

## **Summary**

### **Closing the loop in dialysis patients with diabetes**

Diabetes accounts for the largest proportion of patients undergoing dialysis.

Optimal diabetes control is important to prevent severe complications such as atherosclerosis, myocardial infarction and stroke, thereby reducing morbidity and mortality of diabetic patients. However, maintenance of optimal glucose in patients receiving dialysis poses major challenges to both patients and health care professionals. Complex interactions between end-stage renal disease and the dialysis procedure itself predispose these patients to potentially harmful hypo- and hyperglycaemic fluctuations.

Closed-loop insulin delivery (also known as the Artificial Pancreas) is an emerging therapeutic approach in which a control algorithm autonomously increases and decreases subcutaneous insulin delivery on the basis of real-time sensor glucose measurements, thereby approximating the physiology of the healthy pancreatic beta cell. Due to the continuous adjustment of insulin dosing according to the current blood glucose value, the closed-loop system can cope with the day-to-day variations of insulin requirements (e.g. different blood sugar levels on days with and without dialysis) and has the potential to improve glucose control whilst reducing the risk of hypoglycaemia. Automation of glucose monitoring and insulin delivery may also alleviate the burden of diabetes self-care in this population and hence improve quality of life.

The planned study will evaluate whether closed-loop insulin delivery compared to usual insulin therapy in dialysis patients with type 2 diabetes improves glucose control without increasing or even reducing the risk of hypoglycaemia. The study will also test the feasibility and acceptance of the closed-loop therapy so that it could be considered as a standard treatment modality in the future.

Given the clear need for improved diabetes care and novel approaches to the management of diabetes for people requiring dialysis, we believe that the proposed study makes an important contribution to the field.