

# Emerging Technologies in Diabetes Research

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## JDRF Hosts Key Session on Artificial Pancreas Progress at ADA Scientific Meeting

In an acknowledgement of its leadership in driving the development of an artificial pancreas, JDRF was asked to co-host a special symposium on the dramatic progress in automating diabetes control at last weekend's American Diabetes Association Scientific Sessions. The ADA meeting is a key annual gathering for diabetes researchers worldwide, and the joint JDRF-ADA symposium underscored the partnerships JDRF is forging to bring new treatments and cures to people with type 1 diabetes.

In joining forces with JDRF to host the symposium, the ADA recognized the importance of promoting JDRF's research leading to an artificial pancreas, and of raising awareness about the science now underway. ADA noted that artificial pancreas technologies could not only significantly improve the lives of people with type 1 diabetes, but could have a major impact on those with type 2 who are insulin-dependent, a key part of ADA's constituency.

"This joint symposium highlights how major organizations working together can move these technologies forward," said Richard Bergenstal, M.D., Executive Director of the International Diabetes Center and the ADA's President, Medicine & Science. "It's going to require collaboration between many different organizations to come together to tackle this problem."

JDRF was happy to have the opportunity to outline the progress of its Artificial Pancreas Project to the larger diabetes research community.

"It's very exciting to work together to help people with diabetes achieve their outcomes," said Aaron Kowalski, Ph.D., who directs JDRF's Artificial Pancreas Project. "We're all interested in people with diabetes achieving better glucose control. The community needs to hear what's happening and where we are headed."

At the symposium—"The Artificial Pancreas: A Goal within Reach?"—JDRF-funded researchers announced new,

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previously unpublished findings that further underscore the potential for the artificial pancreas to improve the lives of people with diabetes. The speakers predicted that early-generation artificial pancreas technology could become commercially available within a matter of years.

In the first study, an artificial pancreas system improved overnight glucose control across a range of "real-life situations" in adults—and did so without increasing the risk of dangerous low blood sugar. The findings were presented by Roman Hovorka, Ph.D., Principal Research Associate at the University of Cambridge Metabolic Research Laboratories. Dr. Hovorka has been a key member of JDRF's Artificial Pancreas Project since the program's launch.

By using an artificial pancreas system, adults in the study spent 70 percent of the time overnight within a target blood glucose range, compared with only 47 percent of the time without using an artificial pancreas. To demonstrate the real-life benefits of artificial pancreas technology, the study showed that these benefits remain consistent even after adults ate a large meal and drank a glass of white wine before bedtime. As in the other studies, dangerous low blood sugar—hypoglycemia—was reduced, even though alcohol is known to increase the risk of nighttime hypoglycemia for people with diabetes.

A second study helped to identify the "psychosocial characteristics" of people with type 1 diabetes, in order to show those most likely to successfully use continuous glucose monitoring (CGM) devices, an important component of an artificial pancreas system. This data, presented by Marilyn Ritholz, Ph.D., Senior Psychologist at the Joslin Diabetes Center and Assistant Professor at Harvard Medical School, will help physicians and other

diabetes care providers to identify patients that the new devices are most likely to benefit.

The Joslin Center research found that the people most likely to achieve good results with the technology included those: who used problem-solving skills for coping with frustration and anger, who saw CGM as a way to better understand their diabetes, or who had good support from family members. Those less likely to benefit included people who: had anger and impulse control issues, failed to synthesize the data from CGM, and didn't have good support.

A number of other JDRF-related studies and announcements were made in conjunction with the ADA sessions. For more information about the studies and the symposium, please visit the Artificial Pancreas Project website at [www.artificialpancreasproject.com](http://www.artificialpancreasproject.com).

## Animas, UC Santa Barbara Help Advance Artificial Pancreas Project

Three members of JDRF's Artificial Pancreas Consortium—the University of California, Santa Barbara (UCSB), Sansum Diabetes Research Institute, and pump manufacturer Animas—have helped advance research leading to the development of an artificial pancreas.

Having already created a key tool for advancing this research in clinical trials—called the Artificial Pancreas System (APS) platform—UCSB and Sansum just announced that the platform is now compatible with Animas' insulin-delivery products. This is an important development since it underscores the flexibility being designed into various artificial pancreas systems to accommodate glucose sensors and insulin pumps developed by multiple companies.

Animas, a Johnson & Johnson company, is partnering on a non-exclusive basis with JDRF to develop a first-generation artificial pancreas.

“The significant progress that the researchers at UCSB have made with their artificial pancreas system” is one reason scientists are predicting that a first-generation artificial pancreas will be commercially available in the not-too-distant future, said Aaron Kowalski, Ph.D., Director of JDRF's Artificial Pancreas Project.

“We are all aware of the near-term impact on quality of life that even a partially automated artificial pancreas system can have on people with diabetes, and we are excited to see this development move forward,” Dr. Kowalski said.

Animas' insulin-delivery products configure seamlessly with UCSB/Sansum's platform. The hope is that this compatibility will help speed the development of an artificial pancreas by providing added flexibility for research centers working on artificial pancreas systems. It should also add to the likelihood of adoption by physicians and people with diabetes.

“This milestone should improve the communication performance of the system while also expanding the number of possible research centers that can use it to help close the loop for automated insulin delivery for patients with type 1 diabetes,” said Dr. Howard Zisser, Sansum's Director of Clinical Research and Diabetes Technology.

Animas is already supplying its insulin-delivery products to UCSB/Sansum and will begin supplying them to other members of JDRF's Artificial Pancreas Consortium, the global group of university-based mathematicians, engineers, and diabetes experts that has developed the computer programs (or algorithms) to link continuous glucose monitors and insulin pumps to create an artificial pancreas. The APS has enabled clinical trials to be conducted that have proved the scientific feasibility of the computer programs.

“The APS is the only system that allows fully automated closed-loop clinical trials, and its design allows it to be expanded as new devices become available,” said Dr. Eyal Dassau, lead scientist for UCSB's Artificial Pancreas System.

The announcement was made at the American Diabetes Association's annual Scientific Sessions, where JDRF hosted a special symposium on the dramatic progress in artificial pancreas systems in automating diabetes control.

A copy of the Animas/UCSB/Sansum announcement is [here](#).

For more information about the Artificial Pancreas Project, please visit [www.artificialpancreasproject.com](http://www.artificialpancreasproject.com).