António Ribeiro et al., J Pharm Drug Deliv Res 2017, 6:3 (Suppl)
http://dx.doi.org/10.4172/2325-9604.C1.017

Nanoprecipitation for delivery of Insulin

António Ribeiro and Joana Sequeira
University of Coimbra, Portugal

Micro- and nano-particulates made of Poly-Lactic-co-Glycolic Acid (PLGA) have been extensively studied due to their biocompatibility, biodegradability and ability to control release of drugs and have been linked to delivery of proteins. Nanoprecipitation is the most appropriate method to produce nano sizing particles for parenteral delivery without harsh conditions of temperature and agitation, making use of water miscible solvents and involving a simple set up. However, attempts to encapsulate proteins and specially insulin in PLGA nanoparticles using nanoprecipitation have revealed limited success due to a low Efficiency of Encapsulation (EE). Insulin-PLGA Nanoparticles (Ins-PLGA NPs) for parenteral administration were produced by nanoprecipitation without any co-solvent or additive to insulin, buffering the dispersant phase. NPs were freeze-dried with sorbitol and characterized for size and polydispersity (PdI) and zeta potential. Insulin extracted from NPs was assayed using HPLC and its conformation was assessed before, during and after procedure using Circular Dichroism (CD). *In vitro* release studies were performed to access insulin release kinetics. NPs with a mean size lower than 200 nm, a low PDI were obtained after freeze-drying and revealed physical stability after reconstitution in water. EE of NPs was greatly improved compared to previous attempts, and among formulations, the choice of a buffer with a pH close to the PI of insulin revealed a higher EE. Insulin secondary conformation was maintained during manufacture so insulin was not markedly degraded during the manufacturing process. Insulin release from NPs showed a high burst effect and a release medium pH behavior. The PLGA based NPs buffered formation occurs under mild conditions and consequently can be used as a platform for delivery of labile molecules such as most of the biotechnology-based drugs.

Biography

Antonio Ribeiro is a Professor of Pharmaceutical Technology at University of Coimbra where he managed a high international reputed research group. He completed his PhD in Pharmaceutical Development and Bio-pharmacy and his research has been focused on “Design of delivery systems for peptidic and protein drugs”. He has published more than 60 peer-reviewed publications and presented various talks all over the world. He serves as an Editorial Board Member of several publications and as a Consultant for several research agencies mostly related to Diabetes and Nanotechnology.

aribeiro@ff.uc.pt

Notes: