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Tough Pseudo-IPN Hydrogels for Drug Delivery: Controlling Burst Release and Achieving Mechanically Induced Drug Release

Tough multiple-network hydrogels enable the controlled and reliable delivery of water-soluble drugs, suppressing initial burst release and offering skin-like comfort for localized applications.

For many years, the achievement of continuous release of medication has been the focus of controlled drug release research. An on-demand control of drug delivery is desired in many clinical situations, as it promises to improve therapeutic efficacy and lessen side effects. Hydrogels are an ideal candidates given they respond to changes in the environment including pH, temperature, light, electric fields, and magnetic fields. Unfortunately, such triggers to do not transfer to clinical environments well. There is a need for improved methods of delivering pharmaceutical drugs to patients.

Purdue University researchers have developed the use of tough multiple-network hydrogels for the reliable delivery of water-soluble drugs dissolve in this medium. The dissolved drugs are released from the hydrogel in a controlled fashion, suppressing the initial burst release of drugs and providing a reliable mechanism to controllably release drugs into a local area. Some of the hydrogels utilized have similar mechanical properties to skin. This provides greater comfort for a patient and allows for utilization in difficult applications areas like joints, e.g., knees, elbows.

Advantages:

-Compatible with water-soluble drugs

-Controlled delivery of drugs

-Suppresses initial burse release of drugs

-Allows for stretching to large deformations

-Mechanically similar to skin

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Materials Science & Nanotechnology/Biomedical & Bioinspired Materials

Authors
Mukerrem Cakmak
Gustavo Cardozo
Siamak Shams Es-haghi

Further information
Dipak Narula
dnarula@prf.org

View online

Potential Applications:

-Pharmaceutical companies

-Drug delivery

-On-skin applications

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Intellectual Property:

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