

## Health and Physiology

# One step closer to having diabetes under control

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### ABSTRACT

*Type 1 diabetes is a chronic illness that requires patients to control their blood sugar levels constantly. With daily injection of insulin to maintain healthy glucose concentrations, the patient's quality of life suffers. A drug being tested on newly diagnosed patients could improve their quality of life by protecting and stimulating the pancreatic cells responsible for blood sugar regulation.*

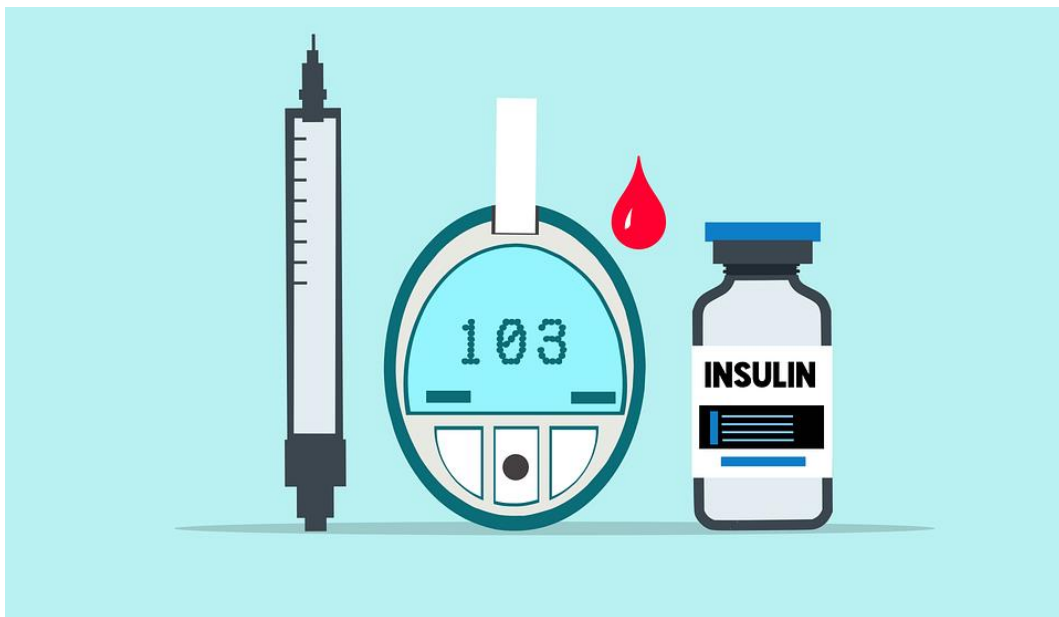


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Imagine yourself walking on a wire between two cliffs. You have to stay as stable as possible, taking into account the wind, the tension in the rope and your movements. It seems difficult, doesn't it? Yet, this is what daily life looks like for people with type 1 diabetes. In this autoimmune disease, our body destroys its own cells, specifically the cells of the pancreas responsible for the production of insulin, called beta cells. Discovered 100 years ago, insulin is essential to maintain an optimal amount of sugar in the blood. Without insulin, sugar builds up in the body and cannot be used by our organs and muscles. This can lead to kidney damage as well as cardiovascular and even eye problems. For people suffering from type 1 diabetes, the only treatment currently available is regular injections of synthetic insulin, mimicking the action of the pancreas. Many technological advances

have been made in the control and regulation of insulin injections, notably thanks to insulin pumps and blood glucose sensors. Nonetheless, this remains very restrictive for patients, who must walk a tightrope throughout their day, imposing constant vigilance. It's also a huge financial burden for patients as well as healthcare systems. A promising study shows the beneficial effects of a new possible treatment for diabetics treated with insulin.

Researchers Guanlan Xu, Tiffany D. Grimes and their colleagues from the University of Alabama in the United States studied the effects of a drug initially used to treat hypertension, Verapamil, in diabetic patients. For 2 years, they measured the effects of the treatment on a group of 10 patients, especially the insulin requirements. The researchers collected blood

samples and compared the group treated by Verapamil and a control group which was given a placebo. The results show that patients treated with Verapamil had lower external insulin requirements than the control group of diabetic patients, while showing signs of stabilization or even improvement of pancreatic function. This drug would therefore reduce the need for external insulin, and at the same time protect the surviving pancreatic cells.

To determine the effects of the drug on the pancreas, the scientists turned to mass spectrometry to identify all the proteins present in the patients' blood. Each chemical element has its own spectrometric signature, an identity card in the form of peaks of varying electrical intensity, which allows their identification. With this snapshot of blood composition, they could compare different groups and see what varied between them. They were able to identify about 800 different proteins, 10 of which were significantly affected by Verapamil. These 10 proteins play major roles in the modulation of the immune response or in the biological activity of pancreatic beta cells. The researchers therefore concluded that Verapamil has a beneficial effect on the stimulation of beta cells and protects them against diabetes-induced destruction. As a result, the patients could better control their disease after 2 years of treatment compared to the control group. It is therefore an important improvement of

quality of life and safety for patients, giving them a safety net and an extra help to more easily stay in balance.

Despite these promising results, the clinical trial is still in Phase 2, which means that a very small number of patients have been treated. This study still needs to be extended to larger cohorts of patients and over a longer period of time to give stronger perspectives in terms of clinical perspective and side-effect monitoring. Several drugs are currently being tested, and it remains to be seen which ones will be effective on the greatest number of people. Verapamil has the advantage of having already been used for a long time and its long-term effects are well known. It's also easy to take on a daily basis and not as expensive as insulin treatments. There is no certainty that this drug will go further to end up as an effective type 1 diabetic treatment, but these are without any doubt promising results.

Currently, the main goals of the drugs tested for diabetes is to prevent the use of external insulin for diagnosed patients. They may even delay or avoid the appearance of symptoms in people who are at risk to declare the disease. Despite the remaining challenges, results like these bring a tremendous amount of hope and enthusiasm to the 40 000 type 1 diabetics in Switzerland and millions around the world.