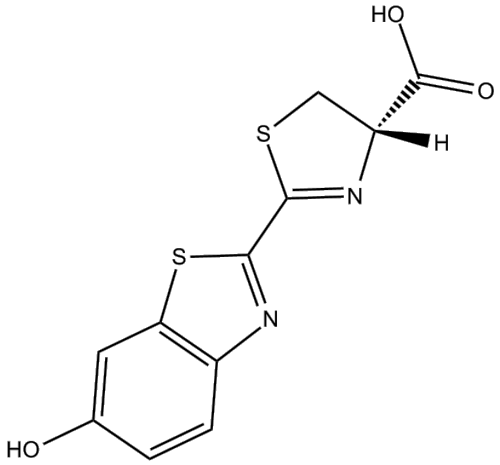
Product Data Sheet

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	≥ 28mg/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:

Product Data Sheet

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 μm 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 Ca2+ and Mg2+) to prepare D-luciferin potassium salt stock solution (15mg/ml), and after fully dissolved, use a 0.22μm 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

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 TGFβ1 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.