

Product Information

Nitric Oxide Synthase, Inducible from mouse

recombinant, expressed in *E. coli*

Catalog Number **N2783**

Storage Temperature -70°C

Synonyms: NOS II, iNOS, mNOS, macrophage NOS, Type II NOS

Product Description

Nitric oxide synthase (NOS) is an enzyme involved in the synthesis of nitric oxide (NO), a free radical generated under physiological conditions by virtually all mammalian cells.¹⁻³ NO is formed from arginine by NOS which oxidizes a guanidino nitrogen of arginine, releasing NO and citrulline. NO is a messenger molecule mediating diverse functions including vasodilatation, neurotransmission, and antimicrobial and antitumor activities. In addition, NO has been implicated as a pathogenic mediator in a variety of conditions, such as central nervous system (CNS) disease states. These include the animal model of multiple sclerosis (MS) and experimental allergic encephalomyelitis.⁴

The proteins predicted from the cDNA sequences of NOS isoforms in all species investigated contain consensus sequences for the binding of NADPH, flavins, and calmodulin. The C-terminal half of NOS possesses a high level of homology with NADPH-cytochrome P-450 reductase, where the predicted sites for binding NADPH and flavins are also located. However, the predicted heme and calmodulin binding sites of NOS are located within its N-terminal half. NOS has been localized in many different cell types.

On the basis of molecular mass, subcellular location, and Ca^{2+} dependence, at least three types of NOS have been classified. Type I NOS is found in neurons. It is a 150–160 kDa protein, also called NOS-1, neuronal NOS (nNOS), brain NOS (bNOS), cerebral NOS, constitutive NOS or Ca^{2+} -regulated NOS (cNOS).

Type II NOS is a soluble enzyme found in a variety of cells, including macrophages, hepatocytes, vascular smooth muscle cells, and chondrocytes.⁷ The enzyme is homodimer and each subunit has a molecular mass of ~130 kDa. It is also known as macrophage NOS (mNOS) or inducible NOS (iNOS).

Type III NOS is found in endothelial cells. It is a 135 kDa protein, also called endothelial NOS (eNOS, or ecNOS).

Neuronal and endothelial NOS are constitutively expressed and are dependent on Ca^{2+} /calmodulin for NO production; whereas, Type II NOS is Ca^{2+} -independent and is expressed in activated macrophages and some glial cells after stimulation.

Evidence indicates the various types of NOS may serve a variety of diverse biological pathways.^{1,5,6} For instance, iNOS is not found only in macrophages but also in several other cell types including hepatocytes, chondrocytes, endothelial cells, and fibroblasts. eNOS is not restricted to the endothelium of blood vessels but exists in the epithelium of several tissues, including the bronchial tree. It has also been localized to neurons in the brain, especially the pyramidal cells of the hippocampus, where it may function in long-term potentiation. bNOS is present also in skeletal muscle, where it is complexed with dystrophin, and is absent in Duchenne's muscular dystrophy, which perhaps accounts for the symptoms of the disease.⁶ In addition, NOS seems to be a highly conserved enzyme, between the various types (e.g., a 52% amino acid identity of human bNOS and eNOS) and between species (e.g., 93% amino acid identity exists between the rat and human bNOS).

The product is supplied as a solution in 50 mM HEPES, pH 7.4, with 10% glycerol and 8 μM tetrahydrobiopterin.

iNOS is not calcium/calmodulin dependent and has a K_m for arginine of ~16 μM .⁸

Recombinant mouse iNOS is a homodimer, each subunit has a molecular mass of ~130 kDa.

The activity of recombinant mouse iNOS is determined by an oxyhemoglobin assay that measures the reaction of nitric oxide with oxyhemoglobin to yield methemoglobin.⁹

Specific activity: ≥ 4 units/mg-protein

Unit definition: One unit will produce 1.0 μmol of nitric oxide per minute at 37 °C in 50 mM HEPES, pH 7.4, containing 1 mM arginine, 1 mM magnesium acetate, 0.15 mM NADPH, 4.5 μM oxyhemoglobin, 18 μM tetrahydrobiopterin and 180 μM DTT.

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

Storage

The product should be stored at -70 °C. It will remain active for at least 6 months at that temperature. The enzyme loses $\sim 10\%$ of its activity after a single freeze-thaw cycle. Therefore, after the initial defrost, it is recommended the product be stored in single-use aliquots at -70 °C. During use, keep the solution on ice at all times since the enzyme loses activity at higher temperatures.

References

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