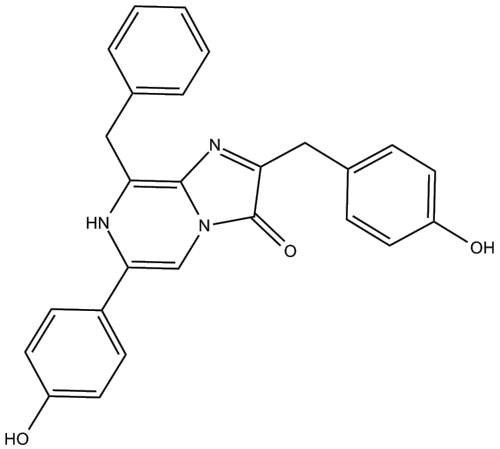
Product Data Sheet

Product Name: Coelenterazine
Cat. No.: GC17680

Chemical Properties

Cas. No.	55779-48-1		
Chemical Name	8-benzyl-2-(4-hydroxybenzyl)-6-(4-hydroxyphenyl)imidazo[1,2-a]pyrazin-3(7H)-one		
SMILES	OC1=CC=C(CC(C2=O)=NC3=C(NC(C4=CC=C(O)C=C4)=CN32)CC5=CC=CC=C5)C=C1		
Formula	$C_{26}H_{21}N_3O_3$	M.Wt	423.46
Solubility	Ethanol : 2 mg/mL (4.72 mM; Need ultrasonic; DMSO can inactivate Coelenterazine's activity)	Storage	-20°C, protect from light, stored under nitrogen,unstable in solution, ready to use.
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

Protocol for Coelenterazine use[1-3]

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This protocol provides only a guide. Please modify according to specific needs.

Preparation of staining solution:

(1) Dissolve Coelenterazine in methanol to prepare a 4.7mM stock solution. Note: Aliquot unused stock solution and store at -20°C or -80°C protected from light. Avoid repeated freeze-thaw cycles.

(2) Dilute the stock solution with 0.1M potassium phosphate buffer to prepare a 0.4μM to 2.5μM working solution. Note: Adjust the working concentration according to actual conditions. Prepare fresh before each use.

Mitochondrial reactive oxygen species detection (using rat heart mitochondria as an example):

(1) Isolate rat heart mitochondria or submitochondrial particles (SMP). Adjust protein concentration to approximately 5mg/ml.

(2) Add 1 mg of mitochondria or SMP suspension to 2.5μM Coelenterazine and 2mg/ml NADH. Immediately measure cumulative luminescence signal within 15 seconds.

Cell staining:

(1) Culture cells expressing Renilla luciferase. Wash cells once with colorless solution.

(2) Add 0.4μM Coelenterazine. Incubate immediately at 37°C protected from light for 6 hours.

(3) Acquire images using a bioluminescence imaging system.

In vivo mouse imaging:

(1) Inject 2mg/kg Coelenterazine via tail vein into mice bearing xenograft tumors stably expressing Renilla luciferase.

(2) Allow Coelenterazine to circulate in vivo for approximately 5 minutes. Use a bioluminescence imaging system to capture images of orthotopic tumors and metastases. After sacrifice, homogenize major organs. Mix 50μL Coelenterazine substrate with 10μL tissue lysate. Quantify using a luminometer.

Precautions:

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(1) Animal experiments must comply with animal welfare guidelines.

(2) For your safety and health, please wear a lab coat and disposable gloves during operation.

References:

[1] Volk-Draper LD, Rajput S, Hall KL, et al. Novel model for basaloid triple-negative breast cancer: behavior in vivo and response to therapy. Neoplasia. 2012 Oct;14(10):926-42.

[2] Raha S, Myint AT, Johnstone L, et al. Control of oxygen free radical formation from mitochondrial complex I: roles for protein kinase A and pyruvate dehydrogenase kinase. Free Radical Biology & Medicine. 2002;32(5):421-30.

[3] Pichler A, Zelcer N, Prior JL, et al. In vivo RNA interference-mediated ablation of MDR1 P-glycoprotein. Clin Cancer Res. 2005 Jun 15;11(12):4487-94.

Background

Coelenterazine is a natural, cell-permeable marine luciferin. Coelenterazine is a substrate for multiple luciferases or photoproteins. Coelenterazine is a probe for calcium ion and reactive oxygen species detection (Ex/Em=429/466nm). Coelenterazine can be used in reporter gene assays, in vivo bioluminescence imaging, Ca^{2+} detection, BRET and oxidative stress-related studies[1-4].

References:

[1] Markova SV, Vysotski ES. Coelenterazine-dependent luciferases. Biochemistry (Mosc). 2015 Jun;80(6):714-32.

[2] Jiang T, Song J, Zhang Y. Coelenterazine-Type Bioluminescence-Induced Optical Probes for Sensing and Controlling Biological Processes. Int J Mol Sci. 2023 Mar 7;24(6):5074.

[3] Krasitskaya VV, Bashmakova EE, Frank LA. Coelenterazine-Dependent Luciferases as a Powerful Analytical Tool for Research and Biomedical Applications. Int J Mol Sci. 2020 Oct 10;21(20):7465.

[4] Jiang T, Du L, Li M. Lighting up bioluminescence with coelenterazine: strategies and applications. Photochem Photobiol Sci. 2016 Apr;15(4):466-80.