D-AMINO ACID DERIVATIVE-MODIFIED PEPTIDOGLYCAN AND METHODS OF USE THEREOF

Tech ID: 22862 / UC Case 2013-041-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,016,498	07/10/2018	2013-041

BRIEF DESCRIPTION

Peptidoglycan (PG) is an essential component of the bacterial cell wall. Although experiments with model organisms in vitro have yielded a wealth of information on PG synthesis and maturation, it is unclear how these studies translate to pathogenic bacteria replicating within host cells. Because PG is required for bacterial viability and absent from eukaryotic cells, it has proven an excellent antibiotic target. Despite its medical importance, there is little known about PG metabolism in the host environment. Investigation of PG in this context has the potential to reveal novel routes of inhibition. Although biochemical methods have revealed PG dynamics in the context of whole bacterial cells, these techniques suffer from limited species applicability, technical complexity or low resolution.

Scientists at UC Berkeley have developed a chemical approach for probing PG in vivo via metabolic labeling and bioorthogonal chemistry. A wide variety of bacterial species incorporated azide and alkyne-functionalized D-alanine into their cell walls, which can be visualized by covalent reaction with click chemistry probes. The D-alanine analogs were specifically incorporated into nascent PG of the intracellular pathogen Listeria monocytogenes both in vitro and during macrophage infection. Metabolic incorporation of D-alanine derivatives and click chemistry detection constitute a facile, modular platform that facilitates unprecedented spatial and temporal resolution of PG dynamics in vivo.

SUGGESTED USES

- Discovery of new pathways for inhibiting bacteria to support drug discovery efforts
- Enable high content screening for mutations that impinge on normal cell wall synthesis or maturation
- Screens could be carried out in a variety of bacteria
- Facilitates attachment of handles to the embedded chemical reporter to promote develop tools for higher-throughput PG analysis.

ADVANTAGES

- Can be used universally on other bacteria
- Rapid results
- High resolution

CONTACT

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INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

- **Biotechnology**
  - Health
  - Proteomics
- **Materials & Chemicals**
  - Biological
  - Chemicals
- **Medical**
  - Disease: Autoimmune and Inflammation
  - Disease: Digestive System
  - Disease: Infectious Diseases
  - Research Tools
  - Screening
  - Therapeutics
- **Research Tools**
  - Screening Assays

RELATED CASES

2013-041-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Optical Imaging Of Nutrient Fluxes In Vivo
- Synthetic compound for quadricyclane labeling of multiple biomolecules without disrupting living systems
- Alkyne-Activated Fluorogenic Azide Probes
- Isotope Targeted Glycoproteomics For Nontemplated Glycan And Peptide Isoform Discovery

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