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Diabetes

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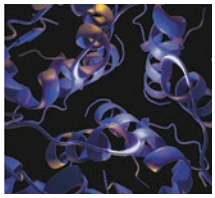

On the cover
Close up view of an insulin hexamer, the storage form of insulin. Credit: Chris Ryan/Springer Nature Limited

Frederick Banting declared that "insulin is not a cure for diabetes; it is a treatment" in his 1923 Nobel lecture. The year 2021 marks 100 years since the discovery of insulin, which revolutionized the management of patients with type 1 diabetes. The past 100 years have seen seismic shifts in our understanding of the pathogenesis of the different types of diabetes, leading to advances in patient care. In this *Nature Milestones in Diabetes*, we highlight some of these key discoveries, which lay a path to the elusive goal of finding a cure for diabetes.

Following the discovery and early use of insulin by Frederick Banting, Charles Best, James Bertram Collip and John Macleod (Milestone 1), there are now a range of insulin analogues that can be used to treat patients. Technological advances have also led to the use of closed-loop systems for insulin delivery (Milestone 21). Insulin has been at the forefront of scientific discovery — it was the first protein to be sequenced, the first human protein to be chemically synthesized and the first recombinant protein to be produced in bacteria, for example.

However, the high cost of insulin analogues and the scarcity of more affordable human insulin, coupled with other barriers to access such as storage issues, have serious ramifications for many patients. Such inequities are non-trivial and urgently need to be addressed, particularly in low-income and middle-income countries. Here, however, we focus on the scientific achievements that have driven increased understanding of diabetes and have led to therapeutic advances.

Indeed, the past few years have seen an expansion of therapeutic options for patients with type 2 diabetes, with the advent of SGLT2 inhibitors, GLP1 receptor agonists and DPP4 inhibitors (Milestones 9, 22 and 24). In immunology, new discoveries are enabling the development of immunotherapies for type 1 diabetes (Milestones 17 and 20).

Each Milestone and the papers that we have highlighted here represent the culmination of years of work from teams of researchers, each building on the work of their predecessors and colleagues. Notably, these Milestones are not an exhaustive list, and we acknowledge the many important contributions to the field that have not been included in the Timeline. We thank the researchers and clinicians who have advised us on this project or agreed to be interviewed. We are pleased to acknowledge financial support from AstraZeneca, Medtronic and Novo Nordisk. As always, responsibility for the editorial content remains with Springer Nature.

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