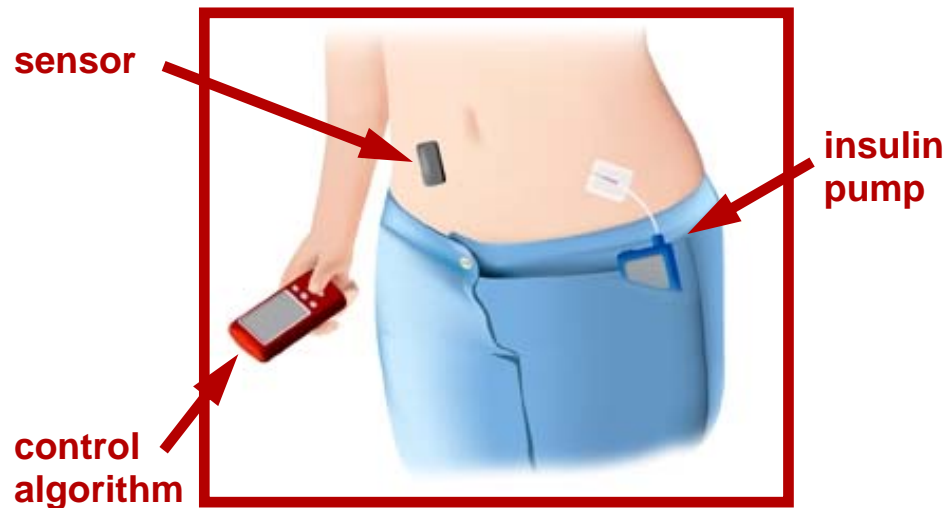


# ARTIFICIAL PANCREAS NEWSLETTER

Winter 2011 / 2012



## Artificial Pancreas Studies

We would like to say a big thank you to all our study participants and update you on the research that we have carried out this year. Without your dedication and commitment to our research we could not have made this progress.

## Day and Night Closed-loop Study

After evaluating the results of the first Day and Night study in which 12 adolescents aged 12 to 18 came to the hospital for two visits, each lasting 36 hours, we extended the study to a further 8 participants so that we could gain more information about the meal boluses to help improve the algorithm for home testing.

During this time the young people took part in a range of normal daily activities: cycling, reading, schoolwork, games consoles, etc.

On both visits the glucose was controlled by the computer.



## Automated system to be used at home

We completed an overnight study on 8 children using the same system that we will take home later in the new year. The results were very promising showing very tight glucose control overnight with avoidance of episodes of hypoglycaemia.



## Adult studies

In September we completed an international study as part of the AP@home European Consortium. The study looked at closed-loop glucose control with 8 participants from each of 6 centres in Cambridge, Italy, Netherlands, Austria, France and Germany.

We compared 2 different algorithms - the Cambridge algorithm which we have been developing at Addenbrooke's Hospital and an algorithm developed in Italy. These algorithms were also compared against conventional insulin pump therapy. Volunteers came to the hospital for 3 visits. We used the Dexcom Glucose Sensor and the Omnipod insulin pump. This is the first time we have used the Omnipod pump. This is a 'patch' pump, ie the insulin is in a pod and insulin infusion rate etc is changed from a hand-held wireless controller.

All six participating centres have now completed the study and we are in the process of analysing data. Early results indicate that computer algorithms are superior to usual pump therapy in reducing low blood glucose (hypoglycaemia). Results from this study will form a basis for further larger studies which are to be conducted in patient's home setting.

## Closed Loop in Pregnancy (CLIP) Studies

Following on from the pilot study using closed-loop in pregnancy (CLIP01), we designed a study to evaluate closed-loop insulin delivery during normal daily activities in pregnant women with type 1 diabetes.

Twelve women spent two 24-hour stays on the research ward - on one visit they continued their usual insulin pump regimen using fingerprick glucose levels to adjust insulin doses; on the other visit they used the closed-loop system of insulin delivery.

The visits included two 50-minute sessions of brisk walking on a treadmill as well as three gentle walks around the hospital premises, to capture the highs and lows of glucose control in pregnancy. Standardised meals and snacks were eaten. We measured activity levels as well as glucose levels.



The results showed that glucose control was very similar between the closed-loop and usual treatment. Even with insulin adjustment, 'hypos' occurred after exercise on both visits (results published recently in the journal Diabetes Care, and presented at conferences)

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