



## User's Manual

# Rat ELABELA ELISA Kit



DEIA-XYZ70



96T



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

For illustrative purposes only. To perform the assay the instructions for use provided with the kit have to be used.

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## PRODUCT INFORMATION

### Intended Use

This ELISA has been validated with the included reagents. It is intended to be used with appropriately extracted samples. For research use only.

### General Description

ELABELA is a 32-amino acid peptide hormone that binds to the Apelin receptor. It bears 2 conserved di-arginine motifs (R31/R32 and R42/R43) suggesting that it may be further processed by Furin-like endopeptidases. Its function is crucial for heart development during embryogenesis and it needs to be secreted to become active since deletion of 7 residues in its signal peptide causes a complete loss-of-function in zebrafish.

This ELISA was developed with serum from rabbits immunized with ELABELA coupled to a carrier protein.

### Principles of Testing

This ELISA kit is a competitive immunoassay. The antiserum is captured by antibodies coated on a 96-well plate. A constant concentration of Bt-tracer (biotinylated tracer) and varying concentrations of unlabeled standard or sample peptide compete for binding specifically to the antiserum. Captured Bt-tracer is subsequently bound by streptavidin-conjugated horseradish peroxidase (SA-HRP), which produces a soluble colored product after a substrate is added.

The sequence of the standard peptide is: NH<sub>2</sub>-Glu-Lys-Ser-Val-Asn-Phe-Pro-Arg-Arg-Arg-LysLeu-Tyr-Arg-His-Asn-Cys-Phe-Arg-Arg-Arg-Cys-Ile-Ser-Leu-His-SerArg-Val-Pro-Phe-Pro-OH (Disulfide bond Cys17 & Cys22), coupled to carrier protein.

The standard is used to make a standard curve in the range specified in the kit's datasheet. Standard curves are S-shaped (on a semi-log plot) but for a few kits they appear to be almost linear over the kit's range. The measuring range is the range of standard concentrations near the middle or near the IC<sub>50</sub> (2ng/ml) of the standard curve. Unknown sample concentrations are measured by comparing their absorbance with the standard curve.

We include sufficient reagents for 96 determinations.

### Reagents And Materials Provided

1. ELISA buffer concentrate (50mL 20x concentrate)
2. 96-well immunoplate with acetate plate sealer
3. Antiserum (lyophilized powder)
4. Standard (1 ug lyophilized powder)
5. Streptavidin-HRP (100 ul 200x concentrate)
6. TMB substrate Stock solution H<sub>2</sub>O<sub>2</sub> (1.5 mL)
7. Stop solution 2N HCl (15 mL)

8. TMB substrate buffer (15 mL citrate buffer)
9. Datasheet

## Materials Required But Not Supplied

1. 96-well microtiter plate reader set up to measure 450 nm and 650 nm
2. 96-well plate washer and shaker (optional)
3. Distilled or deionized water, or comparable quality
4. Curve fitting software (optional)
5. Test tubes, pipettes and various other standard laboratory items

**The following materials are not included but are recommended for this kit.**

Extraction kit (with 50 Sep-columns and buffers A and B)

Buffer A

Buffer B

Sep-Column (200mg)

Sep-Column adapter

## Storage

After you receive the kit, store the lyophilized components and standard diluent at a constant -20 °C for up to one year from the kit's assembly date. The remaining components should be stored in the refrigerator (2-4 °C) also up to 1 year. Long term storage, improper storage conditions and large temperature fluctuation cycles may result in the accumulation of precipitates in the TMB solution and in the ELISA buffer concentrate. These precipitates should not affect the assay noticeably. Nevertheless, if you observe such precipitates, we recommend that you avoid them by allowing them to sink to the bottom.

## Specimen Collection And Preparation

### 1. Sample extraction.

Sample extraction is recommended especially for serum samples. It may not be as important for some tissue culture samples. The kit may still be used without extraction but this may cause unexpected results due to the possible binding between serum proteins and kit components.

