

Product Data Sheet

Product Name: D-Luciferin

Cat. No.: GC11860

Chemical Properties

Cas. No. 2591-17-5

Chemical Name (S)-2-(6-hydroxybenzo[d]thiazol-2-yl)-4,5-dihydrothiazole-4-carboxylic acid

SMILES OC1=CC(S2)=C(N=C2C3=N[C@](C(O)=O)([H])CS3)C=C1

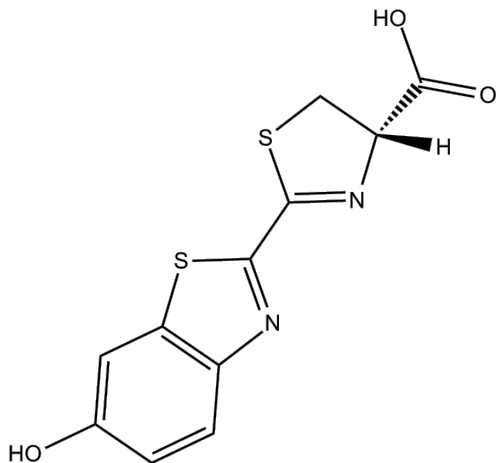
Formula $C_{11}H_8N_2O_3S_2$ M.Wt 280.32

Solubility $\geq 28\text{mg/mL}$ in DMSO Storage Store at -20°C , protect from light

General tips For obtaining a higher solubility, please warm the tube at 37°C and shake it in the ultrasonic bath for a while. Stock solution can be stored below -20°C for several months.

Shipping Condition Evaluation sample solution: ship with blue ice All other available size: ship with RT, or blue ice upon request.

Structure



Protocol

I. Matters needing attention

If used to detect ATP, please wear gloves and use ATP-free autoclaved water, reagents and containers to minimize all possible sources of ATP contamination.

II. Experimental method:

Caution: Product has not been fully validated for medical applications. For research use only.

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The following scheme is an example sodium salt preparation of potassium and potassium. It is suitable for most cell types and in vivo animal use.

This protocol provides a guide only and should be modified according to your specific needs.

1. In vitro (intracellular) fluorescence imaging

- (1) Seed cells stably expressing luciferase in a 12-well plate (2×10^3 /well).
- (2) Use sterile water to prepare 100 mM fluorescein stock solution, and after fully dissolved, use a 0.22 μ m filter membrane to filter and sterilize (protect from light).
- (3) Use pre-warmed medium to dilute the stock solution to a working solution with a concentration of 0.5-1 mM
- (4) Aspirate the medium from the cultured cells, add fluorescein working solution to the cells, and incubate the cells at 37°C for 5-10 minutes before imaging[1].
- (5) Use a series of filters (520- 800nm) for image acquisition

2. In vivo fluorescence imaging

- (1) Use sterile D-PBS (without Ca^{2+} and Mg^{2+}) to prepare D-luciferin potassium salt stock solution (15mg/ml), and after fully dissolved, use a 0.22 μ m filter membrane to filter and sterilize (protect from light).
- (2) Inject animals intraperitoneally 10-15 minutes before imaging, at a dosage of 75-150mg/Kg [2] [3].
- (3) Fluorescent imaging of experimental animals using bioluminescent imaging

Note: Fluorescein kinetic studies should be performed for each animal model to determine peak signal time.

References:

- [1]. Giuseppe Meroni, et al. D-Luciferin, derivatives and analogues: synthesis and in vitro/in vivo

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luciferase-catalyzed bioluminescent activity. ARKIVOC 2009 (i) 265-288.

[2]. Wentian Zhang, et. Dual inhibition of HDAC and tyrosine kinase signaling pathways with CUDC-907 attenuates TGF β 1 induced lung and tumor fibrosis. 2020 Sep 17;11(9):765. doi: 10.1038/s41419-020-02916-w.

[3]. Senlin Li, et. Concurrent silencing of TBCE and drug delivery to overcome platinum-based resistance in liver cancer. 2023 Mar;13(3):967-981. doi: 10.1016/j.apsb.2022.03.003. Epub 2022 Mar 12.

Background

D-luciferin is the natural substrate of firefly luciferase. In the presence of magnesium ions, luciferase catalyzes the reaction of luciferin with ATP, which is then oxidized to form a dioxetane structure that emits yellow-green light [1]. When the substrate luciferin is in excess, the 560 nm chemiluminescence generated by the Luciferin-luciferase luminescent reaction reaches its peak within a few seconds, and the light output is proportional to the luciferase concentration. Chemiluminescent techniques are virtually background-free, making the luciferase reporter an ideal tool for detecting low-level gene expression. 0.02 pg of luciferase can be reliably measured in a standard fluorescence counter. D-luciferin is a commonly used reporter gene for ATP detection, cell viability assay, reporter gene detection, active molecular screening and bacterial counting. D-luciferin is widely used in live animal imaging. Cells expressing the luciferase gene were transplanted into research animals and injected with D-luciferin to be able to detect changes in brightness by bioluminescence imaging (BLI)[2].

D-Luciferin has three product forms, D-Luciferin (D-Luciferin, free acid), D-Luciferin potassium salt (D-Luciferin, potassium salt) and D-Luciferin sodium salt (D-Luciferin, sodium salt). The potassium and sodium salt forms of D-fluorescein are the most versatile because they are both readily soluble in water. Potassium salt is also the main form used in live animal testing.

References:

[1]. Giuseppe Meroni, et al. D-Luciferin, derivatives and analogues: synthesis and in vitro/in vivo luciferase-catalyzed bioluminescent activity. ARKIVOC 2009 (i) 265-288.

[2]. Sangyub Kim, et al. Optimizing live-animal bioluminescence imaging prediction of tumor burden in human prostate cancer xenograft models in SCID-NSG mice. 2019 Jun;79(9):949-960. doi: 10.1002/pros.23802. Epub 2019 Apr 8.

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