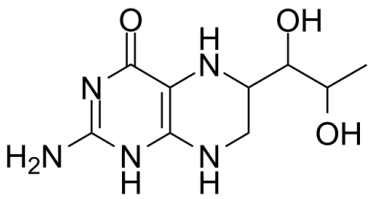
Data Sheet

Product Name:	Tetrahydrobiopterin
Cat. No.:	CS-7811
CAS No.:	17528-72-2
Molecular Formula:	C9H15N5O3
Molecular Weight:	241.25
Target:	Endogenous Metabolite; NO Synthase
Pathway:	Immunology/Inflammation; Metabolic Enzyme/Protease
Solubility:	DMSO : 50 mg/mL (207.25 mM; Need ultrasonic)



BIOLOGICAL ACTIVITY:

Tetrahydrobiopterin is a **cofactor** of the **aromatic amino acid hydroxylases enzymes** and also acts as an essential **cofactor** for all **nitric oxide synthase** (NOS) isoforms. **In Vitro:** MicMicroglial cell cultures under hyperoxia are supplemented or not with an effective dose of Tetrahydrobiopterin (BH4) (100 μM). Exposure of microglial cells to hyperoxia-induced oxidative stress for 24 h reveals a robust increase in TSP-1 mRNA expression and protein compare to normoxia (21% O_2). Tetrahydrobiopterin supplementation significantly prevents hyperoxia-induced microglial activation by diminishing Iba-1 and TSP-1 expression and prevents microvascular injury in choroidal explants[1]. **In Vivo:** To assess the levels of Tetrahydrobiopterin in the retina, three to five pools of retinas are collected from WT and hph-1mice at postnatal age 7, 14, and 22 and evaluated by LC-MS/MS. LC-MS/MS analysis confirm a significant decrease by approximately 90% in the concentration levels of Tetrahydrobiopterin in retinal tissue from hph-1 mice (0.0009±0.0006; $p<0.0001$, 0.01±0.001; $p<0.0001$ and 2.45±0.40; $p<0.005$) compare to the WT group (0.014±0.001, 0.092±0.01, and 23.13±6.44) at P7, P14, and P22, respectively[1].

PROTOCOL (Extracted from published papers and Only for reference)

Kinase Assay: [1]Microglia cell line (SIM-A9) is used and cultured. Briefly, microglial cells (800, 000 cells per well) are cultured in 6-well plates with DMEM/F12 (1:1) supplementing with 10% fetal bovine serum (FBS), 5% of horse serum (HS), and 1% penicillin/streptomycin. After 24 h, the cells are starved with DMEM/F12 (1:1) free of FBS and HS for 6 h. Then, microglial cells cultures in presence or absence of 100 μM of Tetrahydrobiopterin are exposed to hyperoxia (75% oxygen and 25% nitrogen) in a modular incubator chamber and maintained in a humidified CO_2 incubator at 37 °C for 24 h. Microglial cells in matching controls are incubated at 37 °C in an incubator with 95% air and 5% CO_2 and collected at the same time point. Cell lysates are quickly processed for RNA. The conditioning media is stored at -80 and later used in choroidal explant assay[1]. **Animal Administration:** [1]Mice pups are exposed with their mothers in a 75% oxygen environment from postnatal day 7 to P9 using oxycycler to induce retinal vaso-obliteration (VO). Animals are anesthetized and injected intravitreally at P7 with 100 μM of Tetrahydrobiopterin or vehicle (sterile PBS 1×) using a syringe equipped with 50-gauge glass capillary. At P9, mice pups are sacrificed and retinas are dissected and stained overnight at 4 °C with fluorescein-labeled Griffonia Simplicifolia Lectin 1 (GSL 1), isolectin B4 (1:100) with 1 mM $CaCl_2$ in PBS. Quantification of VO is assessed using the computer software[1].

References:

[1]. Rivera JC, et al. Tetrahydrobiopterin (BH4) deficiency is associated with augmented inflammation and microvascular degeneration in the retina. J Neuroinflammation. 2017 Sep 6;14(1):181.

CAIndexNames:

4(3H)-Pteridinone, 2-amino-6-(1,2-dihydroxypropyl)-5,6,7,8-tetrahydro-

SMILES:

O=C1C2=C(NC(N)=N1)NCC(C(O)C(O)C)N2

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