### 2. Sample concentration.

The concentration of the target molecule must be within the measuring range of the kit (in a region around the IC50). If you cannot estimate the concentration range of your sample you can prepare it at different concentrations such that one of the samples may be within the measuring range.

### Suggested protocol for sample extraction

We have provided an excess amount of standard that you may use to determine if extraction is required. For example, if you are working with serum, you may spike it with known amounts of standard and check if they are accurately determined by the assay with and without extraction. Extraction eliminates potentially interfering substances, such as albumin. Extraction may also be necessary to concentrate the sample to

within the measuring range. As with any purification technique, recovery of the desired substance is likely to be incomplete. Therefore, both optimization and quantification of the extraction procedure are recommended for more accurate determinations. While we cannot provide you with extraction optimization and quantification protocols, we have included enough standard in the kit should you wish to use it for this purpose.

### C18 Sep-Column Extraction Method

The following generic protocol is meant to help users with little experience in extracting their samples. It should be applicable to different biological fluids but should not be thought of as an optimized protocol for any particular antigen.

#### Required Materials

- SEP-COLUMN containing 200 mg of C18
- Buffer A (BUFF-A): 1% trifluoroacetic acid (TFA, HPLC Grade). (Acidifies plasma sample to remove interfering proteins such as albumin)
- Buffer B (BUFF-B): 60% acetonitrile (HPLC Grade), 1% TFA, and 39% distilled water. (Elutes peptide from column)
- You may also consider purchasing Extraction kits, which include SEP-columns and buffers.

#### Withdrawal and Preparation of Plasma

- Collect blood samples (2 - 6 ml) into a chilled syringe and transfer into a polypropylene tube containing EDTA (1 mg/ml of blood) as an anticoagulant and Aprotinin (500 KIU/ml of blood) as a protease inhibitor at 4°C. Do not use heparinized tubes as they may interfere with the assay. Vacutainers with EDTA are acceptable.
- Centrifuge blood at 1,600xg for 15 minutes at 4°C.
- Collect the top (plasma) layer.
- Proceed to extraction immediately or freeze at -70°C for later use.

#### Extraction Procedure

- Add an equal amount of Buffer A to the plasma.
- Centrifuge at 6,000xg to 17,000xg for 20 minutes at 4°C.
- Transfer supernatant to a new tube discarding any pellet that may be present.
- Equilibrate a SEP-COLUMN by washing with 1 ml Buffer B followed by 3 X 3 ml Buffer A.
- Load the plasma solution onto the equilibrated SEP-Column.
- Slowly wash the column with Buffer A (3 ml, twice) and discard the wash. A light vacuum (10 sec/drop) may be applied to the column.
- Elute the peptide slowly with Buffer B (3 ml, once) and collect eluant in a polypropylene tube. A light vacuum may be applied as in previous step.
- Freeze-dry eluant to dryness using a dry ice/methanol bath to freeze the sample and a centrifugal concentrator to evaporate it.
- Dissolve the residue in a suitable volume of ELISA buffer such that the concentration of the substance of interest will fall close to the IC50 (within the measuring range).

## Plate Preparation

Seven-Point Standard Curve Layout

|   | 1   | 2   | 3  | 4  | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  |
|---|-----|-----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| A | Blk | Blk | U1 | U1 | U9  | U9  | U17 | U17 | U25 | U25 | U33 | U33 |
| B | S1  | S1  | U2 | U2 | U10 | U10 | U18 | U18 | U26 | U26 | U34 | U34 |
| C | S2  | S2  | U3 | U3 | U11 | U11 | U19 | U19 | U27 | U27 | U35 | U35 |
| D | S3  | S3  | U4 | U4 | U12 | U12 | U20 | U20 | U28 | U28 | U36 | U36 |
| E | S4  | S4  | U5 | U5 | U13 | U13 | U21 | U21 | U29 | U29 | U37 | U37 |
| F | S5  | S5  | U6 | U6 | U14 | U14 | U22 | U22 | U30 | U30 | U38 | U38 |
| G | S6  | S6  | U7 | U7 | U15 | U15 | U23 | U23 | U31 | U31 | U39 | U39 |
| H | S0  | S0  | U8 | U8 | U16 | U16 | U24 | U24 | U32 | U32 | U40 | U40 |

