Bacterial Signaling & Sensing

Cayman offers a wide range of products to study bacterial signaling and sensing by cyclic nucleotide second messengers and multiple quorum-sensing systems.

Cyclic Nucleotide Second Messengers

Bacteria use cyclic dinucleotide (CDN) second messengers, including 3'3'-cGAMP, 3'2'-cGAMP, cyclic di-GMP, and cyclic di-AMP, to regulate exopolysaccharide (EPS) synthesis, biofilm formation, antiphage defense, potassium homeostasis, cellular osmolarity, motility, and more. CDNs from pathogenic bacteria can be detected by the host protein stimulator of interferon genes (STING) during infection, alerting host cells to the presence of a pathogen and leading to activation of innate immune responses. Additional cyclic nucleotide second messengers include the cyclic nucleotide monophosphates cyclic AMP, cyclic GMP, and 2'3'-cyclic GMP (2'3'-cGMP) and the cyclic oligonucleotide cyclic tetra-AMP.

ELISAs to Quantify Cyclic Nucleotides

Cyclic Nucleotide Monophosphate ELISA Kits

Item No.	Product Name
502510	2'3'-cGMP ELISA Kit
581001	Cyclic AMP ELISA Kit
581021	Cyclic GMP ELISA Kit

Cyclic Oligonucleotide ELISA Kit

Item No.	Product Name
502350	Cyclic tetra-AMP ELISA Kit

CDN ELISA Kits

Item No.	Product Name
502340	3'2'-cGAMP ELISA Kit
502130	3'3'-cGAMP ELISA Kit
501960	Cyclic di-AMP ELISA Kit
501780	Cyclic di-GMP ELISA Kit

See all cyclic nucleotide ELISA kits at www.caymanchem.com

Select kits powered by BIOLOG - LIFE SCIENCE INSTITUTE -

Quantification of Cyclic Dinucleotides During Growth Phase in Three Bacterial Species Using ELISAs

Learn how Cayman's ELISA kits were used to measure and compare the levels of 3'3'-cGAMP, cyclic di-GMP, and cyclic di-AMP in bacterial lysates and supernatants.

Download the application note at **www.caymanchem.com/bacterialCDNs**

CDNs, Metabolites, & Negative Controls

Item No.	Product Name
17966	3'3'-cGAMP (sodium salt)
17753	Cyclic di-AMP (sodium salt)
17144	Cyclic di-GMP (sodium salt)
22485	Cyclic di-IMP (sodium salt)
33890	Cyclic di-UMP (sodium salt)
33886	5'-pApA (sodium salt)
33889	5'-pGpG (sodium salt)
36245	$^{13}C_{20}$,$^{15}N_{10}$-Cyclic di-GMP (sodium salt)

Microbial Evasion of STING Signaling

In *Mycobacterium tuberculosis*, cyclic di-AMP is hydrolyzed by cyclic di-NMP phosphodiesterase (CdnP) to prevent activation of host STING and induction of innate immune responses. Cayman offers purified recombinant CdnP as well as the CdnP inhibitor C82 to study this enzyme.

Item No.	Product Name
22809	CdnP (*Mycobacterium tuberculosis* strain ATCC 25618/H37Rv recombinant)
33563	C82

See all STING signaling products at www.caymanchem.com

Quorum Sensing

Bacteria utilize quorum-sensing systems to control population-dependent expression of a variety of genes, including those involved in bioluminescence and virulence factor production. Quorum sensing signaling molecules, also called autoinducers, include acyl-homoserine lactones in Gram-negative bacteria, the *Pseudomonas* quinolone signal (PQS) 2-heptyl-3-hydroxy-4(1H)-quinolone and other quinolones in *P. aeruginosa*, and a class of cyclic dipeptides called diketopiperazines.

Acyl-homoserine Lactones (AHLs)

Item No.	Product Name
10011207	N-(β-ketocaproyl)-L-Homoserine lactone
9001147	N-3-hydroxydecanoyl-L-Homoserine lactone
10007895	N-3-oxo-dodecanoyl-L-Homoserine lactone
10011206	N-3-oxo-octanoyl-L-Homoserine lactone
10007898	N-butyryl-L-Homoserine lactone
10011201	N-decanoyl-L-Homoserine lactone
10011203	N-dodecanoyl-L-Homoserine lactone
10007896	N-hexanoyl-L-Homoserine lactone
10011199	N-octanoyl-L-Homoserine lactone
10011200	N-tetradecanoyl-L-Homoserine lactone

See all homoserine lactones at www.caymanchem.com

Quinolones

Item No.	Product Name
29186	2-heptyl-3-hydroxy-4(1H)-Quinolone
9002699	2-nonyl-3-hydroxy-4-Quinolone
9003969	2-nonyl-3-hydroxy-4-Quinolone-d_4

Diketopiperazines

Item No.	Product Name
25739	Cyclo(Δ-Ala-L-Val)
34758	Cyclo(Phe-Pro)
27961	Cyclo(L-Pro-L-Val)
24943	Cyclo(L-Phe-L-Val)

See all microbial diketopiperazines at www.caymanchem.com

Quorum Sensing Inhibitors

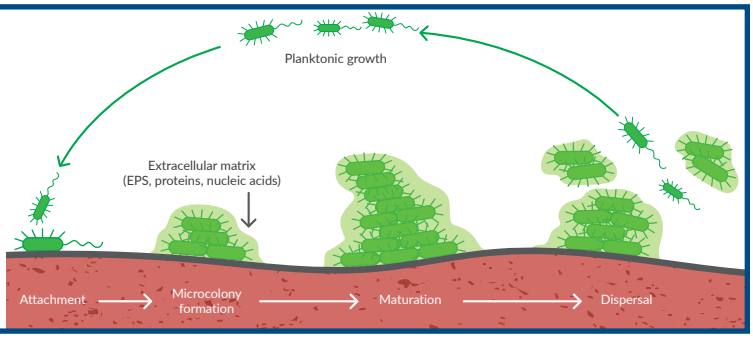
Item No.	Product Name	Description
27483	Ambuic Acid	A cyclohexanone that inhibits the biosynthesis of cyclic peptides involved in quorum sensing, including GBAP in *E. faecalis*, AIP-I in *S. aureus*, and LsrD698 and LsrD826 in *L. innocua*
31777	Amicoumacin B	Inhibits violacein production and downregulates the *vioA*, *vioB*, *vioD*, and *vioE* genes in *C. violaceum*
14016	Iberin	Inhibits AHL signaling in *P. aeruginosa* without affecting growth (IC_{50} = 31-62 µM)
28407	10-Methyldodec-2-en-4-olide	A bacterial volatile lactone that inhibits induction of an AHL-responsive reporter by the AHL N-dodecanoyl-L-homoserine lactone in a *P. putida* AHL biosensor strain
18163	Nifuroxazide	A nitrofuran antibiotic that inhibits quorum sensing and virulence factor production in *P. aeruginosa*
11440	Penicillic Acid	A mycotoxin that inhibits quorum sensing in *P. aeruginosa* by selectively repressing various virulence factor and other quorum sensing-regulated genes
36609	Qstatin	Inhibits activation of the quorum-sensing regulator LuxR in a β-galactosidase reporter assay (25 µM)

View a complete list of quorum sensing products at **www.caymanchem.com**

Article

Bacterial Cyclic Dinucleotides Regulate Biofilm Formation

Read about the synthesis and degradation of bacterial CDNs, their role in biofilm formation, and available research tools and assay kits at www.caymanchem.com/biofilms



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