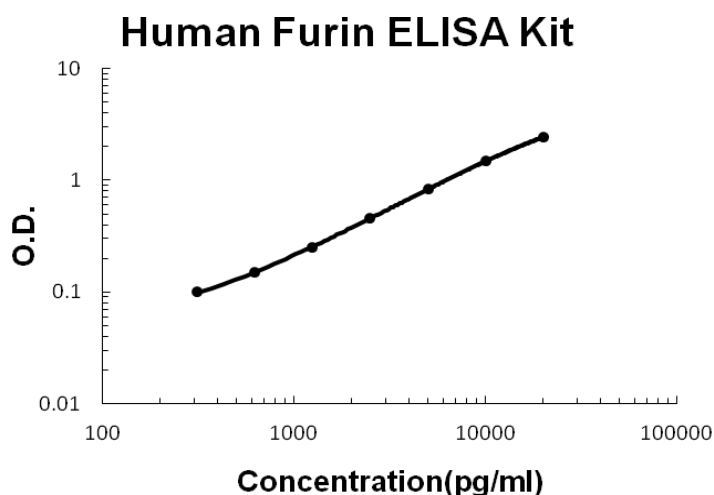
## **Typical Data Obtained from Human Furin**

(TMB reaction incubate at 37°C for 20 min)

| Concentration(pg/ml) | 0     | 312   | 625   | 1250  | 2500  | 5000  | 10,000 | 20,000 |
|----------------------|-------|-------|-------|-------|-------|-------|--------|--------|
| O.D                  | 0.046 | 0.101 | 0.151 | 0.251 | 0.456 | 0.832 | 1.480  | 2.428  |

## **Typical Human Furin ELISA Kit Standard Curve**

This standard curve was generated at OriGene for demonstration purpose only. A standard curve must be run with each assay.



|                         |                                                             |
|-------------------------|-------------------------------------------------------------|
| <b>Range</b>            | 312pg/ml-20,000pg/ml                                        |
| <b>Sensitivity</b>      | < 10pg/ml                                                   |
| <b>Specificity</b>      | Natural and recombinant human Furin                         |
| <b>Cross-reactivity</b> | No detectable cross-reactivity with other relevant proteins |

## **Storage**

Store at 4°C for 6 months, at -20°C for 12 months. Avoid multiple freeze-thaw cycles (Shipped with wet ice.)

## Precision

**Intra-Assay Precision** (Precision within an assay) Three samples of known concentration were tested on one plate to assess intra-assay precision.

**Inter-Assay Precision** (Precision between assays) Three samples of known concentration were tested in separate assays to assess inter-assay precision.

|                    | Intra-Assay Precision |       |       | Inter-Assay Precision |       |      |
|--------------------|-----------------------|-------|-------|-----------------------|-------|------|
| Sample             | 1                     | 2     | 3     | 1                     | 2     | 3    |
| n                  | 16                    | 16    | 16    | 24                    | 24    | 24   |
| Mean(ng/ml)        | 1.9                   | 8.8   | 15.7  | 2.3                   | 9.2   | 17.4 |
| Standard deviation | 0.091                 | 0.493 | 0.942 | 0.122                 | 0.589 | 1.27 |
| CV(%)              | 4.8                   | 5.6   | 6     | 5.3                   | 6.4   | 7.3  |

## Principle

OriGene's human Furin ELISA Kit was based on standard sandwich enzyme-linked immune-sorbent assay technology. A monoclonal antibody from mouse specific for Furin has been precoated onto 96-well plates. Standards(NSO, D108-E715) and test samples are added to the wells, a biotinylated detection polyclonal antibody from goat specific for Furin is added subsequently and then followed by washing with PBS or TBS buffer. Avidin-Biotin-Peroxidase Complex was added and unbound conjugates were washed away with PBS or TBS buffer. HRP substrate TMB was used to visualize HRP enzymatic reaction. TMB was catalyzed by HRP to produce a blue color product that changed into yellow after adding acidic stop solution. The density of yellow is proportional to the human Furin amount of sample captured in plate.

