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Prakash V Diwan

National Institute of Pharmaceutical Education and Research, India

The pursuit of oral insulin is a reality: Is it simply a matter of when?

Oral insulin delivery has been a promising and interesting research area and can revolutionize treatment. Several studies have achieved positive results which includes nanotechnology. Considerable problems of developing oral insulin are because of the small therapeutic index and short half-life which limits the success. Several insulin delivery systems, such as tablets, capsules, intestinal patches, hydrogels, microparticles, and nanoparticles, have been explored to deliver insulin without much success. Various types of nanoparticles are currently studied for insulin delivery in diabetes treatment such as polymeric biodegradable nanoparticles, polymeric micelles, ceramic nanoparticles, liposomes, and dendrimers. Exubera as the first and until now only inhaled insulin with a market approval, was not a market success due to insufficient uptake in the market. The intestinal micro patches for oral insulin delivery is the well-thought approach. The colon-specific drug delivery system has many advantages. Encapsulation of insulin in vitamin B12-coated dextran nanoparticles has been considered in complementing diabetes therapy by taking advantage of enhanced insulin absorption through vitamin B12 intrinsic factor receptor ligand-mediated endocytosis via intestine leucocytes. Artificial pancreas: The future of diabetes treatment. It's known that intestinal epithelial cells have insulin receptors on their apical surfaces. Researchers think that beta-cell implants or island of langerhans transplants would be a more feasible and perhaps better option? Current research has been going on to deliver insulin experimentally and this has been achieved by the developing "smart" insulin patch. The oral version of an acylated insulin analog with a half-life of ~70 hours is a great breakthrough. The herbal medicines are a symbol of safety in contrast to synthetic drugs. The lifestyle is becoming techno-savvy and we are moving away from Nature. The 80 % of the world population is using herbal medicines. Gymnema sylvestre also increases the amount of insulin in the body and increase the growth of beta cells in the pancreas and many more in the armamentarium of Indian herbal wealth. Most of the developments of these companies have failed in phase II clinical studies, showing insufficient metabolic control in patients with diabetes. However, researchers are concerned that oral insulin could raise the risk of certain types of cancer. Addressing these issues successfully will create a new paradigm in diabetes treatment. Future advance in drug delivery could still make it a reality.

Biography

Prakash V Diwan obtained his PhD from Postgraduate Institute of Medical Education and Research, Chandigarh, India. Contributed in the areas of Novel Drug Delivery systems & drug discovery. Published over 200 papers in pre-reviewed journals. He delivered guest lectures in India and abroad. He has many awards instituted by Indian Pharmacological Society. He has served as founder Director of NIPER, Hyderabad and fellow of the Royal Society of London, FRSC (London). Presently working as Technical Advisor, Indian Pharmacopeia Commission, Government of India, Director School of Pharmacy, and Hyderabad. Director, CRL, Maratha Mandal Group of Institutions, Belgaum, and Consultant for Indian Institute of Technology, Hyderabad.

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