

BACKGROUND

Mitogen-activated protein kinases (MAPKs) are serine/threonine kinases that play an instrumental role in signal transduction from the cell surface to the nucleus. MAPKs are major components of pathways controlling embryogenesis, cell differentiation, cell proliferation, and cell death. Mammalian members of this family are extracellular signal-regulated kinases 1/2 (ERK 1/2), c-Jun amino-terminal kinases or stress-activated protein kinases (JNK/SAPKs) and p38 kinases (p38(MAPK)). MAPKs are regulated by phosphorylation cascades. Two upstream protein kinases activated in series lead to activation of a MAPK, and additional kinases may also be required upstream of this three-kinase module. In all currently known MAPK cascades, the kinase immediately upstream of the MAPK is a member of the MAPK/ERK kinase (MAPKK, MAP2K, MEK or MKK) family. These are dual specificity enzymes that can phosphorylate hydroxyl side chains of serine/threonine and tyrosine residues in their MAPK substrates. In spite of their ability to phosphorylate proteins on both aliphatic and aromatic side chains in the appropriate context, the substrate specificity of the known MEKs is very narrow: each MEK phosphorylates only one or a few of the MAPKs. The MAPK kinases (MEK or MKK) are activated by upstream kinases called MAP kinase kinase kinase (MAPKKK or MAP3K) such as Raf family. The Raf>MEK>MAPK is a well studied signaling pathway up to date.¹

ERK1 and ERK2 are proteins of 44 and 42 kDa that are nearly 85% identical overall, with much greater identity in the core regions involved in binding substrates. ERK1 and ERK2 are activated by a pair of closely related MEKs, MEK1 and MEK2. The two phosphoacceptor sites, tyrosine and threonine, which are phosphorylated to activate the kinases, are separated by a glutamate residue in both ERK1 and ERK2 to give the motif TEY(Thr202/Tyr204 and Thr185/Tyr187 for p44 and p42 respective) in the activation loop. Once activated, Erk1/2 rapidly translocated into the nucleus, where Erk1/2 activates downstream signaling components including Elk-1, although activated Erk1/2 also phosphorylated numerous substrates on (S/T)P sites in all cellular compartments.² The Erk1/2 was inactivated by dephosphorylation through action of MAPK phosphatase 1 and 2 in nucleus.³

References:

1. Pearson G et al.: Endocrin. Rev. 22:153-183, 2001.
2. Farooq A & Zhou MM: Cell. Signal. 16:769-779, 2004.
3. Pouyssegur J et al.: Biochem. Pharm. 64:755-763, 2002.

TECHNICAL INFORMATION

Source:

p44/Erk1 Antibody is a mouse monoclonal antibody raised against recombinant human p44/Erk1 fragments expressed in *E. coli*.

Specificity and Sensitivity:

This antibody detects p44/Erk1 proteins in various cell lysate.

Storage Buffer: PBS and 30% glycerol

Storage:

Store at -20°C for at least one year. Store at 4°C for frequent use. Avoid repeated freeze-thaw cycles.

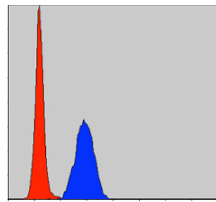
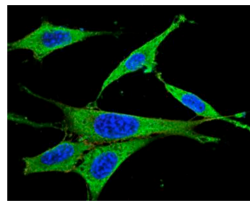
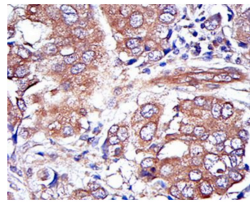
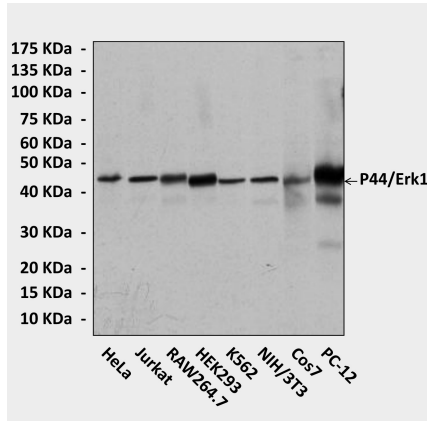
APPLICATIONS

Application:	*Dilution:
WB	1:1000
IP	1:50
IHC (Paraffin)	1:50-200
ICC	1:50-200
FACS	1:50-200

**Optimal dilutions must be determined by end user.*



QUALITY CONTROL DATA



Top: Western blot detection of p44/Erk1 proteins in various cell lysates using p44/Erk1 Antibody. **Middle, Upper:** It also stains paraffin-embedded human breast cancer tissue in IHC analysis. **Middle, Lower:** This antibody stains NIH3T3 cells in confocal immunofluorescent testing (p44/Erk1 antibody: Green; Actin filaments: Red; DRAQ5 DNA Dye: Blue). **Bottom:** This antibody detects p44/Erk1 proteins specifically in HeLa cells by FACS assay (p44/Erk1 antibody: Blue; negative control: Red).

