ProductInformation

MKK7α1, ACTIVE
Human, Recombinant
Expressed in *E. coli*

Product Number **M 1814**
Storage Temperature –70 °C

Synonyms: MAP Kinase Kinase 7α1

Product Description
MKK7α1 is produced from a DNA sequence corresponding to the last 333 amino acids of human MKK7α1, containing a glutathione S-transferase (GST) tag at the amino terminus. The recombinant protein is expressed. in *E. coli*, and is purified by affinity chromatography on glutathione-agarose. The molecular mass of the fusion protein is approximately 65 kDa. MMK7α1 is activated by MEKK and, thus, is suitable for phosphorylation assays. The product contains 100 µg MEKK per mL as a minor contaminant.

The mitogen-activated protein kinase kinases (MAPKKs, MKKs or MEKs) are a family of Thr/Tyr dual specificity protein kinases, upstream of the MAP kinases, that play a central role in mitogenic signaling, transducing extracellular signals to intracellular targets, including transcription factors controlling the expression of genes essential to many cellular processes.[1,2] These upstream kinases are activated by a number of signalling molecules, such as growth factors, or by cellular stress, such as temperature, pH, or osmotic shock. Once activated, MAP kinases phosphorylate a number of cytoplasmic and nuclear regulatory proteins. The cellular response to the initial extracellular signal or event may be differentiation, proliferation, or apoptosis.[3] At least three families of MAPKs have been identified in mammals: ERK (extracellular signal-regulated kinases), JNK (c-Jun N-terminal kinases), and p38 MAPK (also called stress-activated protein kinase).[4]

The JNK signaling pathway is activated by exposure of cells to environmental stress and by the treatment of cells with cytokines. The activation of JNK is mediated by MKK4 and MKK7 in a signaling pathway involving MEKK.[5,6,7] Unlike MKK4 (SEK1, JNKK1, SKK1, MEK4) that also activates p38 kinase, MKK7 (JNKK2, SKK4) is selective for JNK.[8] JNK is activated by dual phosphorylation of Thr and Tyr within the kinase subdomain VIII Thr-Pro-Tyr motif. Recent studies indicate that MKK4 preferentially phosphorylates the Tyr residue while MKK7 preferentially phosphorylates Thr, and in some circumstances these two kinases may work in concert *in vivo*.[6] Studies demonstrate that the JNK pathway regulates AP-1 (activator protein-1) transcriptional activity *in vivo*. JNK is required for embryonic morphogenesis, the regulation of cellular proliferation and apoptosis, and the response of cells to immunological stimuli.[5]

MKK7 isoforms are derived from alternative exon splicing in the *MKK7* gene that produces differences in the amino-terminus (α, β, and γ isoforms) and in the carboxyl-terminus (1 and 2 isoforms). Comparative studies demonstrate that the MKK7 isoforms differ in the extent of activation in response to different upstream components of the JNK signaling pathway.[9]

MMK7α1 lacks the amino-terminal extension that is present in the MMK7β isoform. Thus, MMK7α1 binds poorly to the JNK substrate. Although the basal activity of MMK7α1 is very low, its activity is increased 34-fold in the presence of MEKK1, and the activated enzyme has approximately the same activity as non-activated MKKβ or MKKγ.[9]

Reagent
Human recombinant MKK7α1 is supplied as a solution in 50 mM Tris-HCl, pH 7.5, containing 270 mM sucrose, 150 mM NaCl, 0.1 mM EGTA, 0.03 % Brij 35, 0.1 % (v/v) 2-mercaptoethanol, 0.1 mM benzamidine, 0.2 mM phenylmethylsulfonylfluoride (PMSF)

Precautions and Disclaimer
For laboratory use only. Not for drug, household or other uses.

Storage/Stability
The protein is stable for at least six months when stored at –70 °C. Centrifuge the original vial after thawing and prior to removing the cap for maximum recovery of product. After initial thawing, store the remaining solution in single-use aliquots at –70 °C. Avoid repeated freeze-thaw cycles. Do not store in a frost-free freezer.

Product Profile

Purity is approximately 70% by SDS-PAGE with Coomassie blue staining, with the major band corresponding to the expected molecular weight of 65 kDa. The preparation may contain several lower molecular weight bands.

Activity is determined using a coupled assay system in which MKK7α1 phosphorylates JNK2α2/SAPK1α that, in turn, phosphorylates AFT2. One unit of JNK2α2/SAPK1α activity equals one nmole of phosphate incorporated into AFT2 per minute at pH 7.2 and 30 °C. One unit of MKK7α1 activity equals one unit of JNK2α2/SAPK1α activity.

References

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