

The Artificial Pancreas for People with Type 1 Diabetes

www.diacongroup.org

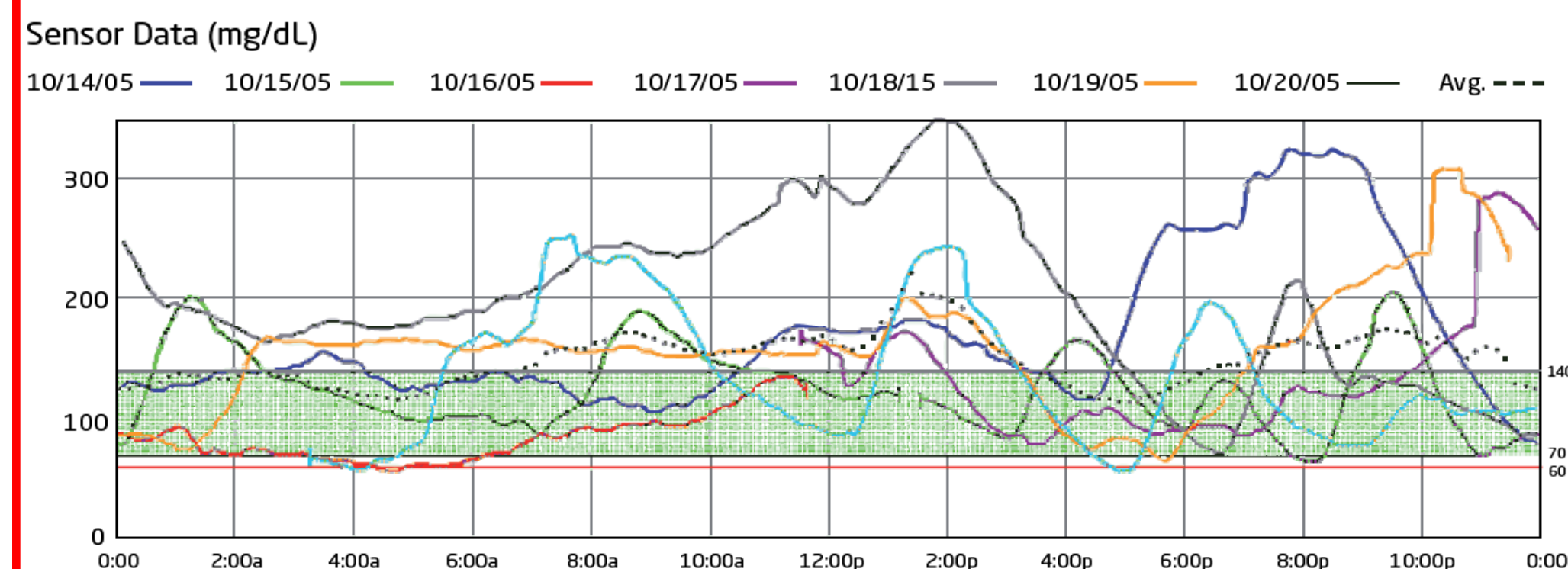
Diabetes

In 2012 371 million people have diabetes. This is 8,3% of the world population. 300.000 danes have diabetes. These numbers are expected to double by 2030. 10% of the cases are type 1 diabetes. In 2006, the total cost in DK associated with diabetes is 31,5 mia DKK of which 22 mia DKK is medical costs.

In healthy people, the blood glucose is controlled by release of insulin from the pancreas. Insulin is released such that it lowers blood glucose to the right value of 90 mg/dL and keeps it between 70 and 110 mg/dL. It never becomes lower than 60 mg/dL at which people fall into coma and may die.

