Abstract

The Artificial Pancreas Consortium was established in 2006 as part of the Juvenile Diabetes Research Foundation International (JDRF) Artificial Pancreas project, a multimillion dollar, multiyear initiative with a mission to accelerate the development of systems for automated control of blood glucose in patients with diabetes. Consortium investigators seek to research and develop strategies, which can be commercialized, that will confer the long-term benefits of improved glycemic control by combining novel automated control algorithms and hormone therapies with continuous glucose monitors (CGMs) and pump devices.

Mission

The Artificial Pancreas Consortium project aims to accelerate the development of systems for automated control of blood glucose in patients with diabetes. The field of closed-loop artificial pancreas research requires that expert diabetologists partner with expert mathematicians and engineers. Consortium investigators include leading endocrinologists and control theorists at top research institutions in the United States and Europe. Many of the leading diabetes device manufacturers have also participated, providing pumps and sensors with enhanced capabilities that allow for closed-loop experiments to be performed.
Structure & Governance

Multicenter consortium activities are coordinated by the Jaeb Center for Health Research, an organization with a strong record of conducting high-impact, diabetes-related human clinical trials. Regulatory affairs are streamlined by an advisory group of experienced JDRF personnel and outside consultants, ensuring good coordination with the FDA and other regulatory bodies. JDRF and FDA have partnered to proactively address regulatory obstacles, and in March 2006 the FDA named the artificial pancreas one of its Critical Path initiatives.

Financing

The consortium is supported by the patient philanthropy, JDRF, as part of its Artificial Pancreas Project, which dedicated more than $5.5 million for the first year’s funding.

Patent Engagement

The consortium is supported by the patient philanthropy, JDRF.

Data Sharing

A consortium goal is to develop a secure Consortium website with a central repository for experimental data and interfaces to submit candidate control algorithms for centralized validation and to upload or download clinical data sets. All participants are required to share their findings with the consortium.

Impact/Accomplishment

Progress to Date: Collaboration among Consortium investigators and the coordinating center has produced a wealth of shared resources to accelerate Consortium research, including the following:
• design, optimization, and clinical testing of multiple algorithmic approaches to closed-loop control
• an in silico simulation platform, accepted by the FDA, for validating candidate closed-loop control algorithms in place of animal trials
• reusable templates for constructing the IDE regulatory documents that must be approved by the FDA prior to any in-clinic, computer-assisted, closed-loop control research involving people
• a modular software platform—the Artificial Pancreas System (APS)—with a protocol-independent user interface and hooks to incorporate an arbitrary control algorithm and control various CGMs and pump devices
• a secure Consortium website with a central repository for experimental data and interfaces to submit candidate control algorithms for centralized validation and to upload or download clinical data sets

Ongoing and recently completed in-clinic studies at the end of 2011 include investigations into hypoglycemia prediction and avoidance as well as fully automated, closed-loop control investigations using MPC and PID/PD-based algorithms. The most recent developments include the first-ever feasibility trials of portable, outpatient-based, closed-loop control systems.

Links/Social Media Feed

Homepage

Points of Contact

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Sponsors & Partners

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