

## TECHNICAL DATA SHEET



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# THUNDER™ Phospho-4EBP1 (T37/T46) + Total 4EBP1 TR-FRET Cell Signaling Assay Kit

**CATALOG NUMBERS** KIT-4EBP1PT-500  
400 points for phospho-4EBP1 and 100 points for total 4EBP1

Store at -80°C  
For research use only.  
Not for use in diagnostic procedures.

## PRODUCT DESCRIPTION

This assay kit measures intracellular levels of **phospho-4EBP1 (T37/T46)** and **total 4EBP1** protein in cell lysates using a simple, rapid and sensitive immunoassay based on the homogeneous (no-wash) THUNDER™ TR-FRET technology. The kit is compatible with both adherent and suspension cells.

## SPECIFICITY

This assay kit contains two specific and selective antibody pairs, one that recognizes **4EBP1** phosphorylated at **Thr37** and **Thr46** and another that recognizes **total** (both phosphorylated and unphosphorylated) **4EBP1**.

## SPECIES REACTIVITY

Human (Swiss-Prot Acc.: Q13541; Entrez-Gene Id: 1978).  
Other species should be tested on a case-by-case basis.

## TR-FRET ASSAY PRINCIPLE

The **Phospho-4EBP1 (T37/T46) + Total 4EBP1** assay kit is a homogeneous time-resolved Förster resonance energy transfer (TR-FRET) sandwich immunoassay (Figure 1). The THUNDER™ Cell Signaling assay workflow consists of 3 steps (Figure 2). Following cell treatment, cells are first lysed with the specific Lysis Buffer provided in the kit. Then **Phospho-4EBP1 (T37/T46)** and **Total 4EBP1** in the cell lysates are detected in separate wells with two pairs of fluorophore-labeled antibodies in a simple "add-incubate-measure" format (single-step reagent addition; no wash steps). For detection of the phosphorylated protein, one antibody is labeled with a donor fluorophore (Europium chelate; Eu-Ab1) and the second with a far-red acceptor fluorophore (FR-Ab2). The same approach is used for the second antibody pair detecting the total protein (Eu-Ab3 and FR-Ab4). The binding of the two matched labeled antibodies to distinct epitopes on the target protein (either **phospho-4EBP1** or **total 4EBP1**) takes place in solution and brings the two dyes into close proximity. Excitation of the donor Europium chelate molecules with a flash lamp (320 or 340 nm) or a laser (337 nm) triggers a FRET from the donor to the acceptor molecules, which in turn emit a TR-FRET signal at 665 nm. Residual energy from the Eu chelate generates light at 615 nm. The signal at 665 nm is proportional to the concentration of **Phospho-4EBP1 (T37/T46)** and **Total 4EBP1** in the cell lysate. Data can be expressed as either the signal at 665 nm or the 665 nm/615 nm ratio.

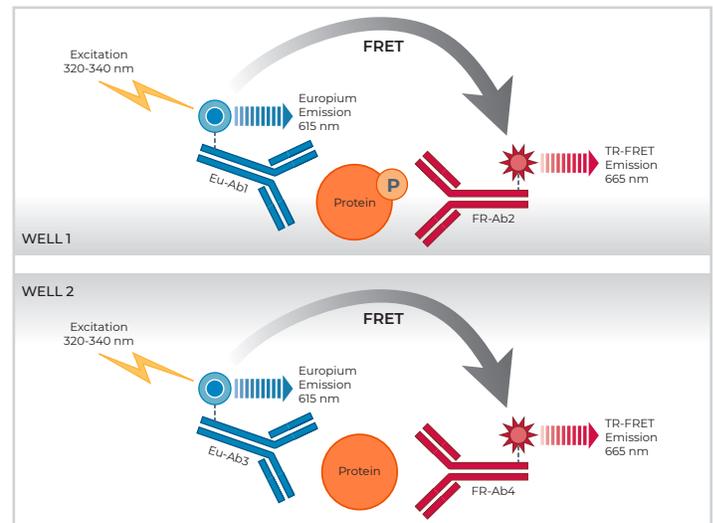


Fig. 1 Schematic representation of the TR-FRET cell signaling assay principle.

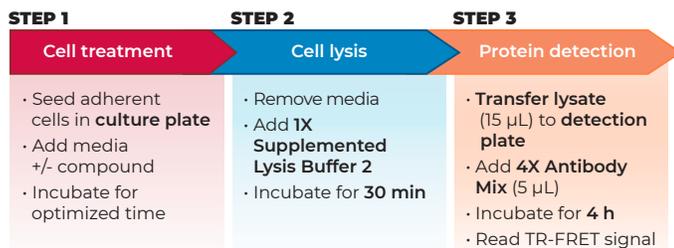


Figure 2 Assay workflow using the 2-plate (transfer) protocol.

## KIT COMPONENTS

	500 points*
Eu-labeled phospho-4EBP1 (T37/T46) antibody (Eu-Ab1)	20 µL
Acceptor-labeled phospho-4EBP1 (T37/T46) antibody (FR-Ab2)	80 µL
Eu-labeled total-4EBP1 antibody (Eu-Ab3)	5 µL
Acceptor-labeled total-4EBP1 antibody (FR-Ab4)	20 µL
Lysis Buffer 2 (5X)	5 mL
Detection Buffer (10X)	250 µL
Positive control cell lysate	200 µL
Phosphatase Inhibitor Cocktail (100X)	250 µL

\* The number of assay points is based on an assay volume of 20 µL in half-area 96-well or low-volume 384-well assay plates using the kit components at the recommended concentrations (refer to the User Manual).