Blk = blank    S = standards    U = unknown samples

## Reagent Preparation

Lyophilized kit components should not be re-hydrated until they are needed.

1. Equilibrate unopened kit components to room temperature. In order to avoid accumulation of moisture, do not open reagents and immunoplate while they are cold.
2. ELISA buffer. Dilute the ELISA buffer concentrate 1 in 20 with water and mix well. Example: mix the 50 ml contained in the kit with 9500 ml of water.
3. Standard. Add 1 ml of standard diluent buffer to the vial of lyophilized standard peptide (1 µg) and vortex gently. If samples are to be extracted and re-suspended in ELISA buffer as described below, use ELISA buffer as a diluent. Otherwise, we encourage customers to use their own diluent such that standards and samples will be treated equally.
4. Standard curve. Make serial dilutions of the standard as below.

| Suggested Preparation of Standards |        |                                 |
|------------------------------------|--------|---------------------------------|
|                                    | ng/ml  | Range: 0.10 to 100ng/ml         |
| <b>Stock</b>                       | 1000   |                                 |
| <b>S1</b>                          | 100.00 | Add 100µl Stock + 900µl diluent |
| <b>S2</b>                          | 25.00  | Add 200µl S1 + 600µl diluent    |
| <b>S3</b>                          | 6.25   | Add 200µl S2 + 600µl diluent    |
| <b>S4</b>                          | 1.56   | Add 200µl S3 + 600µl diluent    |
| <b>S5</b>                          | 0.39   | Add 200µl S4 + 600µl diluent    |
| <b>S6</b>                          | 0.10   | Add 200µl S5 + 600µl diluent    |
| <b>S0</b>                          | 0.00   | 500µl diluent                   |

5. Antiserum. Add 5 ml of ELISA buffer and vortex.
6. Biotinylated tracer. Add 5 ml of ELISA buffer to the vial of lyophilized biotinylated peptide and vortex. Please check the datasheet for exceptions

## Assay Procedure

**Note:**

ELISA buffer and Diluent. The antiserum and the Bt-tracer are always reconstituted and used in ELISA buffer. The standards and samples are prepared in ELISA buffer.

Room Temperature. Reagents, samples, and the plate should be brought to room temperature before use.

Shakers. Shakers (optional) may help lower the experimental variation of duplicates (recommended at 60 rpm).

Blank Wells. Blanks will give you the background to be subtracted from all readings. These should not be confused with the "S0 Standards" which contain no standard peptide and which will yield the highest readings. Blank readings will not influence concentration calculations - thus, they are optional.

**Assay Procedure**

1. Into each well of the immunoplate add

-50 µl standard or sample (in diluent)

-25 µl antiserum (in ELISA buffer)

Add 50 µl diluent and 25 µl ELISA buffer to blank wells.

2. Incubate at room temperature for 1 hour. Shorter incubations may result in lower sensitivity.

3. Rehydrate the Bt-tracer (in ELISA buffer) and add 25 µl / well.

4. Incubate at room temperature for 2 hours.

5. Wash immunoplate 5 times with 300 µl/well of ELISA buffer. Be very careful not to cross-contaminate between wells in the first wash/dispensing cycle. In each wash cycle empty plate contents with a rapid flicking motion of the wrist, then gently blot dry the top of plate on paper towels. Dispense 300 µl of ELISA buffer into each well and gently shake for at least a few seconds. Thorough washing is essential.

