

BACKGROUND

Nucleoside diphosphate kinases (NDP kinase/NDPK/Nm23/Awd) are a large family of nucleotidyl phosphotransferases that possess a high degree of sequence and structural conservation, whose biochemical role is to use ATP to generate a different nucleoside triphosphate. Each gene encodes an approximately 17- to 20-kDa polypeptide, 4-6 of which folds into homomultimers, the native form of the enzymes. With high efficiency and broad substrate specificity NDPKs catalyze the transfer of γ -phosphates between ribo- and deoxyribonucleotides using a conserved histidine residue as the catalytic phosphate donor/acceptor. It has been assumed for decades that the primary physiological role of NDPKs is concerned with the general homeostasis of cellular nucleoside triphosphates. However, numerous additional biochemical and biological studies have concluded that NDPKs also serve as regulatory proteins not necessarily connected to nucleoside phosphorylation, e.g., in normal *Drosophila melanogaster* development, and in the induction and progression of tumors. Indeed, the matriarch of the family, Nm23-1/NDPK-A, was originally cloned as a metastasis suppressor. NDPKs are also implicated in signal transduction, transcriptional and translational control, and in regulatory interactions with an assortment of protein partners. The two most widely studied human NDPK genes *NME1* and *NME2* encode NM23-H1/NDPK-A and NM23-H2/NDPK-B, respectively. Both proteins are ubiquitous but differentially expressed according to the tissue considered, together providing the majority (>95 percent) of NDPK activity in cells. *NME1* and *NME2* are 88 percent identical in sequence and are closely linked on chromosome 17q21.3. Each gene encodes 152 amino acid long peptides, which, when assembled into identical three-dimensional native hexameric structures, carry out identical phosphotransferase reactions. Hence, the A and B proteins are presumed to function in a similar if not identical manner, acting independently and/or together.¹

Nonmetastatic gene 23-H1 (*NME1*, also known as nm23-H1) is a member of the NDK family. Although initially thought of as a housekeeping gene that maintains cellular pools of nucleoside triphosphates, *NME1* has been demonstrated to be a wide-spectrum tumor metastasis suppressor gene that plays an important role in suppressing the invasion and metastasis of tumor cells. *NME1* regulates a critical step during cytokinesis. *NME1* acts to provide a local source of GTP for the GTPase dynamin. Loss of *NME1* in diploid cells leads to cytokinetic furrow regression, followed by cytokinesis failure and generation of tetraploid cells. In the absence of p53 signaling, the tetraploid cells resulting from loss of *NME1* continue cycling and develop classic hallmarks of tumor cells. Thus loss of *NME1*, an event suspected to promote metastasis, may additionally function at

an earlier stage of tumor development to drive the acquisition of chromosomal instability.² In addition, it was shown that *NME1* is involved in erythroid development.³ It has also been demonstrated that *NME1* is expressed in human first-trimester placenta. *NME1* plays important role at the maternal-fetal interface, especially on invasion of the human extravillous cytotrophoblasts (EVCTs). *NME1* has been identified in both human trophoblast cells and decidua stromal cells (DSCs) in early pregnancy. *NME1* can inactivate the phospho-extracellular signal-regulated kinase 1/2 (P-ERK1/2) in trophoblasts in a time-dependent manner. *NME1* expressed in trophoblasts and DSCs controls the inappropriate invasion of human first-trimester trophoblast cells via MAPK/ERK1/2 signal pathway, and the overexpression of *NME1* at maternal-fetal interface leads to pregnancy wastage.⁴

References:

1. Lascu, I. et al: J. Bioenerg. Biomembr. 32:213-14, 2000
2. Conery, A.R. et al: Proc. Natl. Acad. Sci. USA 107:15461-6, 2010
3. Postel, E.H. et al: Mol. Cell. Biochem. 329:45-50, 2009
4. Xie, K.M. et al: Reproduct. 139:799-808, 2010

TECHNICAL INFORMATION

Source:

NME1 Antibody is a mouse monoclonal antibody raised against recombinant human *NME1* fragments expressed in *E. coli*.

Specificity and Sensitivity:

This antibody detects endogenous *NME1* proteins without cross-reactivity with other family members.

Storage Buffer: PBS and 30% glycerol

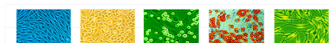
Storage:

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

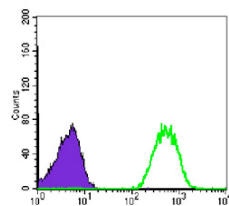
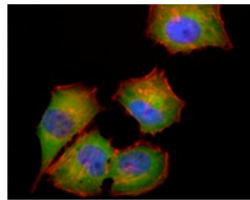
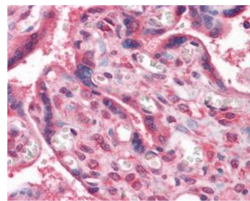
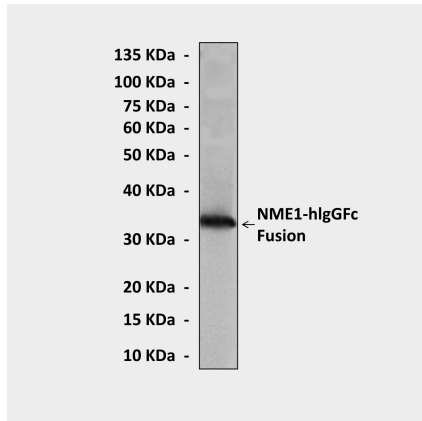
APPLICATIONS

Application:	*Dilution:
WB	1:1000
IP	n/d
IHC	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 NME1 proteins in 293 cell lysate containing recombinant NME1-hlgGfC fusion proteins using NME1 Antibody. **Middle, upper:** This antibody stains paraffin-embedded human placenta tissue in immunohistochemical analysis. **Middle, lower:** It also stains HeLa cells in confocal immunofluorescent analysis (NME1 Antibody: Green; Actin filaments: Red; DRAQ5 DNA Dye: Blue). **Bottom:** This antibody specifically reacts with NME1 proteins in Jurkat cells by FACS testing (NME1 antibody: Green; control; Purple).

