Nitric oxide synthase (E.C. 1.14.13.39)

Overview: The nomenclature suggested by NC-IUPHAR of NOS I, II and III has not gained wide acceptance. Nitric oxide synthases [NOS, L-arginine, $NADPH_2$: oxygen oxidoreductase (nitric-oxide-forming)] utilize L-arginine (not D-arginine) and molecular oxygen to generate nitric oxide and L-citrulline. eNOS and nNOS isoforms are activated at concentrations of calcium greater than 100 nM, while iNOS shows higher affinity for Ca^{2+}/calmodulin and thus appears to be constitutively active. All the three isoforms are homodimers and require tetrahydrobiopterin, flavin adenine dinucleotide, flavin mononucleotide and NADPH for catalytic activity. L-NAME is an inhibitor of all three isoforms, with an IC_{50} value in the micromolar range.

Nomenclature	Endothelial NOS	Inducible NOS	Neuronal NOS
Preferred abbreviation	eNOS	iNOS	nNOS
Other names	NOS III, NOS-3, ecNOS	NOS II, NOS-2	NOS I, NOS-1, brain NOS
Ensembl ID	ENSG00000164867	ENSG00000007171	ENSG00000089250
Selective inhibitors	–	1400W (8.2, Garvey *et al.*, 1997), 2-amino-4-methylpyridine (7.4, Faraci *et al.*, 1996), PIBTU (7.3, Garvey *et al.*, 1994), NIL (5.5, Moore *et al.*, 1994), aminoguanidine (Corbett and McDaniel, 1992)	3-Bromo-7NI (6.1–6.5, Bland-Ward and Moore, 1995), 7NI (5.3, Babbedge *et al.*, 1993)

The reductase domain of NOS catalyses the reduction of cytochrome c and other redox-active dyes (Mayer & Hemmens, 1997). NADPH : O_2 oxidoreductase catalyses the formation of superoxide anion/H_2O_2 in the absence of arginine and tetrahydrobiopterin.

Abbreviations: 1400W, *N*-(3-(aminomethyl) benzyl)acetamidine; **NADPH**, reduced nicotinamide adenosine dinucleotide phosphate; **7NI**, 7-nitroindazole; **NIL**, L-N^6-(1-iminoethyl)lysine; **PIBTU**, 13-phenylen-bis(1,2-ethanediyl)bis-thiourea

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