Method for Synthesizing Beta-Polypeptides from Functionalized Beta-Lactam Monomers

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a robust method for the large-scale synthesis of beta-peptides.

OVERVIEW

Oligomers and polymers comprised of beta-amino acids, known as beta-peptides, can adopt stable secondary structures that mimic natural peptides. These non-natural compounds are resistant to enzymatic degradation and often exhibit important biological activity. However, large-scale synthesis of beta-peptides is difficult because standard methods involve step-wise, residue-by-residue synthesis.

THE INVENTION

UW-Madison researchers have developed a robust method for making large quantities of poly-beta-peptides under mild and controllable conditions. The method involves polymerizing beta-lactams in an organic solvent. At least one of the monomers may comprise a fused, bicyclic beta-lactam moiety. A base initiator and a non-metal-containing co-initiator, such as an anhydride, are also present. This process was successfully used to synthesize a series of beta-peptide homopolymers and co-polymers, many of which exhibited antimicrobial activity.

APPLICATIONS

• Large-scale synthesis of beta-peptides, which potentially are useful as antimicrobial coatings, anti-viral agents and disinfectants/household cleaners, and for gene delivery and water treatment

KEY BENEFITS

• Allows rapid synthesis of large quantities of small- to medium-molecular weight poly-beta-peptides
• Constitutes a versatile and robust synthetic method
- Uses common, inexpensive reagents
- Allows precise control over polymerization process and resulting product
- May be used to synthesize beta-peptides of different architectures, including homopolymers, random and block co-polymers, and terminally-functionalyzed polymers
- Enables systematic fabrication of random and block co-polymers using different combinations of beta-lactam monomers
- Provides an efficient means for optimizing the biological activity of beta-peptides
- Provides poly-beta-polypeptides that contain a variety of functionalized side chains
- Provides poly-beta-peptides with controlled solubility properties and narrow molecular weight distributions
- Provides polymers with good antibacterial activity which do not lyse, or destroy, red blood cells

ADDITIONAL INFORMATION

Tech Fields
Materials & Chemicals - Synthesis
Pharmaceuticals & Vitamin D - Antibacterials

CONTACT INFORMATION

For current licensing status, please contact Rafael Diaz at rdiaz@warf.org or 608-960-9847.