## Kit Components

| Description                                             | Quantity              |
|---------------------------------------------------------|-----------------------|
| 96-well plate precoated with anti- human Furin antibody | 1                     |
| Lyophilized recombinant human Furin standard            | 20ng/tubex2           |
| Biotinylated anti- human Furin antibody                 | 130µl(dilution 1:100) |
| Avidin-Biotin-Peroxidase Complex (ABC)                  | 130µl(dilution 1:100) |
| Sample diluent buffer                                   | 30 ml                 |
| Antibody diluent buffer                                 | 12ml                  |
| ABC diluent buffer                                      | 12ml                  |
| TMB color developing agent                              | 10ml                  |
| TMB stop solution                                       | 10ml                  |

## Material Required But Not Provided

1. Microplate reader in standard size.
2. Automated plate washer.
3. Adjustable pipettes and pipette tips. Multichannel pipettes are recommended in the condition of large amount of samples in the detection.
4. Clean tubes and Eppendorf tubes.
5. Washing buffer (neutral PBS or TBS).
  - Preparation of 0.01M **TBS**: Add 1.2g Tris, 8.5g NaCl; 450µl of purified acetic acid or 700µl of concentrated hydrochloric acid to 1000ml H<sub>2</sub>O and adjust pH to 7.2-7.6. Finally, adjust the total volume to 1L.
  - Preparation of 0.01 M **PBS**: Add 8.5g sodium chloride, 1.4g Na<sub>2</sub>HPO<sub>4</sub> and 0.2g NaH<sub>2</sub>PO<sub>4</sub> to 1000ml distilled water and adjust pH to 7.2-7.6. Finally, adjust the total volume to 1L.

## Notice for Application of Kit

1. To inspect the validity of experiment operation and the appropriateness of sample dilution proportion, pilot experiment using standards and a small number of samples is recommended.
2. The TMB Color Developing agent is colorless and transparent before using, contact us freely if it is not the case.
3. Before using the Kit, spin tubes and bring down all components to the bottom of tubes.
4. Duplicate well assay is recommended for both standard and sample testing.
5. Don't let 96-well plate dry, for dry plate will inactivate active components on plate.
6. Don't reuse tips and tubes to avoid cross contamination.
7. Avoid using the reagents from different batches together.
8. In order to avoid marginal effect of plate incubation due to temperature difference (reaction may be stronger in the marginal wells), it is suggested that the diluted ABC and TMB solution will be pre-warmed in 37°C for 30 min before using.

## Preparation

### 1. Sample Preparation and Storage

Store samples to be assayed within 24 hours at 2-8°C. For long-term storage, aliquot and freeze samples at -20°C. Avoid repeated freeze-thaw cycles.

- **Cell culture supernates:** Remove particulates by centrifugation, assay immediately or aliquot and store samples at -20°C.
- **Tissue Homogenates:** Rinse tissue with PBS to remove excess blood, chopped into 1-2 mm pieces, and homogenize with a tissue homogenizer in PBS or in lysate solution(Mammal Tissue Protein Extraction Reagent, Catalog# AR0101), lysate solution: tissue net weight = 10ml:1g(i.e. Add 10ml lysate solution to 1g tissue). Centrifuge at approximately 5000 X g for 5 min. Assay immediately or aliquot and store homogenates at -20°C. Avoid repeated freeze-thaw cycles.
- **Cell Lysates:** Collect cells and rinse cells with PBS. Homogenize and lyse cells thoroughly in lysate solution (Cell Protein Extraction Reagent, Catalog# AR0103). Centrifuge cell lysates at approximately 10000 X g for 5 min to remove debris. Aliquots of the cell lysates were removed and assayed.

