

## AP@home: A Novel European Approach to Bring the Artificial Pancreas Home

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and the AP@home consortium

### Abstract

The development of an artificial pancreas (AP) made huge strides from 2006 to 2008 and a large number of activities are going on in this area of research. Until now, most AP systems under development were tested only under highly controlled conditions. The aim of our project, funded by the European Union, is to develop an AP system to such a level that it can be studied under daily life conditions at the home of patients with diabetes (hence AP@home). Based on a subcutaneous-subcutaneous closed-loop strategy (i.e., glucose sensing and insulin infusion in the subcutaneous tissue), two different approaches will be taken to achieve this aim: a two-port AP system and a single-port AP system. The two-port AP system will use off-the-shelf-components for the glucose sensor and insulin pump in combination with closed-loop algorithms generated in Europe. As to the single-port AP system, two different innovative single-port systems will be developed; in this case, continuous glucose monitoring and insulin infusion will take place via a single catheter. The first clinical trials with the two-port AP system under controlled clinical conditions have started and good progress has been made in the development of the single-port AP systems. We believe that our consortium of 12 European partners, which builds on existing achievements and close cooperation between academic centers and industry, can contribute substantially to the development of an AP system that can be used by patients in daily life.

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**Abbreviations:** (ADICOL) Advanced Insulin Infusion using a Control Loop, (AP) artificial pancreas, (AP@home) Artificial Pancreas at home, (CGM) continuous glucose monitoring, (CLINICIP) Closed Loop Insulin Infusion for Critically Ill Patients, (CRC) clinical research center, (CRI) clinical research institute, (DIADVISOR) Personal Glucose Predictive Diabetes Advisor, (EU) European Union, (FDA) Food and Drug Administration, (ICT) information and communication technologies, (INCA) Intelligent Control Assistant for Diabetes, (JDRF) Juvenile Diabetes Research Foundation, (MPC) model predictive control, (PBA) phenylboronic acid, (PID) proportional integrative derivative, (RCT) randomized clinical trial, (SC) subcutaneous

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