Reversible Chemoenzymatic Protein Labeling

Published date: March 23, 2017

Technology description

Researchers at UC San Diego have developed a method to reversibly tag a protein essential for the assembly of complex molecules in biological cells. Specifically, the inventors have invented new methods and compositions for removing a phosphopantethiene analogue moiety from an ACP-phosphopantetheine conjugate thereby providing Apo-ACP proteins. This reversible process can be repeated multiple times without degradation in protein identity, making it a major addition to an already popular and useful labeling method.

The technique could help researchers to rewire cellular factories, such as those involved in nonribosomal protein, and fatty acid syntheses, to allow construction of new products, such as biofuels or drugs. Given the multitude of existing opportunities for ACP labeling, particularly in work involving fusion-protein applications and natural-product biosynthetic studies, this reversible methodology will provide markedly improved flexibility for rapid modification of protein species. Additionally, the cost-saving measure of recovering valuable apo-ACP substrates cannot be overlooked.

Some of nature’ s most complex molecules are made by cellular factories that rely on an acyl carrier protein (ACP) to shuttle growing molecules along biological assembly lines. Post-translational protein modification is important for adding functions to proteins that can be exploited for therapeutics, protein engineering, affinity design and enzyme immobilization, among other applications. Commercial techniques for attaching labels to acyl carrier protein (ACP) and other carrier proteins are currently in use.

Additional Information

Related Materials

Nicolas M Kosa, Robert W Haushalter, Andrew R Smith & Michael D Burkart “Reversible labeling of native and fusion-protein motifs” Nature Methods 9, 2012, pp 981-984.

Coverage in Sept 19, 2012 issue of Chemical & Engineering News “Tool May Aid Biosynthetic Reverse Engineering”

Additional Technologies by these Inventors

Anticancer Agents - Novel Spirohexenolides

Analogs of the Cytotoxic Natural Product Mycolactone
Synthetic Anticancer Polyketide Compounds

Institution

University of California, San Diego

Inventors

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