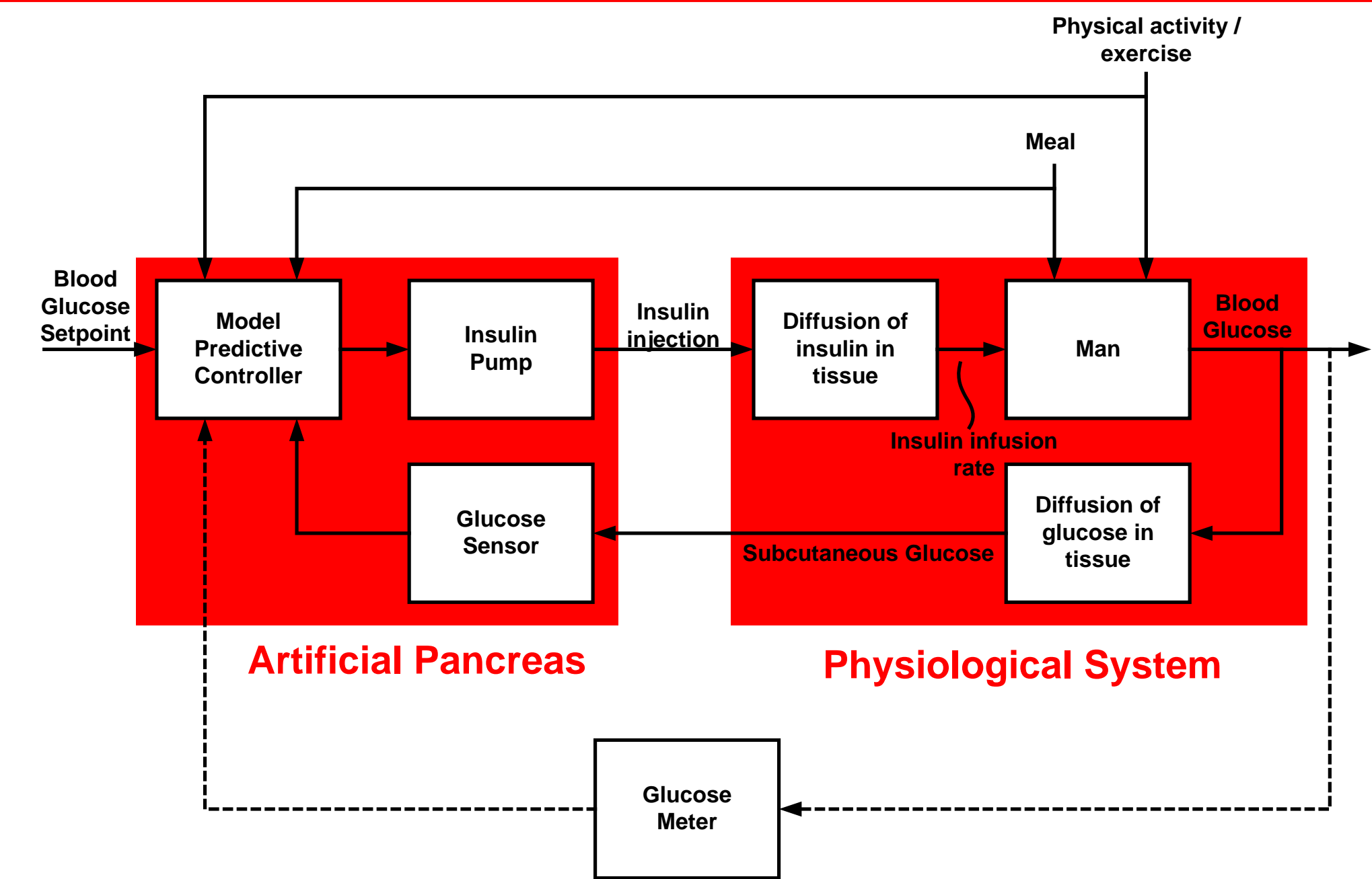
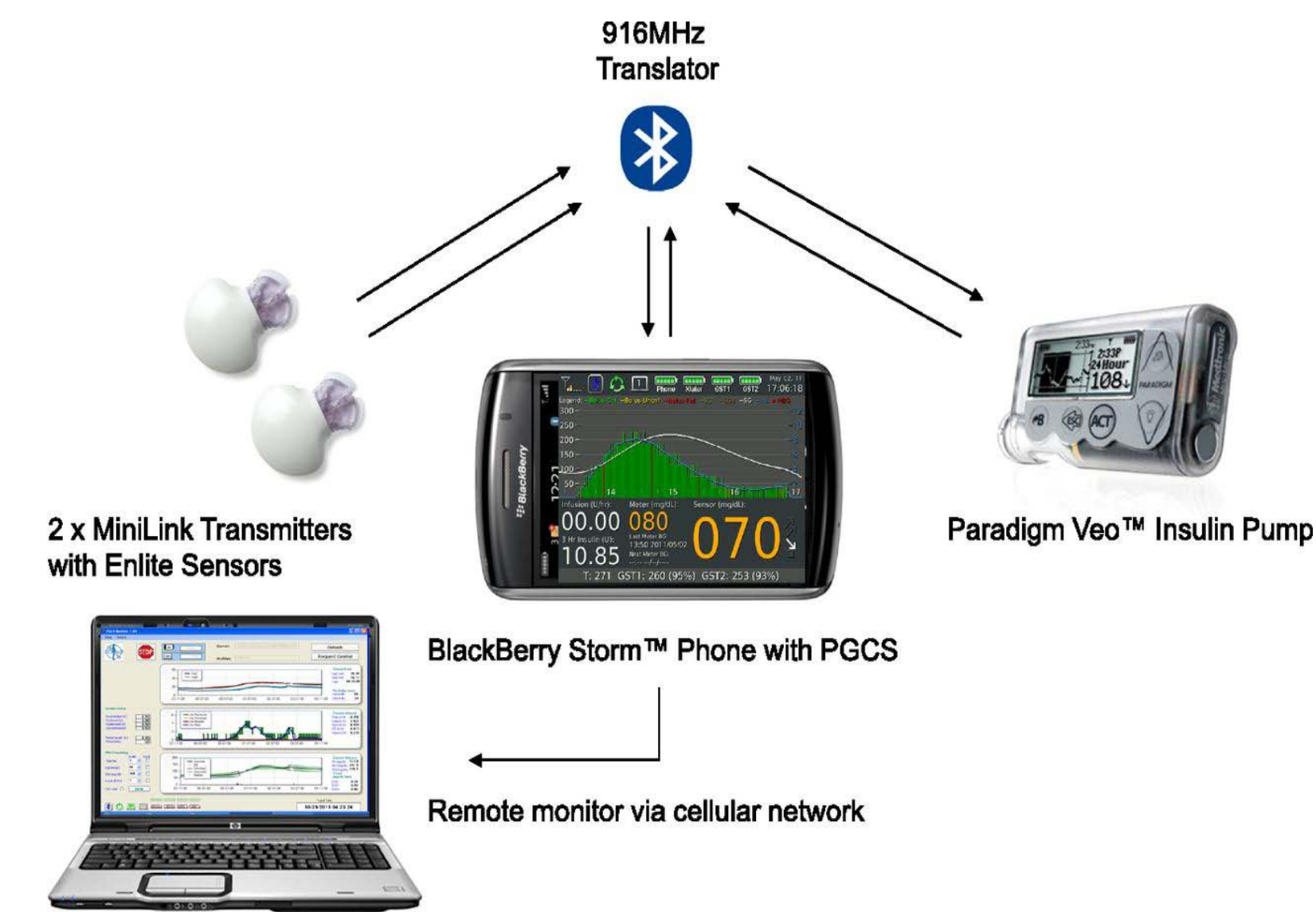
People with diabetes do not produce insulin. Insulin must therefore be injected to keep blood glucose in the normal range. To most people it is difficult to inject the right amount of insulin at the right time – see the Figure below.