6. Add 100 µl /well of streptavidin-HRP. Tap or centrifuge the SA-HRP vial to collect all liquid contents on the bottom of the vial. Dilute 1/200 in ELISA buffer (60 µl / 12 ml) and vortex. Add 100µl to all wells, including the blanks.

7. Incubate at room temperature for 1 hour.

8. Prepare TMB chromogenic solution immediately before use by mixing 20 parts of the TMB substrate buffer (citrate, brought to room temperature) with 1 part TMB - H<sub>2</sub>O<sub>2</sub> solution (TMB substrate stock). This dilution should be used within 15 minutes after preparation.

9. Wash immunoplate 5 times (see step 5).

10. Add 100 µl/well of TMB solution. Add to all wells, including the blanks.

11. Incubate at room temperature (usually 10 - 30 minutes). You may read the developing blue color at 650 nm and use the data for your calculations.

12. Terminate reactions by adding 100 µl 2 N HCl per well.

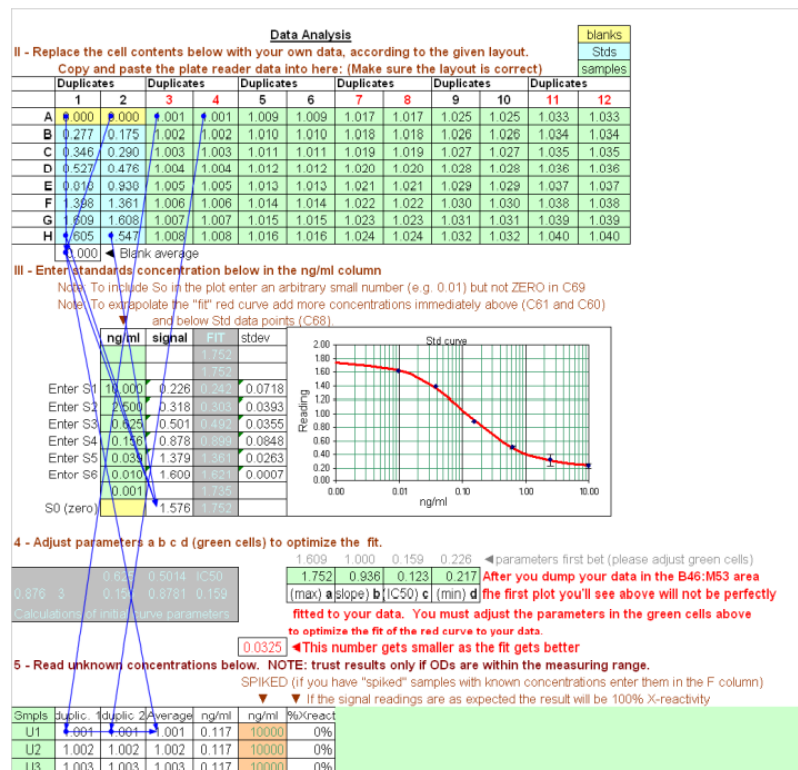
13. Read absorbance at 450 nm within fifteen minutes.

**Calculation**

Plot data and calculate results. We recommend that you use curve fitting software for your data analysis. Plate readers often include such software packages. This is, however, not essential and you may opt to plot

manually on semi-log paper. You can also use a spreadsheet program. Should you need help with the latter method we recommend the following procedure.

Set up a spreadsheet as shown below (note that the values on the spreadsheet are merely illustrative and are not necessarily typical for this particular kit).



Set up an 8 X 12 area to match the layout of the plate and dump the plate reader data in it.

Calculate the average of the blanks on another cell as indicated by the arrows starting from cells A1 and A2.

Enter the concentration of the standards (see under ng/ml in figure). Calculate the average of the ODs of the standards and subtract the background (blank) as indicated by the arrows for the last standard (cells H1 and H2).

Plot a standard curve on a semi-log scale. Use the y axis for the average of the OD readings (minus the blank average) and the x axis for the standard concentrations in ng/ml.

