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Advancement of nanoparticle-based insulin delivery systems in treatment of diabetes

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Abstract

Insulin injections remain to be preferred approach for the treatment of insulin-dependent diabetes mellitus (type I) and for many patients non-insulin-dependent diabetes mellitus (type II). The subcutaneous injection of insulin decreases the quality of life of many people and causes suboptimal control of blood glucose levels. It would be beneficial if insulin could be administered orally, buccal, nasal, pulmonary, ocular and rectal in order to replace parenteral therapy because different routes of insulin could mimic the physiological fate of endogenously secreted insulin and might provide a better glucose homeostasis.

When considering poor patient compliance and difficulties of administration in using parenteral insulin this makes the oral route the most preferred and safest if it's available. In order to obtain adequate bioavailability, oral route of insulin should overcome various gastrointestinal tract (GIT) barriers such as chemical, enzymatic and absorption barriers. Polymeric nano and/or microparticles have been used as matrices for the delivery of oral route of insulin. Nanoparticles; have a large specific surface area and protection power against gastrointestinal environment, are thought to be the most promising solution for oral delivery of insulin.

Our aim is to discuss the ability of the nanoparticles for enhancing the pharmacological response of different routes of given exogenous insulin in treatment of diabetes. Finally, recent advances in using polymeric nanoparticles for different administrations of insulin delivery and their effects on insulin transport will be reviewed.

Biography

H. Kubra Elçioglu has completed his Ph.D at the age of 31 years from Marmara University and postdoctoral studies from Marmara University School of Pharmacy, Department of Pharmacology. She is the associated professor in Pharmacology and also Vice Dean of Marmara University School of Pharmacy. She has published more than 13 papers in reputed journals. She is the member of Turkish Pharmacological and Clinical Pharmacy Societies.