BIOINSPIRED OXIDATIVE CYCLIZATION REAGENTS FOR CHEMOSELECTIVE TRYPTOPHAN BIOCONJUGATION

Tech ID: 32360 / UC Case 2021-150-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

Selectively modifying specific amino acids in proteins is a cornerstone of modern chemical biology and drug development, yet tryptophan remains a challenging target due to its unique chemical properties. UC Berkeley researchers have developed a redox-based strategy for the chemoselective bioconjugation of tryptophan using oxaziridine reagents. This technology mimics the oxidative cyclization reactions found in natural indole-based alkaloid biosynthetic pathways to achieve highly selective and rapid labeling. By leveraging this biomimetic approach, the method allows for the precise modification of tryptophan residues in complex biological systems, offering a robust tool for creating stable and functional protein conjugates.

SUGGESTED USES

- Antibody-Drug Conjugates (ADCs): Creating site-specific therapeutic agents by attaching drugs to tryptophan residues, providing an alternative to traditional cysteine or lysine methods.
- Proteomics Research: Identifying and tracking tryptophan-containing proteins within complex cellular lysates to study protein expression and interaction.
- Biomarker Discovery: Labeling specific tryptophan-rich proteins to assist in the detection and diagnosis of various diseases.
- Protein Engineering: Modifying enzymes or structural proteins to introduce new functionalities, such as fluorescence or improved stability, for research and industrial use.
- Peptide Synthesis: Facilitating the late-stage modification of synthetic peptides for pharmaceutical development.

ADVANTAGES

- High Chemoselectivity: Specifically targets tryptophan residues with minimal cross-reactivity toward more abundant amino acids like cysteine or lysine.
- Nature-Inspired Mechanism: Utilizes a biomimetic redox strategy that ensures efficient and rapid reaction kinetics under mild physiological conditions.
- Enhanced Stability: Produces stable covalent linkages that maintain their integrity in biological environments.
- Preserved Protein Function: The reaction conditions are designed to be gentle, minimizing the risk of protein denaturation or loss of biological activity.
- Versatility: Compatible with a wide range of protein substrates and functional handles, making it a flexible platform for diverse bioconjugation needs.

RELATED MATERIALS

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

» **Biotechnology**
» Health
» Proteomics
» **Materials & Chemicals**
» Chemicals
» **Research Tools**
» Reagents

RELATED CASES

2021-150-0

- Redox-Based Reagents For Methionine Bioconjugation
- Asymetric Electrophilic Fluorination Using An Anionic Chiral Phasee-Transfer Catalyst
- Symmetric, Air-Tolerant And Membraneless All Organic Flow Batteries
- pH Signaling and Regulation in Pyridinium Redox Flow Batteries

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