Use the equation shown below to calculate the values on the "FIT" column and plot a smooth line of FIT values versus standard concentrations. Then change the parameters a (max), b (slope), c (IC50), and d (min), until you are satisfied that fit is good.

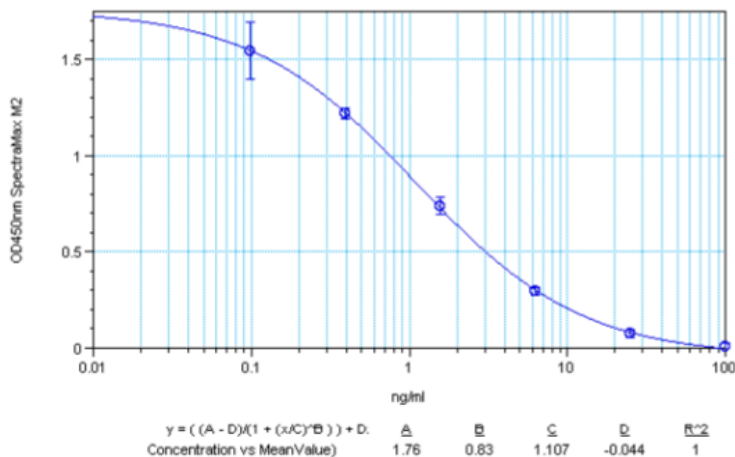
$$y = \frac{a - d}{1 + (x/c)^b} + d$$

Next calculate the average of your sample readings and subtract the blank average (see arrows starting from A3 and A4, and the arrows leading to "Average"). Finally, you may use the "reverse" of the equation above to calculate the concentrations in ng/ml for all your samples.

$$x = c \left( \frac{y - a}{d - y} \right)^{1/b}$$

**Caution:** when you calculate sample concentrations using the "reverse" equation if  $y = d$  or  $y > a$  or  $y < d$ , the reading is out of range and the calculation will yield an error or a meaningless negative concentration.

## Typical Standard Curve



## Detection Range

0-100ng/ml

## Specificity

ELABELA (rat) :100%

ELABELA (human): 0%

Apelin-13: 0%

Apelin-17: 0%

(Pyr-1) Apelin-13: 0%

## Precautions

The physical and chemical properties of the reagents contained in this kit have been tested individually. Reagents do not contain ingredients which have been determined to be health hazards and which comprise greater than 1% of the mixture or which could be released from the mixture in concentrations that would exceed OSHA permissible exposure limits.

## Hazardous Ingredients

The lyophilized standard, antiserum and biotinylated tracer contain thimerosal. The ELISA buffer concentrate



contains Tris and thimerosal. The buffer is in liquid form. The SA-HRP contains 0.01% methylisothiazolone, 0.01% bromonitrodioxane, and 10 ppm Proclin 300 as a preservative.

**Physical and Chemical Data**

Components are stable in closed containers under normal temperatures and pressures. No hazardous polymerization is known.

**Fire and Explosion Data**

Components are non-combustible with negligible fire hazard when exposed to heat or flame. Fire fighting media should be appropriate to burning material.

**Health Hazards**

Components may be harmful by inhalation, ingestion, or skin absorption and may cause skin irritation or eye irritation. In case of eye contact, flush eye with water and contact a physician. In case of skin contact, wash skin with soap and water.

**Reactivity Data**

Components are stable in closed containers under normal temperatures and pressures.

**Spill and Disposal Procedures**

For spills, ventilate area and wash spill site. For disposal, please dispose in accordance with local regulations.

**Handling and Storage Information**

Safety glasses, gloves, and a full-length lab coat should be worn to prevent unnecessary contact.

The above information is believed to be correct but does not purport to be all-inclusive and shall be used only as a guide. It is the user's responsibility to determine the suitability of this information for the adoption of safety precautions as may be necessary.