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Poly lactide-Based Chiral Particles with Enantio-Differentiating Release Ability

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ABSTRACT: Polylactide (PLA, two enantiomers: PLLA and PDLA) is well-known for its biocompatibility, biodegradability, and good mechanical capacity. However, PLLA and PDLA have been rarely explored in spite of the well-known significance of chirality and chiral (macro)molecules. This work aims to investigate PLLA and PDLA's chirality in terms of enantioselectivity towards chiral guests. For this purpose, PLA-based chiral particles were successfully prepared and demonstrated enantioselectivity in releasing chiral drug, naproxen. The PLLA- and PDLA-based particles both showed enantioselectivity towards the chiral drug, i.e. preferably releasing S-naproxen over the R-enantiomer. Moreover, PDLA-based particles showed enantioselectivity only in racemic release mode but not in single enantiomer release mode. We accordingly propose that enantio-differentiating effects not only occur in release process, but also in drug loading process. The intriguing findings are essentially different from other chiral polymers investigated earlier, and deserve much more interest due to the extensive uses of PLA as biomaterials.

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