Available online at www. scholarsresearchlibrary.com

Scholars Research Library

Der Pharmacia Lettre, 2023, 15(1): 07-08
(http: //scholarsresearchlibrary. com/archive. html)

ISSN 0975-5071
USA CODEN: DPLEB4

Glucose Responsive Insulin Delivery System in Recent Approaches

Ronald George*

Department of Pharmacology, University of Jawaharlal Nehru, New Delhi, India

***Corresponding author:** Ronald George, Department of Pharmacology, University of Jawaharlal Nehru, New Delhi, India; E-mail: Ronaldg@gmail.com*

***Received:** 09-Feb-2023, Manuscript No. DPL-23-89141; **Editor assigned:** 13-Feb-2023, PreQC No. DPL-23-89141 (PQ); **Reviewed:** 27-Feb-2023, QC No.DPL-23-89141; **Revised:** 06-Mar-2023, Manuscript No. DPL-23-89141 (R); **Published:** 13-Mar-2023, DOI: 10.37532/dpl.2023.15.07.*

DESCRIPTION

Currently, 382 million individuals worldwide suffer from diabetes mellitus, a chronic medical illness that is brought on by decreased insulin production or insulin resistance. The only widely approved therapy for controlling blood glucose levels in diabetic patients is subcutaneous insulin injection. The blood glucose level must be monitored often in many people with advanced type II diabetes mellitus in order to maintain the target range. The invasive method of administering long-term insulin therapy, however, creates issues with patient compliance and unexpected drops in blood glucose levels. One technique to get around the issue with the traditional method of administering insulin is to use an artificial closed loop insulin release device that mimics the glucose responsive insulin secretion by pancreatic beta cells. When combined with glucose responsive catalyst like glucose oxidase, phenyl boronic acid, and glucose binding proteins, many polymeric formulations demonstrated improved glucose responsive release of insulin. The release rate can be regulated by optimizing the concentration of glucose responsive catalyst.

The focus of this article is on various glucose responsive release mechanisms that incorporate a glucose responsive catalyst. Diabetes mellitus is an autoimmune disorder in which the body's normal glucose levels cannot be maintained due to insufficient insulin production from the pancreas as a result of the destruction of the islets of Langerhans beta cells (type I diabetes) or a concomitant combination of cellular insulin resistance and insufficient insulin secretion (type II diabetes). For those with type I diabetes and some people with type II diabetes, subcutaneous insulin injection and routine blood glucose monitoring are essential. However, open-loop insulin delivery, a common form of diabetes treatment, does not strictly control patients' blood glucose levels since pharmacological therapy and glucose sensing are not directly related. An artificial pancreas-like closed-loop insulin administration system that can release insulin in response to changing blood glucose levels is one strategy for solving this issue. As many people with diabetes don't know the potential of insulin treatment for glycemic control, this would also eliminate the risk of insulin-induced hypoglycemia.

An insulin releasing module and a glucose monitoring module are typically used to create such closed loop systems. An external insulin infusion pump and a glucose sensor are components of the present closed-loop system. However, the implementation of such devices is constrained by system delays in bio fouling and blood glucose feedback. A novel glucose-responsive medication delivery system includes glucose oxidase, a glucose-responsive enzyme that uses oxygen to convert glucose to gluconic acid while also generating hydrogen peroxide in the process. As long as this hydrogen peroxide is there, questions concerning its biocompatibility with our bodies are raised.

However, these hydrogen peroxide can be utilized to separate the H_2O_2 responsive polymer, such as co-block polymer Poly Ethylene Glycol (PEG) and Phenyl Boronic Ester (PBE) conjugated polyserine (designated mPEG-b-P(Ser-PBE)) for construction of the system, from the glucoresponsive system. The ability of glucose transporters, glucose binding proteins, and aptamers to bind glucose has also recently improved within the context of glucose sensor and insulin delivery systems. Concanavalin A, a lectin family protein, is one of the most extensively studied particles in this regard. With a high affinity, concanavalin A can bind precisely, reversibly, and competitively to the glucose and mannose molecules. A molecule of concanavalin A has the ability to bind to the saccharide moiety and function as a macromolecular cross-linker. Gels are a very good type of formulation that can be utilized as an insulin release mechanism that is based on Concanavalin A. Concanavalin A interacts competitively with the free glucose moiety in the presence of elevated glucose concentration, resulting in a reduction in the gel's crosslinking thickness.