

ENDOTELIO 1-MNA

The Molecule of the Future

1-MNA, or 1-methylnicotinamide, is a compound naturally produced in our bodies, primarily in the liver, and is a byproduct of nicotinic acid and nicotinamide metabolism. While it is found in vitamin B3-rich foods, dietary sources contribute minimally to the total amount of 1-MNA in the human body.

1-MNA works at the cellular level to help balance key molecular pathways involved in NAD regulation and energy, endothelial function, oxidative stress, and longevity.

As a European-manufactured product, 1-MNA underwent rigorous testing and approval by the European Food Safety Authority (EFSA). With extensive research done on the novel molecule, we are excited to share the science and enhance lives with the molecule of the future, 1-MNA.



1-MNA Benefits

Safely Supports NAD Levels While Regulating NNMT Enzymes

1-MNA safely supports NAD levels within the cell while avoiding the consequences of NNMT. NNMT is an enzyme linked to disease states such as cancer, obesity, cardiovascular disease, and dementia, among many more. 1-MNA regulates this relationship between NAD and NNMT. [1,2]

Improves Energy Within The Cell

1-MNA is crucial for energy at the cellular level. Studies have shown that it enhances the use of energy stores within the cell. [3,4]

Reduces Inflammatory Proteins

By regulating the NNMT enzyme, 1-MNA lowers inflammatory proteins such as NF- κ B and inflammatory cytokines like IL-1 β and TNF- α that are associated with age-related diseases. [5,6]

Encourages Healthy Blood Vessels

1-MNA supports cardiovascular endothelial function by inhibiting NF- κ B and upregulating NRF2, which is involved in the modulation of oxidative stress. [5,6]

Supports Longevity and Sirtuin Upregulation

1-MNA enhances the stability of sirtuins (SIRT1), which in specific biological models has been associated with extended lifespan. [7,8,9]

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References:

1. Li XY, Pi YN, Chen Y, Zhu Q, Xia BR. Nicotinamide N-Methyltransferase: A Promising Biomarker and Target for Human Cancer Therapy. *Front Oncol.* 2022 Jun 9;12:894744.
2. Shibata, Katsumi. (2018). Organ Co-Relationship in Tryptophan Metabolism and Factors That Govern the Biosynthesis of Nicotinamide from Tryptophan. *Journal of Nutritional Science and Vitaminology.* 64. 90-98.
3. Chudzik M, Kapusta J, Burzynska M. Use of 1-MNA to improve exercise tolerance and fatigue in patients after COVID-19. *medRxiv* 2021.07.14.21259081, 2021.
4. Ström K, Morales-Alamo D, Ottosson F, Edlund A, Hjort L, Jörgensen SW, Almgren P, Zhou Y, Martin-Rincon M, Ekman C, Pérez-López A, Ekström O, Perez-Suarez I, Mattiasson M, de Pablos-Velasco P, Oskolkov N, Ahlqvist E, Wierup N, Eliasson L, Vaag A, Groop L, Stenkula KG, Fernandez C, Calbet JAL, Holmberg HC, Hansson O. N1-methylnicotinamide is a signaling molecule produced in skeletal muscle coordinating energy metabolism. *Sci Rep.* 2018, 8: 3016.
5. Nejabati HR, Ghaffari-Novin M, Fathi-Maroufi N, Faridvand Y, Holmberg HC, Hansson O, Nikanfar S, Nouri M. N1-Methylnicotinamide: Is it Time to Consider it as a Dietary Supplement for Athletes? *Curr Pharm Des.* 2022;28(10):800-805.
6. Song Ziguang, Zhong Xiao, Li Mingyang, Gao Pingping, Ning Zhongping, Sun Zhiqi, Song Xiang. 1-MNA Ameliorates High Fat Diet-Induced Heart Injury by Upregulating Nrf2 Expression and Inhibiting NF-κB in vivo and in vitro. *Frontiers in Cardiovascular Medicine*, 8, 2021
7. Hong S, Moreno-Navarrete JM, Wei X, Kikukawa Y, Tzameli I, Prasad D, Lee Y, Asara JM, Fernandez-Real JM, Maratos-Flier E, Pissios P. Nicotinamide N-methyltransferase regulates hepatic nutrient metabolism through Sirt1 protein stabilization. *Nat Med.* 2015, 21: 887-94.
8. Schmeisser K, Parker JA. Nicotinamide-N-methyltransferase controls behavior, neurodegeneration and lifespan by regulating neuronal autophagy. *PLoS Genet.* 2018 Sep 7;14(9):e1007561.
9. Zhang J, Chen Y, Liu C, Li L, Li P. N1-Methylnicotinamide Improves Hepatic Insulin Sensitivity via Activation of SIRT1 and Inhibition of FOXO1 Acetylation. *J Diabetes Res.* 2020 Mar 23;2020:1080152.