

## 4-Hydroxynonenal

## Chemical Properties

CAS No. : 75899-68-2

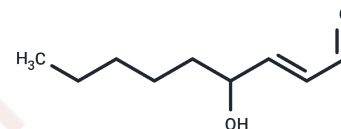
Formula: C<sub>9</sub>H<sub>16</sub>O<sub>2</sub>

Molecular Weight: 156.22

Store at low temperature

Storage: Pure form: -20°C for 3 years | In solvent: -80°C for 1 year

Actual storage temperature shall be subject to the COA.



## Biological Description

Description	4-Hydroxynonenal (4-HNE) (4-HNE) is an oxidative/nitrosative stress biomarker. It is a substrate and an inhibitor of acetaldehyde dehydrogenase 2 (ALDH2).
Targets(IC50)	Endogenous Metabolite,Dehydrogenase
In vitro	4-Hydroxynonenal (4-HNE) is both a substrate and an inhibitor of ALDH2, with inhibition reversible at low concentrations and becoming irreversible at 10 μM. It induces antioxidant defense mechanisms to limit its own production and enhance cellular protection against oxidative stress. As a product of lipid peroxidation, 4-HNE is mutagenic and genotoxic in viruses, bacteria, and mammalian cells, reacting with all four DNA bases with varying efficiency (G > C > A > T). 4-Hydroxynonenal-dG serves as the best biomarker of its genotoxic effects, primarily found in nuclear DNA [1].
In vivo	Twenty-four hours after fluid percussion injury (FPI), mouse brain tissue is analyzed for the expression levels of NADPH oxidase 1 (NOX1), inducible nitric oxide synthase (iNOS), and 4-Hydroxynonenal (4-HNE). Both wild-type (Nrf2+/+) and Nrf2-deficient (Nrf2-/-) mice show increased 4-HNE expression following a moderate 15 psi injury compared to uninjured controls. In Nrf2-/-knockout mice, 4-HNE expression is significantly higher than in corresponding injured and uninjured Nrf2-/-wild-type animals [2].

## Solubility Information

Solubility	DMSO: 249 mg/mL (1593.91 mM),Sonication is recommended. (< 1 mg/ml refers to the product slightly soluble or insoluble)
In vivo Formulation	10% DMSO+40% PEG300+5% Tween 80+45% Saline: 5 mg/mL (32.01 mM),Sonication is recommended. <i>Please add the solvents sequentially, clarifying the solution as much as possible before adding the next one. Dissolve by heating and/or sonication if necessary. Working solution is recommended to be prepared and used immediately. The formulation provided above is for reference purposes only. In vivo formulations may vary and should be modified based on specific experimental conditions.</i>

### Preparing Stock Solutions

	1mg	5mg	10mg
1 mM	6.4012 mL	32.0061 mL	64.0123 mL
5 mM	1.2802 mL	6.4012 mL	12.8025 mL
10 mM	0.6401 mL	3.2006 mL	6.4012 mL
50 mM	0.128 mL	0.6401 mL	1.2802 mL

Please select the appropriate solvent to prepare the stock solution, according to the solubility of the product in different solvents. Please use it as soon as possible.

Note: The dilution table applies only to solid products. For liquid products, please calculate the stock solution based on the stated concentration and/or density.

### Reference

Zhong H, et al. Role of lipid peroxidation derived 4-hydroxynonenal (4-HNE) in cancer: focusing on mitochondria. *Redox Biol.* 2015;4:193-9.

Ouyang A, Chen T, Feng Y, et al. The Hemagglutinin of Influenza A Virus Induces Ferroptosis to Facilitate Viral Replication. *Advanced Science.* 2024: 2404365.

Shan G, Bian Y, Yao G, et al. Targeting ALDH2 to Augment Platinum-Based Chemosensitivity through Ferroptosis in Lung Adenocarcinoma. *Free Radical Biology and Medicine.* 2024

Csala M, et al. On the role of 4-hydroxynonenal in health and disease. *Biochim Biophys Acta.* 2015 May;1852(5): 826-38.

Bhowmick S, et al. Traumatic brain injury-induced downregulation of Nrf2 activates inflammatory response and apoptotic cell death. *J Mol Med (Berl).* 2019 Nov 22.

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