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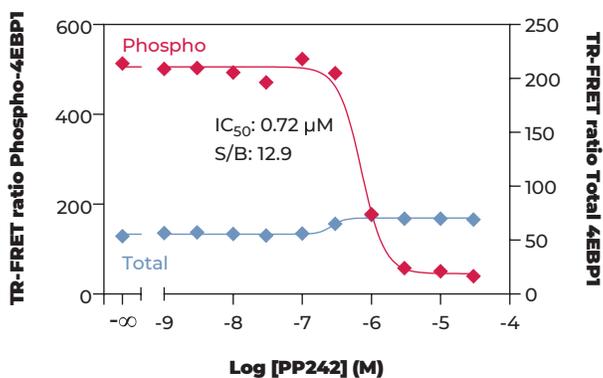
Phospho-4EBP1 (T37/T46) + Total 4EBP1

## VALIDATION DATA

This assay kit has been validated for the relative quantification of phospho-4EBP1 (T37/T46) and total 4EBP1 in A431 and HEK293 cell lysates using the 2-plate assay protocol.

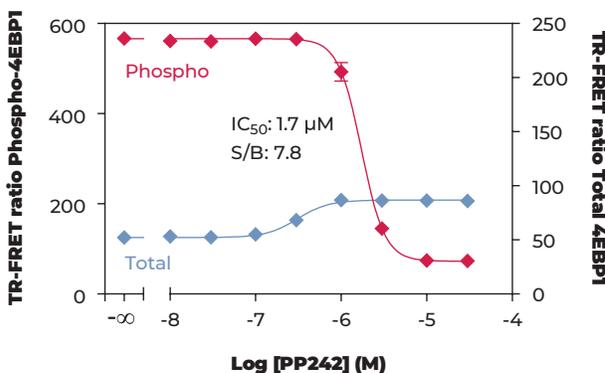
- Adherent cells were cultured overnight in a 96-well tissue culture plate (EMEM +10% FBS for HEK293; DMEM+10% FBS for A431). The plates used for HEK293 were coated with poly-L-lysine.
- Following cell treatment, the media was removed and cells were lysed with the 1X **Lysis Buffer 2** (50  $\mu$ L) supplemented with the phosphatase inhibitors sodium fluoride (1 mM) and sodium orthovanadate (2 mM).
- Following a **30-min** incubation at room temperature (RT) on an orbital shaker (400 rpm), lysates (15  $\mu$ L) were then transferred to a 384-well assay plate followed by addition to separate wells of either the labeled antibodies Eu-Ab1 and FR-Ab2 (5  $\mu$ L) for detection of phospho-4EBP1 (T37/T46) or Eu-Ab3 and FR-Ab4 (5  $\mu$ L) for detection of total 4EBP1.
- The plate was incubated at RT for **4 hours** and the TR-FRET signal was recorded at 665 and 615 nm (EnVision<sup>®</sup>; lamp excitation).

## INHIBITION OF PHOSPHO-4EBP1 IN A431 CELLS



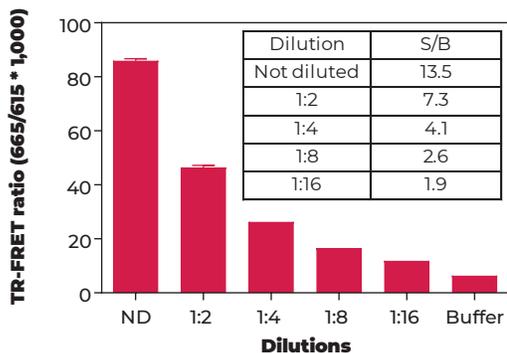
A431 cells (25,000 cells/well; in triplicate) were incubated with serial dilutions of PP242 for 3 hours at 37°C. Data show that treatment of A431 cells with PP242 inhibits phosphorylation of 4EBP1 at T37/T46, but does not have a major effect on the levels of total 4EBP1.

## INHIBITION OF PHOSPHO-4EBP1 IN HEK293 CELLS

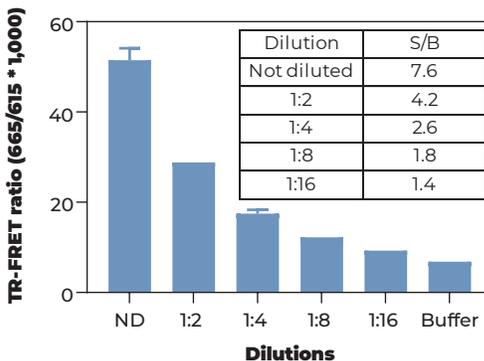


HEK293 cells (60,000 cells/well; in triplicate) were incubated with serial dilutions of PP242 for 3 hours at 37°C. Data show that treatment of HEK293 cells with PP242 inhibits phosphorylation of 4EBP1 at T37/T46, but does not have a major effect on the levels of total 4EBP1.

## A431 CONTROL LYSATE TITRATION (QC TEST) PHOSPHO-4EBP1 (T37/T46)



## A431 CONTROL LYSATE TITRATION (QC TEST) TOTAL 4EBP1



Quality Control: the Phospho-4EBP1 (T37/T46) + Total 4EBP1 assay kit is routinely tested against A431 lysates. A431 cells were cultured in a T175 flask to 70% confluence. Following cell lysis using 4 mL of 1X Lysis Buffer 2, lysates were serially diluted with 1X Lysis Buffer 2 and tested in triplicate and in separate wells for phospho-4EBP1 (T37/T46) and total 4EBP1. Data show a linear relationship between lysate dilutions and TR-FRET ratio values.

