

## The Tadpole-Shaped Polypeptides with Two Regulable (Alkyl Chain) Tails

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**Abstract :** The biocompatible tadpole-shaped polypeptides with one cyclic polypeptides ring and two alkyl chain tails were synthesized by N-heterocyclic carbene (NHC)-mediated ring-opening polymerization (ROP) of  $\alpha$ -amino acid N-carboxyanhydrides (NCAs). First, the NHC precursor, denoted as [NHC(H)][HCO<sub>3</sub>], with two alkyl chains at the nitrogen was prepared by a simple anion metathesis of imidazole(in)ium chlorides with KHCO<sub>3</sub>. Then NHC releasing from the [NHC(H)][HCO<sub>3</sub>] directly initiated the ROP of NCA to produce the cyclic polypeptides. Finally, the tadpole-shaped polypeptides with two regulable tails were obtained. The target polypeptides were characterized by nuclear magnetic resonance spectrum (1H NMR), Fourier transform infrared spectroscopy (FT-IR), gel permeation chromatography (GPC) and matrix-assisted laser desorption ionization-time of flight mass spectra (MALDI-TOF MS). This pioneering approach simplifies the synthesis procedures of tadpole-shaped polypeptides compared to other methods, which usually requires specific intramolecular ring-closure reaction.

**Keywords :** cyclic polypeptides,  $\alpha$ -amino acid N-carboxyanhydrides, N-heterocyclic carbene, ring-opening polymerization, tadpole-shaped

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