Sequence-Controlled Polymers for Sustained Release of Pharmaceutical Ingredients

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- Pharmaceuticals

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- Sustained Release

Purdue University researchers have produced sequence-controlled polymers for pharmaceutical formulations with superior sustained release properties. Poly-(lactic-co-glycolic acid) (PLGA) is a common material used in controlled drug delivery systems, but limitations in its manufacturing process result in an uncontrollable initial release of the intended active pharmaceutical ingredient (API). Seeking to alleviate this problem, researchers at Purdue University have developed a method for manufacturing PLGA that results in a microstructure capable of housing a uniform distribution of the API, reducing hard to predict initial bursts and allowing for slower, more sustained release behavior. This first-in-class method stands as a proof of concept and paves the way for a significant improvement in the controllability of drug delivery.

Related Publication:
Strategy for Synthesis of Statistically Sequence-Controlled Uniform PLGA and Effects of Sequence Distribution on Interaction and Drug Release Properties
ACS Macro Lett. 2021, 10, 12, 1510–1516
https://doi.org/10.1021/acsmacrolett.1c00637

Advantages:
-More homogeneous PLGA microstructure
-Facilitates sustained release of API
-Significantly reduces the initial burst release of API

Applications:
-Pharmaceuticals
-Drug delivery systems
-Non-clinical PLGA products

Technology Validation:
This technology has been validated through the laboratory testing and kinetics analysis of prototypes. Molecular weight and sequence properties were determined from NMR. Polymer physical properties were analyzed by dynamic light scattering, transmission electron microscopy, and scanning electron microscopy. Drug release kinetics were demonstrated with paclitaxel in buffer.

People:

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Intellectual Property:

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