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Responsive Elastic Polymers and Methods of Making and Using Same

An injectable, thermo-responsive elastic polymer system using functionalized hyaluronic acid enables spatio-temporally controlled delivery of various drugs and growth factors, improving efficacy and patient compliance.

Medications are drugs used to treat, cure, prevent, or diagnose an illness or medical condition. However, sometimes drugs are not effective by simply being ingested. Delivery of local or systemic drugs requires targeted doses to specific parts of the body. The accuracy of delivery is often hampered by inferior mechanical performance of the material used for delivery.

Researchers at Purdue University have developed a functionalized hyaluronic acid (HA), a thermo-responsive elastic polymer system comprising functionalized HA, and the methods of fabrication and utilization for drug delivery. This polymer system is injectable and may be used for spatio-temporally controlled delivery of analgesics, anesthetics, antibodies, and other drugs as well as growth factors. Controlled drug delivery offers numerous advantages when compared to conventional dosage forms including improved efficacy, reduced toxicity, reduced need for specialized drug administration, and improved patient compliance/convenience. In addition, HA offers numerous useful biological benefits including wound healing, cell adhesion and proliferation, cell motility, angiogenesis, cellular signaling, and matrix organization.

Advantages:

-Injectable

-Thermo-responsive

-Highly elastic

-Controlled drug delivery

Potential Applications:

-Medical/Health

Technology ID

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Category

Pharmaceuticals/Pharmaceutical Packaging & Delivery Systems
Materials Science & Nanotechnology/Biomedical & Bioinspired Materials

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View online

-Drug delivery

-Tissue engineering

TRL: 4

Intellectual Property:

Provisional-Patent, 2016-06-13, United States | Provisional-Patent, 2016-07-25, United States | Utility Patent, 2017-06-13, United States | PCT-Patent, 2017-06-13, WO | DIV-Patent, 2017-06-13, China | NATL-Patent, 2018-12-12, United States | NATL-Patent, 2019-01-16, China | DIV-Patent, 2022-11-07, United States

Keywords: Functionalized hyaluronic acid, HA polymer system, thermo-responsive polymer, elastic polymer, injectable drug delivery, controlled drug delivery, spatio-temporally controlled delivery, tissue engineering, wound healing, angiogenesis