Product Data Sheet

Mouse Anti-Methylglyoxal Monoclonal Antibody

CATALOG NUMBER: STA-011 **STORAGE:** -20ºC

QUANTITY AND CONCENTRATION: 100 µg of affinity purified antibody at 1.25 mg/mL in PBS containing 0.2% 5-bromo-5-nitro-1,3-dioxane

SHELF LIFE: 1 year from date of receipt under proper storage conditions; aliquot to avoid multiple freeze thaw cycles

HOST SPECIES: Mouse

CLONE: 3D11

IMMUNOGEN: MG-modified ovalbumin

SPECIFICITY: MG-modified proteins, lipids and nucleic acids (MG-H1(methyl-glyoxal-hydro-imidazolone) based on HPLC and GC-MS). 3D11 does not react with CML, CEL, or other AGE epitopes.

APPLICATION: Immunoblot (1:1000 to 1:4000)
Immunohistochemistry (1:20 to 1:60)

Background

The non-enzymatic reaction of reducing carbohydrates with lysine side chains and N-terminal amino groups of macromolecules (proteins, phospholipids and nucleic acids) is called the Maillard reaction or glycation. The products of this process, termed advanced glycation end products (AGEs), adversely affect the functional properties of proteins, lipids and DNA. Tissue levels of AGE increase with age and the formation of AGEs is predominantly endogenous, though these products can also be derived from exogenous sources such as food and tobacco smoke. AGE modification of proteins can contribute to the pathophysiology of aging and long-term complications of diabetes, atherosclerosis and renal failure. AGEs also interact with a variety of cell-surface AGE-binding receptors (RAGE), leading either to their endocytosis and degradation or to cellular activation and pro-oxidant or pro-inflammatory events.

Several AGE structures have been reported, such as N^{ε}-(carboxymethyl) lysine (CML), N^{ε}-(carboxyethyl) lysine (CEL), pentosidine, and Methylglyoxal (MG) derivatives. MG is formed through non-oxidative mechanisms from triose phosphates during anaerobic glycolysis and it can modify amino acids, nucleic acids, and proteins. MG reacts with arginine, lysine and cysteine residues of proteins to form AGEs. MG is involved in various pathological processes. For example, MG derivatives are found elevated in diabetes.

Recent Product Citations

1. Borysiuk, K. et al. (2022). Glyoxalase I activity affects Arabidopsis sensitivity to ammonium nutrition. *Plant Cell Rep*. doi: 10.1007/s00299-022-02931-5.
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11. Korça, E. et al. (2020). Circulating antibodies against age-modified proteins in patients with coronary atherosclerosis. *Sci Rep*. **10**:17105. doi: 10.1038/s41598-020-73877-5.
12. de Almeida, G.R.L. et al. (2020). Methylglyoxal-Mediated Dopamine Depletion, Working Memory Deficit, and Depression-Like Behavior Are Prevented by a Dopamine/Noradrenaline Reuptake Inhibitor. *Mol Neurobiol*. doi: 10.1007/s12035-020-02146-3.
13. Kim, D. et al. (2020). Methylglyoxal-Induced Dysfunction in Brain Endothelial Cells via the Suppression of Akt/HIF-1α Pathway and Activation of Mitophagy Associated with Increased Reactive Oxygen Species. *Antioxidants (Basel)*. **9**(9):E820. doi: 10.3390/antiox9090820.
14. Scumaci, D. et al. (2020). DJ-1 Proteoforms in Breast Cancer Cells: The Escape of Metabolic Epigenetic Misregulation. *Cells*. **9**(9):E1968. doi: 10.3390/cells9091968.
15. Kepchia, D. et al. (2020). Diverse proteins aggregate in mild cognitive impairment and Alzheimer's disease brain. *Alzheimers Res Ther*. **12**(1):75. doi: 10.1186/s13195-020-00641-2.
16. Rodrigues, D.C. et al. (2020). Methylglyoxal couples metabolic and translational control of Notch signalling in mammalian neural stem cells. *Nat Commun*. **11**(1):2018. doi: 10.1038/s41467-020-15941-2.
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