

Adaptable nanosphere drug delivery system

Information Summary

Reference Code:	ROI 99033
Technology overview:	Drug delivery system.
Applications:	Encapsulation and delivery of drug candidates for parenteral administration.
Inventors:	Dr. Adi Eisenberg et al.
Contact:	Laurent Masaro Ph.D. MBA 514-398-8667 laurent.masaro@mcgill.ca

dihydrotestosterone (Journal of Controlled Release, 2000, 63, 275-286) as well as *in vivo* in the rat, where dihydrotestosterone concentration was detected over several weeks (Drug Delivery, 2000, 7, 82-88). In another study (Science, 2003, April, page 300), it was demonstrated that these nanospheres can penetrate cells and transport drugs intracellularly unlike other drug delivery systems that are degraded in the blood. In summary, these block copolymer nanosphere are water-soluble, biocompatible containers with potential for delivering hydrophobic drugs.

Technology Description

This invention relates to a drug delivery system consisting of diblock copolymers of polycaprolactone- β -polyethylene oxide (PCL- β -PEO). The diblock copolymers form micelles of unusually small and narrow disperse diameter (nanometer scale). The hydrophobic reservoir of the PCL- β -PEO micelles enables incorporation and containment of larger amount of drug molecule. Inventors have shown that this micellar system is biocompatible and can incorporate diverse classes of compounds including steroids and certain macrocyclic compounds with full retention of biologic activity *in vitro* and *in vivo*. This drug delivery system uniqueness is its versatility and flexibility. Nanosphere size and controlled release can be tailored to the drug to be delivered, ranging from few days to several weeks. In addition, this system has been demonstrated to enhance loading of hydrophobic drugs. Numerous formulations could be developed using this technology.

Performance

This drug delivery system has been characterized *in vitro* using HeLa cells and studying delivery of

Benefits

- Issued patent: US 6,469,132 (composition of matter)
- Performance: solubility of a hydrophobic drug such as dihydrotestosterone was increased by 300 fold
- Safety: no toxicity with HeLa cells
- Animal validation: Drug release characterized in rat models
- Time release: Formulation can be tailored from few days to several weeks depending on the copolymer used (copolymer length and hydrophobic/hydrophilic ratio of the copolymer)

Opportunity

Exclusive license and/or collaboration agreement to further characterize the compatibility of this unique nanosphere drug delivery system with drug candidates of choice.