



Making Progress in the Fight Against Diabetes

MAGNACARESM
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It's estimated that by 2050, over 1.3 billion people worldwide will have diabetes, more than doubling the 529 million people who currently have the disease. Ninety percent of this increase is expected to be in type 2 diabetes.

For those who currently have diabetes, the heartening news is that medical research into both type 1 and type 2 diabetes continues to make substantial progress. The much sought-after cure is not right around the corner, but **scientists are discovering new ways to treat and manage the disease.**

Ozempic, Wegovy and Mounjaro: Effective but in Short Supply

These three drugs are now extremely sought-after, not just for their ability to treat type 2 diabetes, but for their potential for inducing weight loss and lessening the incidence of heart disease. Ozempic and Wegovy contain semaglutide, which regulates blood sugar and insulin and reduces appetite. Mounjaro contains a different drug (tirzepatide) which has a similar effect.

Because these drugs (usually taken by self-injection once a week) are so popular among people trying to lose weight, shortages have made it more difficult for people with diabetes to access them. Suppliers of all three drugs expect sporadic shortages to continue through 2024.

A Type 1 Breakthrough: Teplizumab

Far fewer people suffer from type 1 diabetes than from type 2 (about 8.4 million worldwide), but type 1 diabetes, in which the immune system attacks and destroys its own insulin-producing pancreatic beta cells, is more difficult to manage properly. Teplizumab works by slowing down the destruction of the beta cells, thus making the disease easier to manage, especially for children and adolescents and their parents. It is not a cure, but a delaying tactic, postponing clinical progression of the disease by up to two years.

Promising Therapies and Diabetes Management

Scientists are working on innovative ways to control and alleviate diabetes symptoms.

Nanotechnology

Researchers are currently exploring nanotechnology as a way to deliver diabetes medication more precisely. A nano is a tiny unit of measurement (there are 25,400,000 nanometers in one inch) which has been used in medicine generally to target cancerous cells and tumors. Nanotechnology can potentially provide far more targeted and controlled release of insulin and can aid in increasing the delivery and efficacy of oral hypoglycemic drugs.

Artificial intelligence

A potentially groundbreaking 2023 study published in Nature shows that great progress has been made on using advanced deep learning systems that can detect type 2 diabetes with high accuracy by using existing X-rays and other medical data from a patient. Early detection of type 2 diabetes is crucial to managing the disease, which has been increasing rapidly worldwide.

The "artificial pancreas"

The artificial pancreas is not a mechanical organ, but a so-called "closed loop" system of diabetes management that checks blood glucose levels through a continuous glucose monitor (CGM) and automatically delivers the insulin needed through a glucose pump. Thousands of people with diabetes already use

a system like this, but recent research has found that young children with the artificial pancreas system spend three hours more a day within their target blood glucose range than children who do not have such a system.

One shot of insulin per week

About a third of people with type 2 diabetes need daily insulin to keep their blood sugar under control, but that may be changing. In a 2023 study published in the Journal of the American Medical Association (JAMA), an experimental form of insulin, known as

insulin codec, administered just once a week, was not only safe for patients with type 2 diabetes, but helped them control their blood sugar better than a once-daily shot. The drug is currently awaiting FDA approval.

Is a Complete Cure Possible?

Most scientists agree that hopes for a total diabetes cure may lie with beta-cell replacement—in other words, replacing or regenerating the missing beta cells in the pancreas that produce insulin. If possible, such an approach would have the pancreas producing insulin normally, which would help both people with type 1 diabetes, whose pancreas produces no insulin, and those with type 2, whose bodies have reduced beta cell function.

Up until relatively recently, transplanted pancreatic cells have been destroyed by the host body's autoimmune response. However, **in two small clinical trials**, a drug called Lantidra, the first drug made with deceased donor pancreatic cells, was infused into 30 patients with type 1 diabetes, **21 of whom did not need to take insulin for a year or more**. Eleven patients did not need insulin for one to five years and ten did not need to take it for more than 10 years. **In 2023, the FDA approved Lantidra for treatment of type 1 diabetes in patients with severe hypoglycemia.**



There is a very limited supply of this drug (which does have potentially serious side effects and must be administered in a hospital) because it is donor-dependent. However, the hope is that within the next decade or less, replacement cells can be grown in a laboratory.

Sources: <https://www.utsouthwestern.edu/newsroom/articles/year-2023/july-weekly-insulin-found-safe.html#:~:text=DALLAS%20%20%20July%2012%2C%202023%20%20E%20%20a%20UT%20Southwestern%20Medical%20Center> | <https://www.yalemedicine.org/news/teplizumab-new-diabetes-drug#:~:text=The%20goal%20of%20teplizumab%20is,by%20at%20least%20two%20years> | <https://www.verywellhealth.com/fda-approves-lantidra-to-treat-type-1-diabetes-7559545> | https://www.sciencedaily.com/news/health_medicine/diabetes/ | <https://www.uchicagomedicine.org/forefront/research-and-discoveries/articles/type-1-diabetes-beta-cell-treatment> | <https://diabetesaction.org/current-research> | <https://www.niddk.nih.gov/about-niddk/research-areas/diabetes> | <https://medicine.iu.edu/news/2023/10/type-1-diabetes-repurposed-drug-research> | <https://www.ucsf.edu/news/2023/10/426396/breakthrough-drug-helps-children-new-onset-type-1-diabetes> | <https://www.labiotech.eu/in-depth/diabetes-treatment-cure-review/> | <https://www.nih.gov/news-events/news-releases/nih-supported-trial-shows-artificial-pancreas-improves-blood-glucose-control-young-children> | <https://www.utmb.edu/news/article/utmb-news/2023/07/20/new-ai-technology-shows-promise-in-early-detecting-diabetes-using-x-rays-and-medical-records#:~:text=The%20study%20shows%20that%20an,preventing%20complications%2C%20%20%20said%20Dr>

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