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Artificial pancreas partnerships aim to compete with Medtronic



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The glucose monitor company Senseonics has become the latest group to sign up the insulin delivery algorithm developer Typezero as a partner on an artificial pancreas project. Typezero is already working with Dexcom, Tandem and Ascensia on one such project, and has licensed technology to Cellnovo for another.

This collaborative approach is taken by most of those developing closed-loop insulin delivery systems. The obvious exception is Medtronic, which has produced a series of iterations of its Minimed system, all of the components of which are developed in-house. Smaller groups need to band together to take on the giant – but even then, can they succeed?

The latest deal will see Typezero develop its inControl artificial pancreas software to work with Senseonics' Eversense implantable continuous glucose monitoring (CGM) system. Eversense is implanted subcutaneously in the upper arm and lasts three months before it must be replaced. It uses fluorescence sensing – the intensity with which a chemical in the device fluoresces depends on glucose levels in the interstitial fluid. The sensor communicates with a separate transmitter, which then sends the data to an app.

Eversense was CE marked a year ago, and a label update for six months' use is expected in the coming months ([Senseonics hooks Roche for implantable glucose monitor, May 26, 2016](#)). Senseonics is working towards a US PMA, too, and must be confident of success as it is preparing for US launch.

In its current form it requires the patient to take the data from the app and manually programme their insulin pump; Senseonics wants to eliminate this step by linking the sensor to an insulin pump without any human mediation. The new system is also intended to work with insulin pens, alerting patients when they need to administer a bolus.

Partners

The deal is non-exclusive, and Typezero has its fingers in many pies. It is responsible for the algorithms being tested in the NIH-sponsored international diabetes closed-loop trial, geared at developing a system that can predict peaks and troughs in blood sugar and adjust insulin delivery accordingly.

The algorithms are being tested with glucose monitors from two developers, and two more companies are supplying the pumps. A second NIH-funded trial, testing a different algorithm, will follow.

Separately, Typezero licensed its software to Cellnovo last month. The inControl platform will be incorporated directly into Cellnovo's micropump. Cellnovo declined to give details of this project when contacted by *EP Vantage*.

Other companies focusing on the software component of artificial pancreas systems include Mode Automated Glucose Control, a start-up in Palo Alto, California co-founded by a former Dexcom executive, and Diabeloop, a French company also collaborating with Dexcom and Cellnovo ([Diabeloop takes the collaborative route to Europe, May 11, 2017](#)).

The other company with an algorithm is, of course, Medtronic. Its most advanced closed-loop device, the Minimed 670G, is the only one to have gained FDA approval, and the company developed all the parts in-house. But that sort of thing is easy for a company with a market cap in the hundred-billion-dollar range.

Smaller groups need to specialise, and can only master one aspect. Still, with luck, these partnerships ought to enable more closed-loop systems to reach patients.

Selected artificial pancreas collaborations

Company	Product	Status
Tandem Dexcom Typezero Cellnovo Ascensia	Typezero's algorithms will be tested with blood glucose monitors from Dexcom and Ascensia and insulin pumps from Cellnovo and Tandem	Currently in the 240-patient international diabetes closed loop trial (NCT02844517); data expected early 2017
Diabeloop Dexcom Cellnovo	Cellnovo's insulin patch pump plus Dexcom CGM, incorporating Diabeloop's algorithms	Currently in 60-patient pivotal EU trial (NCT02987556); data expected late 2017 and CE mark in 2018
Typezero Cellnovo	Typezero's software plus Cellnovo's Bluetooth-enabled micropump	Product launch expected in 2018
Insulet Dexcom Mode AGC	OmniPod plus DexCom CGM and an algorithm licensed from Mode AGC	Currently in feasibility testing with prototype
Typezero Senseonics	Typezero algorithms plus Senseonics' Eversense CGM	Development beginning