Jagdish Singh et al., J Biotechnol Biomater 2016, 6:3 (Suppl)
http://dx.doi.org/10.4172/2155-952X.C1.055

Molecularly modified insulin for controlled delivery from triblock copolymers

Jagdish Singh, Mayura Oak and **Divya Sharma**
North Dakota State University, USA

The objective of the present work was to develop a delivery system for controlled release of insulin at basal level based on chitosan-zinc-insulin complex incorporated into poly (lactic acid)-poly (ethylene glycol)-poly (lactic acid) (PLA-PEG-PLA, 4500 Da) thermosensitive polymer. *In vitro* release profile of insulin from the delivery system was studied in phosphate buffered saline, pH 7.4 (PBS). A significant decrease ($p<0.05$) in the initial burst was observed from the formulation containing chitosan-zinc-insulin complex compared to zinc-insulin, chitosan-insulin and insulin alone. Additionally, the release of insulin was complete with minimal secondary burst. The polymeric formulations containing chitosan-zinc-insulin complex showed a long-term controlled release (~84 days) of insulin. The *in vivo* absorption and bioactivity of insulin released from the delivery systems were studied in the streptozotocin-induced diabetic rat model. Chitosan-zinc-insulin complex significantly ($P<0.05$) reduced the initial burst release of insulin from the polymeric delivery system in comparison to zinc-insulin or insulin alone *in vivo* in rat. The delivery system released insulin for ~3 months in biologically active form with corresponding reduction in blood glucose levels in diabetic rats. The delivery systems were biocompatible both *in vitro* and *in vivo* and were non-immunogenic. The results indicate that the chitosan-zinc-insulin complex incorporated in the thermosensitive polymeric delivery system can be used as an alternative to the conventional daily basal insulin therapy.

Biography

Jagdish Singh is a Professor and Chairman of the Department of Pharmaceutical Sciences at North Dakota State University School of Pharmacy and a Fellow of American Association of Pharmaceutical Scientists (AAPS) and Fellow of Association of Biotechnology and Pharmacy. His research efforts focus on the mechanistic studies for developing and testing novel delivery technologies to deliver biotechnologically derived molecules. He has published over 170 peer-reviewed papers and 300 abstracts.

jagdish.singh@ndsu.edu

Notes: