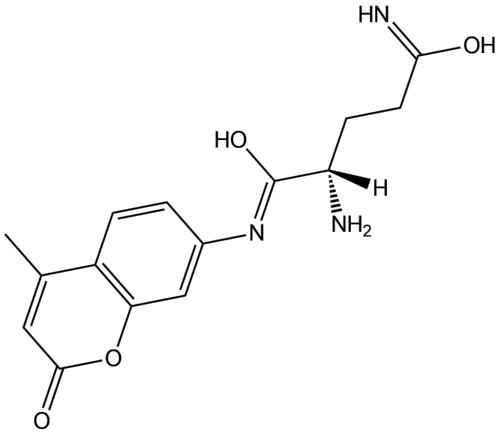
Product Data Sheet

Product Name: H-Gln-AMC
Cat. No.: GA22334

Chemical Properties

Cas. No.	105888-45-7		
Formula	$C_{15}H_{17}N_3O_4$	M.Wt	303.32
Solubility	Soluble in DMSO	Storage	Store at -20°C
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

H-Gln-AMC used as the substrate for QC activity assays.
1. Prepare a 50mM Tris-HCl buffer with 150mM NaCl at pH 8.0.
2. Prepare H-Gln-AMC solutions with varying concentrations (e.g 50μM for bacterial QC catalytic activity testing) in the Tris-HCl buffer.
3. Add 0.5U of pyroglutaminyl aminopeptidase to each well of a 96-well microtiter plate containing the H-Gln-AMC solutions.
4. Incubate the plate at 30°C for 10 minutes.
5. Add approximately 50nM of the QC enzyme to a final volume of 125μL reaction mixture to initiate the reaction.

Caution: Product has not been fully validated for medical applications. For research use only.
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6. Monitor the fluorescence intensity at excitation/emission wavelengths of 380/460nm using the FluoStar Optima
7. Calculate QC activity from a standard curve of the fluorophore AMC generated under the same assay conditions
This protocol only provides a guideline, and should be modified according to your specific needs.

References:
[1]Taudte N, Linnert M, Rahfeld J, et al.Mammalian-like type II glutaminyl cyclases in Porphyromonas gingivalis and other oral pathogenic bacteria as targets for treatment of periodontitis. J Biol Chem. 2021 Jan-Jun:296:100263.

Background

H-Gln-AMC is a fluorogenic substrate commenly used to measure the activity of glutaminyl cyclase (QC) enzymes with K_m value of 51 ± 3μM at pH 8.0 and k_{cat} value of 5.4 ± 0.1s^{-1}[1]. Glutaminyl cyclase (QC) catalyzes the intramolecular cyclization of N-terminal glutaminyl (Gln) and glutamyl (Glu) residues to form pyroglutamic (pGlu) peptides or proteins. Some recent findings suggest that QC can be a potential target against Alzheimer's disease, Huntington disease and other serious neurodegenerative disease[2].

H-Gln-AMC was used as a fluorescent substrate to detect glutaminyl cyclase (QC) activity in cerebrospinal fluid (CSF) from multiple sclerosis (MS) patients. In CSF, H-Gln-AMC was catalyzed by QC to form pyroglutamyl-AMC, which was subsequently hydrolyzed by pyroglutamyl aminopeptidase to release the fluorescent product AMC. The results show a slight increase in QC activity observed in MS patients, although the difference was not significant[3]. H-Gln-AMC was used as a fluorescent substrate to measure the activity of glutaminyl cyclases (QCs) from *Porphyromonas gingivalis* (*PgQC*), *Tannerella forsythia* (*TfQC*), and *Prevotella intermedia* (*PiQC*). At a concentration of 50μM H-Gln-AMC, the catalytic activity of *PgQC*, *TfQC*, and *PiQC* could be accurately determined based on changes in AMC fluorescence intensity[4].

References:
[1] Schilling S, Hoffmann T, Rosche F, et al. Heterologous expression and characterization of human glutaminyl cyclase: evidence for a disulfide bond with importance for catalytic activity. Biochemistry. 2002 Sep 3;41(35):10849-57.
[2] Szaszkó M, Hajdú I, Flachner B, et al. Identification of potential glutaminyl cyclase inhibitors from

Product Data Sheet

lead-like libraries by in silico and in vitro fragment-based screening. Mol Divers. 2017.21:175–186
[3] Gontsarova A, Kaufmann E, Tumani H, et al. Glutaminyl cyclase activity is a characteristic feature of human cerebrospinal fluid. Clin Chim Acta. 2008 Mar;389(1-2):152-9.
[4] Taudte N, Linnert M, Rahfeld J, et al.Mammalian-like type II glutaminyl cyclases in Porphyromonas gingivalis and other oral pathogenic bacteria as targets for treatment of periodontitis. J Biol Chem. 2021 Jan-Jun:296:100263.

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