Clemson University Research Foundation

Biocompatible Hydrogel for Enhanced Hydrophobic Drug Delivery (04-032)

Hydrogel releases variable sized drugs at controlled rates for decreased treatment intervals

Market Overview

This hydrogel is tailored during fabrication to release hydrophobic drugs at varying molecular weights to decrease treatment intervals of chronic disorders. The drug delivery market was valued at $1,048.1 billion globally in 2015 and is expected to grow to $1,504.7 billion by 2020, driven by needs for ease of use, proper dosage delivery, and superior spreading ability. Treatments of chronic disorders like diabetes, renal failure, and dwarfism can only be treated with regular dosages of drugs, normally via injection. Regular injection of drugs causes the patient pain and often patient compliance is low with the proper treatment regimen. Clemson University researchers have synthesized a biocompatible, polymeric hydrogel that can be tailored to hold hydrophobic drugs of varying molecular weight, and release these drugs at controlled rates over extended periods of time. By tailoring release time and extending the time period the drug can be delivered, the patient would not have to self-administer regular dosages to treat their chronic disorder.

Application

Drug Delivery

Stage of Development

Proof-of-concept with validation/verification analytical work

Advantages

- Maintains a hydrophilic environment without covalent drug modification, allowing sensitive drugs to retain their higher-order structures and optimum bioactivities
- Hydrogel can be loaded with drugs previously difficult for loading, allowing treatment of chronic disorders that require regular dosage
- Controlled release over extended periods of time decreases self-administered treatments, increasing patient compliance

Technical Summary

This invention features an approach to immobilize and subsequently release various unmodified drugs from polymer networks by incorporating non-covalent, reversible drug-ligand interactions into an encapsulating, biocompatible matrix. This approach is specifically advantageous for the controlled release of hydrophilic, macromolecular drugs such as the new generation of protein therapeutics from polymeric hydrogels. Pseudospecific ligands possessing varying degrees of affinity for the drug of interest can be covalently bound to the polymer network. The drug is then temporarily immobilized in the gel by its affinity towards the tethered ligand leading to its subsequent release at a rate predetermined by the chosen ligand chemistry and fabrication conditions.

App Type	Country	Serial No.	Patent No.	CURF Ref. Number	Inventors
Utility	United States	11/034,437	8,128,952	04-032	Andrew T. Metters

For More Information

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