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Product Information

Anti-MSK-1
produced in rabbit, IgG fraction of antiserum

Catalog Number **M5437**

Product Description

Anti-MSK-1 is produced in rabbit using as immunogen a synthetic peptide corresponding to the C-terminal sequence of human MSK-1, amino acids 783-800 with N-terminally added lysine, conjugated to KLH. This sequence is not found in the human and mouse MSK-2 isoforms. Whole antiserum is purified to provide an IgG fraction of antiserum.

Anti-MSK-1 recognizes rat MSK-1 (90 kDa). Applications include the detection of MSK-1 by immunoblotting and immunocytochemistry. Staining of MSK-1 in immunoblotting is specifically inhibited with the MSK-1 immunizing peptide.

MSK-1 is a mitogen and stress-activated protein kinase activated by ERK/MAPK as well as by p38 MAPK in response to growth and cell stress stimuli.[1] MSK-1 resembles the MAPKAP-K1/p90^{Rsk} isoforms (43 % homology) in that it contains two kinase domains connected by a regulatory linker region. An additional MSK isoform, termed MSK-2 has 75% homology with MSK-1. MSK-1 is widely expressed in various tissues, including heart, brain, placenta, lung, liver, kidney, and pancreas, with the highest levels observed in brain, muscle and placenta. It is localized to the nucleus of unstimulated or stimulated cells.

The activating phosphorylation sites present in MAPKAP-K1 are conserved in MSK-1. Two of these sites, Ser^{260} and Thr^{581}, are followed by proline residues indicating that MSK-1 is activated by more than one MAPK. Endogenous MSK-1 is activated in cells by growth factors, phorbol ester stimulation, exposure to UV irradiation, and oxidative or chemical stress.

The activation of MSK-1 in HEK293 cells by growth factors/phorbol ester is prevented by specific inhibition of the ERK/MAPK cascade, while activation of MSK-1 by stress stimuli is prevented by specific inhibition of the p38 MAPK cascade. In several cell lines including HeLa, PC-12 and SK-N-MC cells inhibition of both ERK and p38 MAPK cascades is required to suppress the activation of MSK-1 by TNF, NGF and FGF, respectively.

MSK-1 phosphorylates CREB at Ser^{133} and ATF1 at Ser^{63} in response to phorbol ester and EGF cell stimulation. CREB and ATF1 phosphorylation are abolished in MSK-1 knockout mouse enmbryonic stem (ES) cells. This suggests that MSK-1 may mediate the growth factor and stress-induced activation of CREB and ATF1.[1,2]

Muscle contraction activates the ERK and p38 MAPK cascades and their downstream targets p90^{Rsk}, MAPKAP-K2, and MSK-1.[3] Stimulation of MSK-1 in contracting skeletal muscle requires the activation of both ERK and p38 MAPK. Thus, MSK-1 may play a major role in exercise-induced signal transduction.[4]

MSK-1 has also been suggested as a potential kinase for the physiological phosphorylation of histone H3 at Ser^{10} and of HMG-14 at Ser^{6}.These actions are mediated via stimulation of the ERK and p38 MAPK cascades. Such a function for MSK-1 provides a link completing the cascade between the cell surface and the nucleosome.[5]

Reagent

Solution in 0.01 M phosphate buffered saline, pH 7.4, containing 15 mM sodium azide.

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

Storage/Stability

Store at –20 °C. For continuous use, the product may be stored at 2-8 °C for up to one month. For extended storage, freeze in working aliquots at –20 °C. Repeated freezing and thawing, or storage in "frost-free" freezers, is not recommended. If slight turbidity occurs upon prolonged storage, clarify the solution by centrifugation before use. Working dilution samples should be discarded if not used within 12 hours.

Product Profile

Immunoblotting: a minimum working dilution of 1:2,000 is determined using a whole cell extract of the rat fibroblast Rat1 cell line.

Immunocytochemistry: a minimum working dilution of 1:1,000 is determined using a rat fibroblast Rat1 cell line.

Note: In order to obtain best results in different techniques and preparations we recommend determining optimal working dilution by titration test.

References

1. Deak, M., et al., *EMBO J.,* **17**, 4426 (1998).
2. Arthur, J.S., and Cohen, P., *FEBS Lett.*, **482**, 44 (2000).
3. Aronson, D., et al., *J. Biol. Chem.*, **272**, 25636 (1997).
4. Ryder, J.W., et al., *J. Biol. Chem.*, **275**, 1457 (1998).
5. Thomson, S., et al., *EMBO J.*, **18**, 4779 (1999).

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