### 2. Sample Dilution Guideline

The user needs to estimate the concentration of the target protein in the sample and select a proper dilution factor so that the diluted target protein concentration falls near the middle of the linear regime in the standard curve. Dilute the sample using the provided diluent buffer. The following is a guideline for sample dilution. Several trials may be necessary in practice. **The sample must be well mixed with the diluents buffer.**

- **High target protein concentration (200-2000ng/ml).** The working dilution is 1:100. i.e. Add 1µl sample into 99 µl sample diluent buffer.
- **Medium target protein concentration (20-200ng/ml).** The working dilution is 1:10. i.e. Add 10µl sample into 90 µl sample diluent buffer.
- **Low target protein concentration (312-20,000pg/ml).** The working dilution is 1:2. i.e. Add 50µl sample to 50 µl sample diluent buffer.
- **Very Low target protein concentration (≤312pg/ml).** No dilution necessary, or the working dilution is 1:2.

### 3. Reagent Preparation and Storage

- A. Reconstitution of the human Furin standard: Furin standard solution should be prepared no more than 2 hours prior to the experiment. Two tubes of Furin standard (20ng per tube) are included in each kit. Use one tube for each experiment.
  - a. 20,000pg/ml of human Furin standard solution: Add 1ml sample diluent buffer into one tube, keep the tube at room temperature for 10 min and mix thoroughly.

- b. 10,000pg/ml → 312pg/ml of human Furin standard solutions: Label 6 Eppendorf tubes with 10,000pg/ml, 5000pg/ml, 2500pg/ml, 1250pg/ml, 625pg/ml, 312pg/ml respectively. Aliquot 0.3ml of the sample diluent buffer into each tube. Add 0.3ml of the above 20,000pg/ml Furin standard solution into 1st tube and mix. Transfer 0.3ml from 1st tube to 2nd tube and mix. Transfer 0.3ml from 2nd tube to 3rd tube and mix, and so on.
- Note:** The standard solutions are best used within 2 hours. The 20ng/ml standard solution should be stored at 4°C for up to 12 hours, or at -20°C for up to 48 hours. Avoid repeated freeze-thaw cycles.
- B. Preparation of biotinylated anti-human Furin antibody working solution: The solution should be prepared no more than 2 hours prior to the experiment.
    - a. The total volume should be: 0.1ml/well x (the number of wells). (Allowing 0.1-0.2 ml more than total volume)
    - b. Biotinylated anti-human Furin antibody should be diluted in 1:100 with the antibody diluent buffer and mixed thoroughly. (i.e. Add 1µl Biotinylated anti-human Furin antibody to 99µl antibody diluent buffer.)
  - C. Preparation of Avidin-Biotin-Peroxidase Complex (ABC) working solution: The solution should be prepared no more than 1 hour prior to the experiment.
    - a. The total volume should be: 0.1ml/well x (the number of wells). (Allowing 0.1-0.2 ml more than total volume)
    - b. Avidin- Biotin-Peroxidase Complex (ABC) should be diluted in 1:100 with the ABC dilution buffer and mixed thoroughly. (i.e. Add 1µl ABC to 99µl ABC diluent buffer.)

### **Assay Procedure**

The ABC working solution and TMB color developing agent must be kept warm at 37°C for 30 min before use. When diluting samples and reagents, they must be mixed completely and evenly. Standard Furin detection curve should be prepared for each experiment. The user will decide sample dilution fold by crude estimation of Furin amount in samples.

