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# Synthesis and Characterization of an Amphiphilic Block Copolymer from Amino Acid-Based Monomers via Xanthate RAFT

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**ABSTRACT** (200-250 WORDS)

This study explores the synthesis and characterization of an amphiphilic block copolymer derived from amino acid-based monomers using a xanthate reversible addition-fragmentation chain transfer (RAFT) polymerization method. Amphiphilic block copolymers, owing to their distinct hydrophilic and hydrophobic segments, present significant potential in biomedical applications, particularly in drug delivery systems. The copolymer was synthesized through a controlled RAFT polymerization process, ensuring precise control over molecular weight and polymer architecture. The resulting copolymer was characterized using techniques such as nuclear magnetic resonance (NMR) spectroscopy, gel permeation chromatography (GPC), and dynamic light scattering (DLS), confirming the successful synthesis and desired properties of the amphiphilic structure. To assess the biocompatibility of the synthesized copolymer, its impact on cell viability and cytotoxicity was evaluated using in vitro assays with human cell lines. Preliminary results indicate that the copolymer exhibits low cytotoxicity and maintains high cell viability, suggesting its potential as a biocompatible material for pharmaceutical applications. This study demonstrates the feasibility of using amino acid-based monomers in the synthesis of amphiphilic block copolymers and highlights the advantages of xanthate RAFT polymerization in achieving controlled polymer architectures. The promising biocompatibility results pave the way for further investigation into the copolymer's application in targeted drug delivery and other biomedical fields.

KEYWORDS (3-5): Amphiphilicity, RAFT, Polymers, Cytotoxicity, Biocompatibility