Product Datasheet

NBD-Pen

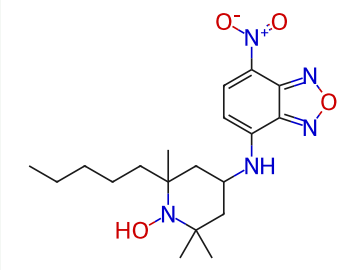
Catalog No. **BP-00635** · CAS **1955505-54-0** · Form **free base** · Physical state **solid** · Color **Orange to red** · Version **1.0** · Revision **2026-11-13**

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Target	Research area
Fluorescent Dye	**Inflammation/Immunology; Cancer**

Molecular formula	$C_{19}H_{29}N_5O_4$
Molecular weight	**391.4647**

STRUCTURE



DESCRIPTION

NBD-Pen is a fluorescence probe. NBD-Pen can be used for the research of detection of lipid-derived radicals .

BIOLOGICAL ACTIVITY

In Vitro
Guide (The following is our recommend protocol. This protocol is only a guide and should be modified according to your specific needs).

1. Preparation of stock solution

Use anhydrous DMSO to prepare a 10 mM NBD-Pen stock solution.

2. Preparation of working solution

Use preheated serum-free cell culture medium or PBS to dilute the stock solution to prepare a 10 μM NBD-Pen working solution.

Note: Please adjust the concentration of NBD-Pen working solution according to actual conditions and prepare it before use.

3. Spectroscopic methods

3.1 Use 100 mM phosphate buffer and 0.5% ethanol to prepare a lipid (500 μM) emulsion.

3.2 Mix this emulsion with 5 μM NBD-Pen in phosphate buffer containing 0.5% acetonitrile.

3.3 Add the LOX into the mixture at indicated concentration in phosphate buffer and incubate.

3.4 Perform fluorescence emission and ESR measurements.

3.5 Measure fluorescence spectra of the probes at excitation and emission wavelengths of 470 and 530 nm.

3.6 Monitor ESR spectrometer using a X-band (9.45 GHz) ESR spectrometer.

4. Preparation and staining of cells

4.1 Discard cell culture medium and rinse cells three times with PBS and phenol red free culture media with 10% FBS.

4.2 Add 1 μM of NBD-Pen and incubate for 10 min.

4.3 Add 30 mM of Diethylnitrosamine (DEN).

4.4 Perform fluorescence imaging immediately at 37°C under a humidified atmosphere of 5% CO2 in air.

4.5 Administer Hoechst33342 (1 μM) and SKF525A (50 μM) and incubate for 1 h, then wash with PBS.

4.6 Conduct fluorescence imaging with a confocal laser-scanning microscope with 63x or 40x objective lens.

4.7 Use the following detection lasers: Hoechst33342, λex = 405 nm, λem = 410-505 nm; NBD-Pen, λex = 458 nm, λem = 490-674 nm.

NBD-Pen (1 μM, 20 min) shows low background fluorescence in Hepal-6 cells[1].

NBD-Pen (1 μM, 10 min, followed by 30 mM DEN for another 20 min) enables visualization of intracellular lipid radicals produced by DEN activation in Hepa1-6 cells[1].

NBD-Pen (10 μM, 0-60 min) induces increased fluorescent intensity in a concentration-dependent manner in LDL with the addition of hemin (HY-19424) (0-3μM)[2].
In Vivo
NBD-Pen (2 mM, i.v., 1-24 h after DEN administration) increases fluorescence intensity 1 h after DEN administration in plasma and liver of rat models[1].

NBD-Pen (2 mM, i.v., 1-24 h after a 1 g/kg iron dectran administration) significantly increases the fluorescence intensity in LDL at 1 h after iron administration to mice with the peak at 2 h in iron overloaded model mice[2].

SOLUBILITY

Soluble in DMSO

REFERENCES

[1]. Yamada, K., et al., (2016). Fluorescence probes to detect lipid-derived radicals. Nature chemical biology, 12(8), 608–613.

[2]. Ishida Y, et al. Detection and inhibition of lipid-derived radicals in low-density lipoprotein. Free Radic Biol Med. 2017 Dec;113:487-493.

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