

Exploring insulin alternatives: A new era in diabetes treatment

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INTRODUCTION

Diabetes, particularly type 1 diabetes and advanced type 2 diabetes, has traditionally been managed through insulin therapy. For individuals with type 1 diabetes, insulin is a life-sustaining treatment, as their pancreas produces little to no insulin. In type 2 diabetes, the body becomes resistant to insulin, and over time, the pancreas may fail to produce enough. While insulin has been a cornerstone of diabetes management for over a century, the search for alternatives has gained significant momentum.

DESCRIPTION

While insulin is an essential tool for managing diabetes, it does come with its challenges. The process of using insulin involves multiple injections daily or the use of an insulin pump, both of which can be burdensome. Additionally, achieving the right balance of insulin can be difficult, as insulin doses must be adjusted based on food intake, activity level, stress, and other factors. Over- or under-dosing can lead to dangerous fluctuations in blood sugar, including hypoglycemia (low blood sugar) or hyperglycemia (high blood sugar). Furthermore, insulin therapy does not cure diabetes; it only helps manage symptoms and maintain blood sugar levels. This reliance on insulin makes the search for alternatives even more urgent. For individuals with type 2 diabetes, oral medications have been a mainstay of treatment for many years. Drugs like metformin, sulfonylureas, and DPP-4 inhibitors help lower blood sugar by improving insulin sensitivity or stimulating the pancreas to release more insulin. However, while these medications are effective to a certain extent, they do not replace insulin for people with type 1 diabetes, and they don't fully address the issue of insulin resistance in type 2 diabetes. But there have been significant advancements in oral diabetes medications that target different mechanisms in the body to manage glucose levels more effectively.

One promising class of drugs is SGLT-2 inhibitors, such as canagliflozin and empagliflozin, which work by preventing the kidneys from reabsorbing glucose, effectively allowing the body to excrete excess glucose through urine. These drugs can be administered via injection, but researchers are exploring ways to create oral formulations, potentially making them a convenient alternative to insulin injections for type 2 diabetes. The development of artificial pancreas systems, also known as closed-loop insulin delivery systems, marks a groundbreaking innovation in diabetes treatment. Although still in experimental stages, these systems hold great promise for the future of diabetes treatment. One of the most exciting areas of research in insulin alternatives is stem cell therapy. Scientists are investigating ways to generate insulin-producing beta cells from stem cells. The idea is to grow new beta cells in the laboratory and implant them into patients with diabetes, providing a natural source of insulin production. This could potentially eliminate the need for insulin therapy entirely for people with type 1 diabetes, and it may offer new hope for people with type 2 diabetes who have lost beta cell function. While stem cell therapy is still in its early stages and faces significant challenges, including ethical considerations and long-term safety concerns, the potential for creating a biological cure for diabetes is a tantalizing prospect.

CONCLUSION

The exploration of insulin alternatives marks a transformative moment in diabetes care. While insulin remains a vital tool for managing both type 1 and type 2 diabetes, the development of non-insulin treatments such as oral medications, artificial pancreas systems, stem cell therapy, and lifestyle interventions are offering new hope for people living with diabetes. These alternatives not only reduce the physical and emotional burden of daily insulin injections but also pave the way for more personalized, effective treatment options.

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