We improve insulin therapy and develop systems and software for automatic injection of the right insulin dose at the right time based on glucose sensors and mathematical models.



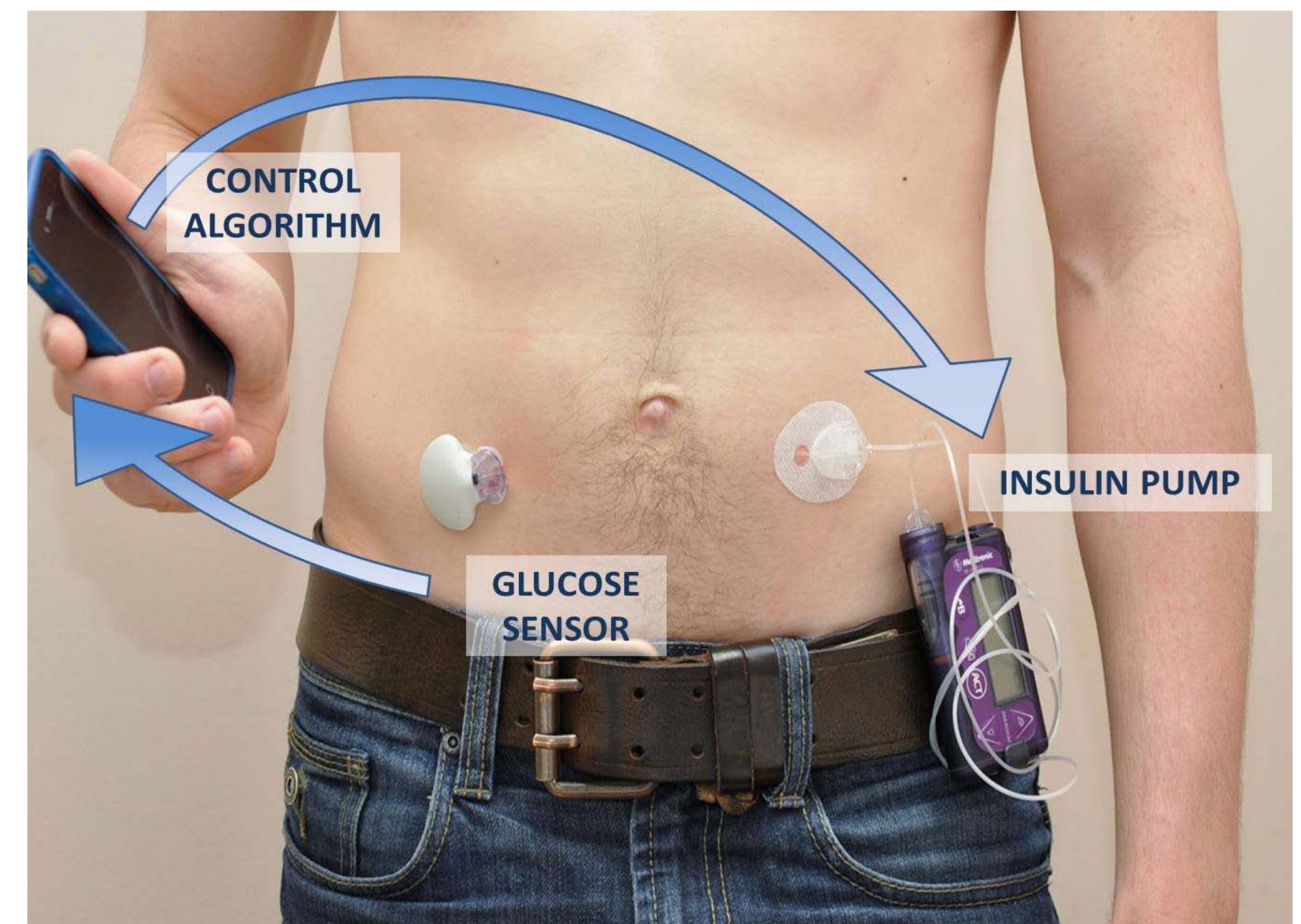
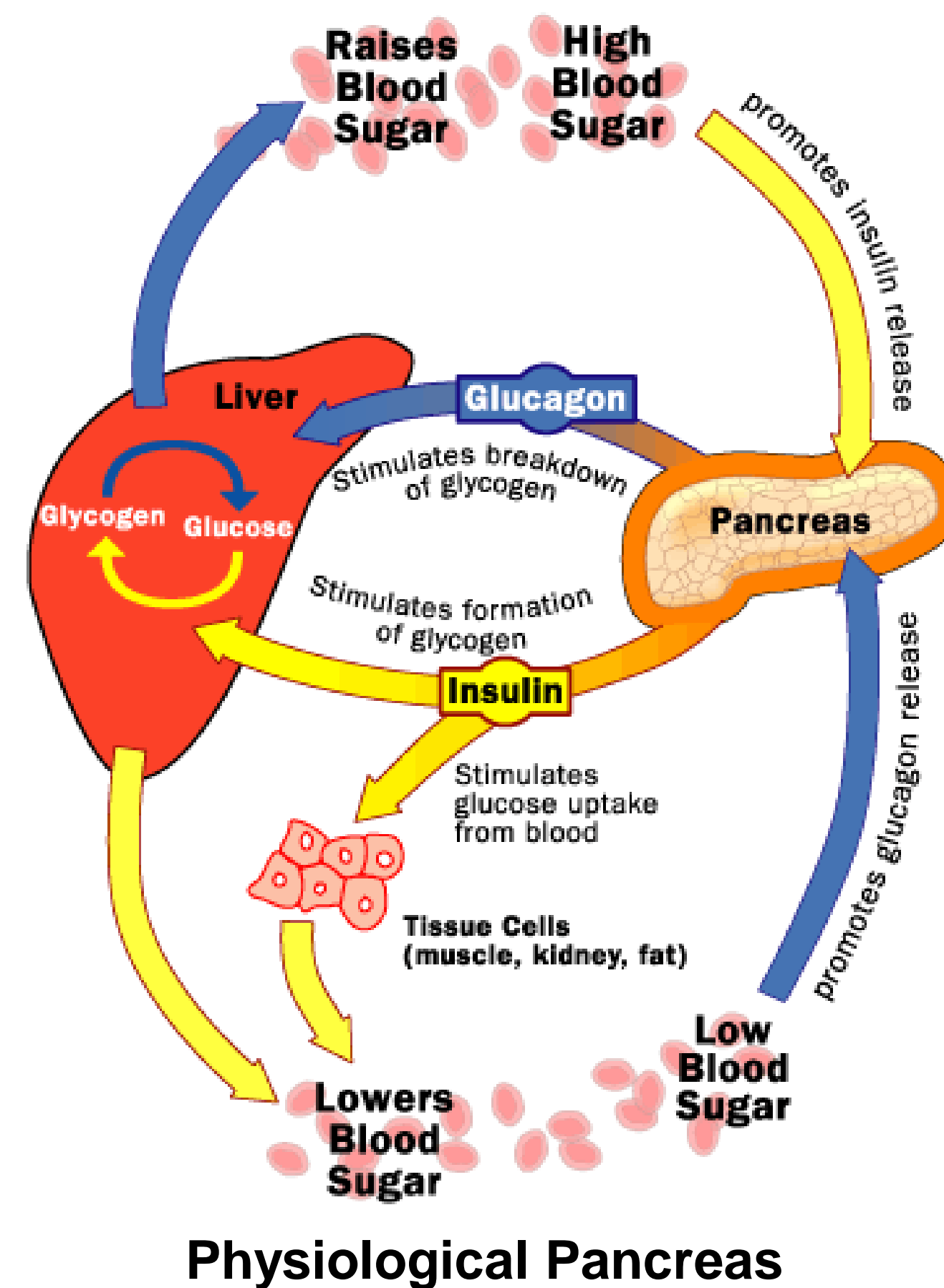
Blood glucose for conventional insulin therapy

Closed-Loop Diabetes Care System



Physiological and Artificial Pancreas

The artificial pancreas is an intelligent system that computes how much insulin to inject based on glucose measurements. Model Predictive Control and mathematical models are used in the control algorithm.



Artificial Pancreas