



Product Information

eIF-4E
human, recombinant
expressed in *E. coli*

Product Number **E 2654**
Storage Temperature $-70\text{ }^{\circ}\text{C}$

Synonyms: eIF4E; Eukaryotic Initiation Factor 4E;
mRNA cap-binding protein

Product Description

eIF-4E (Eukaryotic Initiation Factor 4E) is a protein containing 217 amino acids with a molecular mass of approximately 28 kDa. It plays a critical role in the initiation of protein synthesis. The protein binds to the 7-methylguanosine containing mRNA 5' cap structure. eIF-4E is a functional subunit of the eIF-4F complex, which is composed of three functional and unique initiation factors. In addition to the eIF-4E, eIF-4A and eIF-4G are the other functional subunits. eIF4A is an ATP-dependent RNA helicase and eIF-4G, formerly p220, bridges between eIF-4A and eIF-4E. eIF-4F is driven in and out of complex by phosphorylation of its subunits. This phosphorylation is regulated by a multitude of factors, including many endogenous and exogenous proteins, as well as stress and environmental conditions.

Each of the subunits, including eIF-4E is subject to regulation by phosphorylation as well. Activation of eIF-4E is brought about through the phosphorylation of the eIF4E Binding Proteins 1 and 2 (4E-BP1 and 4E-BP2). These binding proteins dissociate from the inactive initiation factor when phosphorylated, allowing the translation process to proceed. eIF-4E phosphorylation is regulated by mitogens, insulin, growth factors, Mnk1, and PKC and may be indirectly influenced by the MAP kinases ERK and p38. Ser²⁰⁹ and Thr²¹⁰ appear to be the sites phosphorylated in response to growth factors and external stimuli. Ser⁵³ was initially believed to be a phosphorylation site, but further studies indicated phosphorylation at Ser²⁰⁹.

The product is supplied as a solution in 50 mM Tris-HCl, pH 7.0, containing 14 mM 2-mercaptoethanol, 1 mM benzamidine, 0.1 mM PMSF, 1 mM EDTA, and 10% glycerol.

Purity: minimum 90% (SDS-PAGE)

Precautions and Disclaimer

This product is for laboratory research use only. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

Storage/Stability

The product ships in dry ice and storage at $-70\text{ }^{\circ}\text{C}$ is recommended. Avoid freeze-thaw cycles. Store working aliquots at $-70\text{ }^{\circ}\text{C}$. The product is stable for 24 to 48 hours at 2-8 $^{\circ}\text{C}$.

References

1. Scheper, G.C., et al., Phosphorylation of Eukaryotic Initiation Factor 4E Markedly Reduces Its Affinity for Capped mRNA. *J. Biol. Chem.*, **277**, 3303-3309 (2002).
2. McKendrick, L., et al., Phosphorylation of eukaryotic factor 4E(eIF4E) at Ser209 is not required for synthesis in vitro and in vivo. *Eur. J. Biochem.*, **268**, 5375-5385 (2001).
3. Tan, A., et al., Inhibition of Myc-dependent apoptosis by eukaryotic translation initiation factor 4E requires cyclin D1, *Oncogene*, **19**, 1437-1447 (2000).
4. Waskiewicz, A.J., et al., Phosphorylation of the Cap-Binding Protein Eukaryotic Translation Initiation Factor 4E by Protein Kinase Mnk1 in vivo. *Mol. Cell Biol.*, **19**, 1871-1880 (1999).

5. Diggle, T.A., et al., Both rapamycin-sensitive and -insensitive pathways are involved in the phosphorylation of the initiation factor-4E-binding protein(4E-BP1) in response to insulin in rat epididymal fat-cells. *Biochem. J.*, **316**, 447-453 (1996).
6. Whalen, S.G., et al., Phosphorylation of eIF-4E on Serine 209 by Protein Kinase C is inhibited by the Translational Repressors, 4E-binding Proteins, *J. Biol. Chem.*, **271**, 11831-11837 (1996).
7. Makinji, A., et al., Phosphorylation of Eukaryotic Protein Synthesis Initiation Factor 4E by Insulin-stimulated Protamine Kinase, *J. Biol. Chem.*, **270**, 14824-14828 (1995).
8. Joshi, B., et al., Phosphorylation of Eukaryotic Protein synthesis Initiation Factor 4E at Ser209, *J. Biol. Chem.*, **270**, 14597-14603 (1995).

LCM/MAM 11/02

Sigma brand products are sold through Sigma-Aldrich, Inc.

Sigma-Aldrich, Inc. warrants that its products conform to the information contained in this and other Sigma-Aldrich publications. Purchaser must determine the suitability of the product(s) for their particular use. Additional terms and conditions may apply. Please see reverse side of the invoice or packing slip.