1. Aliquot 0.1ml per well of the 20,000pg/ml, 10,000pg/ml, 5000pg/ml, 2500pg/ml, 1250pg/ml, 625pg/ml, 312pg/ml human Furin standard solutions into the precoated 96-well plate. Add 0.1ml of the sample diluent buffer into the control well (Zero well). Add 0.1ml of each properly diluted sample of human cell culture supernates, tissue homogenates or cell lysates to each empty well. **See “Sample Dilution Guideline” above for details.** It is recommended that each human Furin standard solution and each sample be measured in duplicate.
2. Seal the plate with the cover and incubate at 37°C for 90 min.
3. Remove the cover, discard plate content, and blot the plate onto paper towels or other absorbent material. Do NOT let the wells completely dry at any time.
4. Add 0.1ml of biotinylated anti-human Furin antibody working solution into each well and incubate the plate at 37°C for 60 min.
5. Wash plate 3 times with 0.01M TBS or 0.01M PBS, and each time let washing buffer stay in the wells for 1 min. Discard the washing buffer and blot the plate onto paper towels or other absorbent material. **(Plate Washing Method:** Discard the solution in the plate without touching the side walls. Blot the plate onto paper towels or other absorbent material. Soak each well with at least 0.3 ml PBS or TBS buffer for 1~2 minutes. Repeat this process two additional times for a total of THREE washes. Note: For automated washing, aspirate all wells and wash THREE times with PBS or TBS buffer, overfilling wells with PBS or TBS buffer. Blot the plate onto paper towels or other absorbent material.)
6. Add 0.1ml of prepared ABC working solution into each well and incubate the plate at 37°C for 30 min.
7. Wash plate 5 times with 0.01M TBS or 0.01M PBS, and each time let washing buffer stay in the wells for 1-2 min. Discard the washing buffer and blot the plate onto paper towels or other absorbent material. (See Step 5 for plate washing method).

8. Add 90µl of prepared TMB color developing agent into each well and incubate plate at 37°C in dark for 25-30 min (**Note:** For reference only, the optimal incubation time should be determined by end user. And the shades of blue can be seen in the wells with the four most concentrated human Furin standard solutions; the other wells show no obvious color).
9. Add 0.1ml of prepared TMB stop solution into each well. The color changes into yellow immediately.
10. Read the O.D. absorbance at 450nm in a microplate reader within 30 min after adding the stop solution.

For calculation, (the relative O.D.<sub>450</sub>) = (the O.D.<sub>450</sub> of each well) – (the O.D.<sub>450</sub> of Zero well). The standard curve can be plotted as the relative O.D.<sub>450</sub> of each standard solution (Y) vs. the respective concentration of the standard solution (X). The human Furin concentration of the samples can be interpolated from the standard curve. **Note:** if the samples measured were diluted, multiply the dilution factor to the concentrations from interpolation to obtain the concentration before dilution.

### Summary

1. Add samples and standards and incubate the plate at 37°C for 90 min. Do not wash.
2. Add biotinylated antibodies and incubate the plate at 37°C for 60 min. Wash plate 3 times with 0.01M TBS.
3. Add ABC working solution and incubate the plate at 37°C for 30 min. Wash plate 5 times with 0.01M TBS.
4. Add TMB color developing agent and incubate the plate at 37°C in dark for 25-30 min.
5. Add TMB stop solution and read.

### Background

Furin(Fur), also known as PACE, is a protein that in humans is encoded by the FURIN gene. The protein encoded by this gene is an enzyme which belongs to the subtilisin-like proprotein convertase family. The FUR gene is located approximately 1 kb upstream of the FES gene on chromosome 15q25-q26. This gene is thought to play a role in tumor progression. Furin is one of the proteases responsible for the proteolytic cleavage of HIV envelope polyprotein precursor gp160 to gp120 and gp41 prior to viral assembly. Furin is enriched in the Golgi apparatus, where it functions to cleave other proteins into their mature/active forms. Expression of furin in T-cells is required for maintenance of peripheral immune tolerance

### Reference

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2. Hallenberger S, Bosch V, Angliker H, Shaw E, Klenk HD, Garten W (November 1992). "Inhibition of furin-mediated cleavage activation of HIV-1 glycoprotein gp160". *Nature* 360 (6402): 358–61.
3. Thomas G (October 2002). "Furin at the cutting edge: from protein traffic to embryogenesis and disease". *Nat. Rev. Mol. Cell Biol.* 3 (10): 753–66.doi:10.1038/nrm934
4. Roebroek, A. J. M., Schalken, J. A., Leunissen, J. A. M., Onnekink, C., Bloemers, H. P. J., Van de Ven, W. J. M. Evolutionary conserved close linkage of the c-fes/fps proto-oncogene and genetic sequences encoding a receptor-like protein. *EMBO J.* 5: 2197-2202, 1986.