



## Product Information

### Monoclonal Anti-Mismatch Repair Protein 2

Clone 2MSH01

Tissue Culture Supernatant

Product Number **M 6315**

#### Product Description

Monoclonal Anti-Mismatch Repair Protein 2 (mouse IgG1 isotype) is derived from the hybridoma produced by the fusion of mouse myeloma p3-NS1.Ag4-1 cells with splenocytes from BALB/c mice immunized with recombinant human mismatch repair protein 2 (MSH2) protein.

Monoclonal Anti-Mismatch Repair Protein 2 recognizes human mismatch repair protein 2 (102 kDa). The antibody may be used in immunohistochemistry with formalin-fixed, paraffin-embedded tissue sections.

Mismatched base pairs within DNA may arise in a number of ways. They may result from DNA damage, damage to the nucleotide precursors or by mistakes made during DNA replication or genetic recombination. Some of the components of these repair systems have been structurally and functionally conserved throughout evolution. The majority of research on DNA repair has been done in *E. coli*, where the MutHLS pathway is responsible for the mismatch repair that occurs by excision/resynthesis system. Another well-studied organism is *S. cerevisiae*, whose repair pathway has a MutS homolog, MSH2. In both bacteria and yeast, it has been shown that mismatch repair plays a role in maintaining the genetic stability of DNA. Research indicates that in *S. cerevisiae*, MSH2-MSH6-dependent mismatch repair is the major mechanism by which misincorporation of adenine opposite 8-oxo-G is corrected.<sup>1,2</sup>

In humans, four genes have been identified that encode proteins homologous to bacterial repair system: hMSH2, hMLH1, hPMS1 and hPMS2. These gene mutations are responsible for the majority of the hereditary nonpolyposis colon cancer and for sporadic cancers exhibiting length polymorphism in simple repeat. A model for bidirectional mismatch repair was proposed in which stochastic loading of multiple ATP-bound MSH2-MSH6 sliding clamps onto mismatch-containing DNA leads to activation of the repair machinery and/or other signaling effectors similar to G protein switches. The mutations in hMSH2 and hMLH1

cause a mismatch repair deficiency resulting in a mutator phenotype where the replication errors are not repaired. A high level of microsatellite instability was detected in colorectal cancers from individuals with MSH2 and MLH1 mutations.<sup>3-5</sup>

#### Reagent

Monoclonal Anti-Mismatch Repair Protein 2 is supplied as tissue culture supernatant with 15 mM sodium azide.

#### Precautions and Disclaimer

Due to the sodium azide content, a material safety data sheet (MSDS) for this product has been sent to the attention of the safety officer of your institution. Consult the MSDS for information regarding hazards and safe handling practices.

#### Storage/Stability

Store at  $-20^{\circ}\text{C}$ . Upon initial thawing freeze the solution in working aliquots for extended storage. Avoid repeated freezing and thawing to prevent denaturing the antibody. Do not store in a frost-free freezer. The antibody is stable for at least 12 months when stored appropriately. Working dilutions should be discarded if not used within 12 hours.

#### Product Profile

A recommended working concentration of 4  $\mu\text{g/ml}$  (approximately 1:25 dilution) was determined by immunohistochemistry on formalin-fixed, paraffin-embedded human tonsil tissue sections.

Note: In order to obtain the best results using various techniques and preparations, we recommend determining the optimal working concentration by titration.

#### References

1. Fishel, R. and Kolodner, R.D., Identification of mismatch repair genes and their role in the development of cancer. *Curr. Opin. Genet. Develop.* **5**, 382-395 (1995).

2. Ni, T.T., et al., MSH2 and MSH6 are required for removal of adenine misincorporated opposite 8-oxo-guanine in *S. cerevisiae*. *Molec. Cell*, **4**, 439-444 (1999).
3. Gradia, A., et al., hMSH2-hMSH6 forms a hydrolysis-independent sliding clamp on mismatched DNA. *Mol. Cell*, **3**, 255-261 (1999).
4. Millar, A. L., Mismatch repair gene defects contribute to the genetic basis of double primary cancers of the colorectum and endometrium. *Hum. Molec. Genet.*, **8**, 823-829 (1999).
5. Maliaka, Y. K., et al., CpG dinucleotides in the hMSH2 and hMLH1 genes are hotspots for HNPCC mutations. *Hum. Genet.*, **97**, 251-255 (1996).

CAA/AH 12/03

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