Product Datasheet

Biological Description

Specificity	Phospho-PERK (Thr980) Antibody [E16F3] detects endogenous levels of total PERK protein only when it is phosphorylated at Thr980.
Background	Phospho-PERK Thr980 marks the activated state of protein kinase-like endoplasmic reticulum kinase (PERK), a type I transmembrane eIF2α kinase of the unfolded protein response (UPR) that transduces ER stress from its N-terminal luminal sensor domain through a single transmembrane helix to its C-terminal cytoplasmic kinase domain, where Thr980 autophosphorylation on the activation loop stabilizes the catalytically competent conformation. The kinase domain adopts a canonical bilobal fold with the Thr980 phosphate forming charge-charge interactions with Lys631/Arg634 in the αC helix and Arg934 in the C-lobe, rigidifying the activation loop (residues 953–990, partially disordered) and ordering helix αG to create the eIF2α substrate-binding surface, while luminal domain oligomerization by misfolded proteins drives a "line-up" trans-autophosphorylation mechanism between adjacent PERK dimers. Activated pThr980-PERK phosphorylates eIF2α at Ser51, globally attenuating cap-dependent translation while selectively upregulating ATF4 translation via uORF1 bypass, triggering integrated stress response (ISR) genes for antioxidant defense such as NRF2, protein folding chaperones, amino acid metabolism, and autophagy to restore ER proteostasis under accumulation of unfolded proteins from nutrient deprivation, redox imbalance, or calcium dysregulation. This adaptive pathway protects secretory cells like pancreatic β-cells from ER overload during development and glucose stimulation; pathologically, chronic hyperactivation exhausts adaptation, leading to apoptosis via CHOP/ATF4 induction in diabetes (β-cell failure), neurodegeneration such as Alzheimer's and prion diseases, and ischemia-reperfusion injury, while PERK loss impairs the UPR, causing proinsulin misfolding. Therapeutic PERK inhibitors show promise in prion disease and cancer by blocking ISR-driven survival.

Usage Information

Application	WB	Dilution	WB 1:1000
Reactivity	Mouse, Rat		
Source	Rabbit Monoclonal Antibody	MW	170 kDa
Storage Buffer	PBS, pH 7.2+50% Glycerol+0.05% BSA+0.01% NaN3		
Storage (from the date of receipt)	-20°C (avoid freeze-thaw cycles), 2 years		

Experimental Methods

WB

Experimental Protocol:

Sample preparation
1. Tissue: Lyse the tissue sample by adding an appropriate volume of ice-cold **RIPA/NP-40 Lysis Buffer (containing Protease Inhibitor Cocktail, Phosphatase Inhibitor Cocktail)**, and homogenize the tissue at a low temperature or lyse it by sonication on ice, then incubate on ice for 30 minutes.
2. Adherent cell: Aspirate the culture medium and wash the cells with ice-cold PBS twice. Lyse the cells by adding an appropriate volume of **RIPA/NP-40 Lysis Buffer (containing Protease Inhibitor Cocktail, Phosphatase Inhibitor Cocktail)**, sonicate to lyse the cells, and incubate on ice for 30 minutes.
3. Suspension cell: Transfer the culture medium to a pre-cooled centrifuge tube. Centrifuge and aspirate the supernatant. Wash the cells with ice-cold PBS twice. Lyse the cells by adding an appropriate volume of **RIPA/NP-40 Lysis Buffer (containing Protease Inhibitor Cocktail, Phosphatase Inhibitor Cocktail)**, sonicate to lyse the cells, and incubate on ice for 30 minutes.
4. Place the lysate into a pre-cooled microcentrifuge tube. Centrifuge at 4°C for 15 min. Collect the supernatant;
5. Remove a small volume of lysate to determine the protein concentration;
6. Combine the lysate with protein loading buffer. Boil 20 μL sample under 95-100°C for 5 min. Centrifuge for 5 min after cool down on ice.

Electrophoretic separation
1. According to the concentration of extracted protein, load appropriate amount of protein sample and marker onto SDS-PAGE gels for electrophoresis. **Recommended separating gel (lower gel) concentration: 5%.** Reference Table for Selecting SDS-PAGE Separation Gel Concentrations
2. Power up 80V for 30 minutes. Then the power supply is adjusted (110 V~150 V), the Marker is observed, and the electrophoresis can be stopped when the indicator band of the predyed protein Marker where the protein is located is properly separated. (Note that the current should not be too large when electrophoresis, too large current (more than 150 mA) will cause the temperature to rise, affecting the result of running glue. If high currents cannot be avoided, an ice bath can be used to cool the bath.)

Transfer membrane
1. Take out the converter, soak the clip and consumables in the pre-cooled converter;
2. Activate PVDF membrane with methanol for 1 min and rinse with transfer buffer;
3. Install it in the order of "black edge of clip - sponge - filter paper - filter paper - glue -PVDF membrane - filter paper - filter paper - sponge - white edge of clip";
4. The protein was electrotransferred to PVDF membrane. (0.45 μm PVDF membrane is recommended) Reference Table for Selecting PVDF Membrane Pore Size Specifications
Recommended conditions for wet transfer: **200 mA, 120 min**.
(Note that the transfer conditions can be adjusted according to the protein size. For high-molecular-weight proteins, a higher current and longer transfer time are recommended. However, ensure that the transfer tank remains at a low temperature to prevent gel melting.)

Block
1. After electrotransfer, wash the film with TBST at room temperature for 5 minutes;
2. Incubate the film in the blocking solution **(recommending 5% BSA solution)** for 1 hour at room temperature;
3. Wash the film with TBST for 3 times, 5 minutes each time.

Antibody incubation
1. Use 5% skim milk powder to prepare the primary antibody working liquid (recommended dilution ratio for primary antibody 1:1000), gently shake and incubate with the film at 4°C overnight;
2. Wash the film with TBST 3 times, 5 minutes each time;
3. Add the secondary antibody to the blocking solution and incubate with the film gently at room temperature for 1 hour;
4. After incubation, wash the film with TBST 3 times for 5 minutes each time.

Antibody staining
1. Add the prepared ECL luminescent substrate (or select other color developing substrate according to the second antibody) and mix evenly;
2. Incubate with the film for 1 minute, remove excess substrate (keep the film moist), wrap with plastic film, and expose in the imaging system.

References

https://pubmed.ncbi.nlm.nih.gov/21543844/ https://pubmed.ncbi.nlm.nih.gov/25925385/

Application Data

WB

Validated by Capsid Bio



Lane 1: AR42J, Lane 2: AR42J (thapsigargin, 1 μM, 20 min)