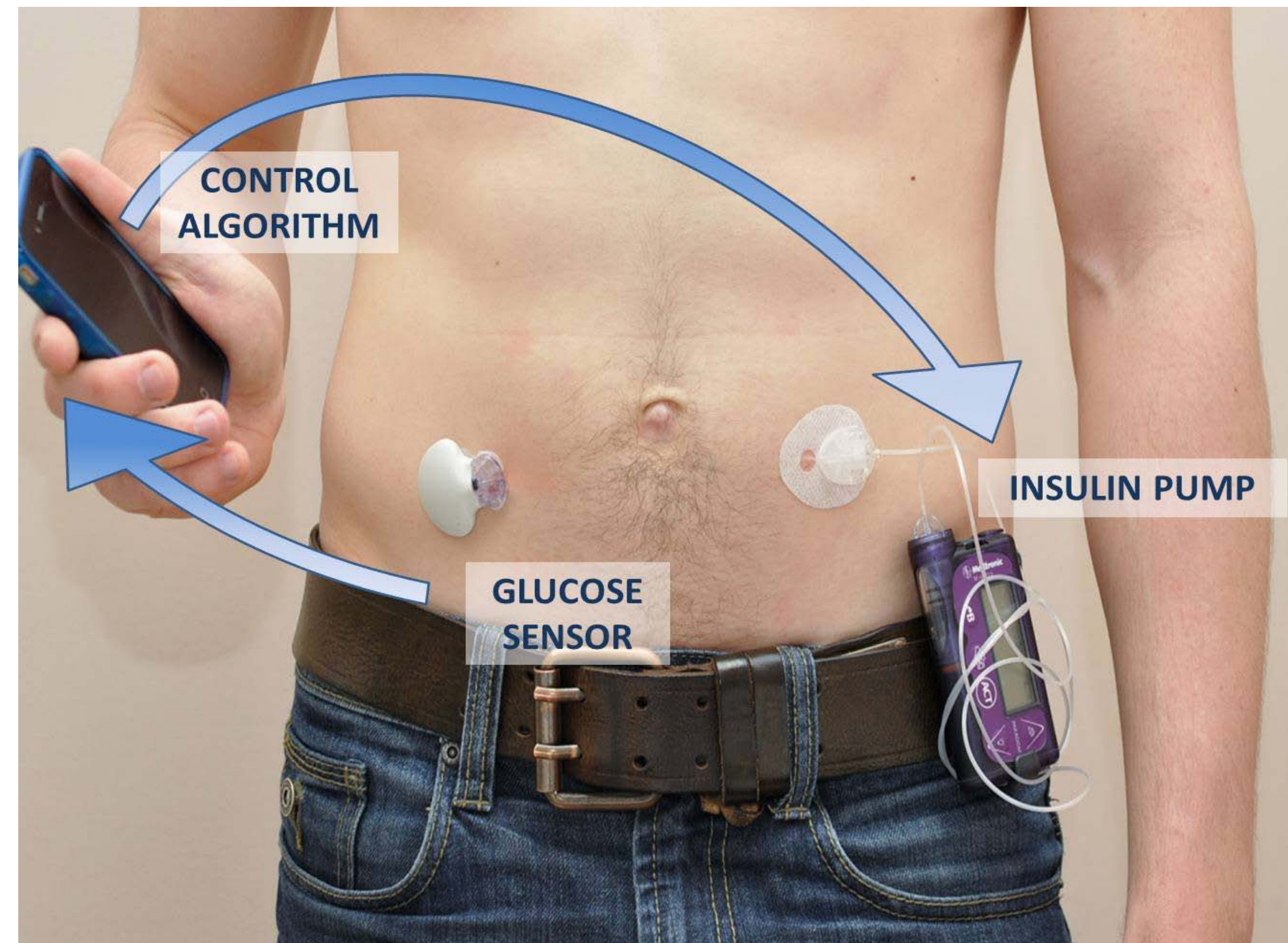# The Artificial Pancreas

## Prototype Artificial Pancreas – Beta Cell

**Insulin Pump + Glucose Sensor**
**Laptop computer with control algorithm (MPC)**
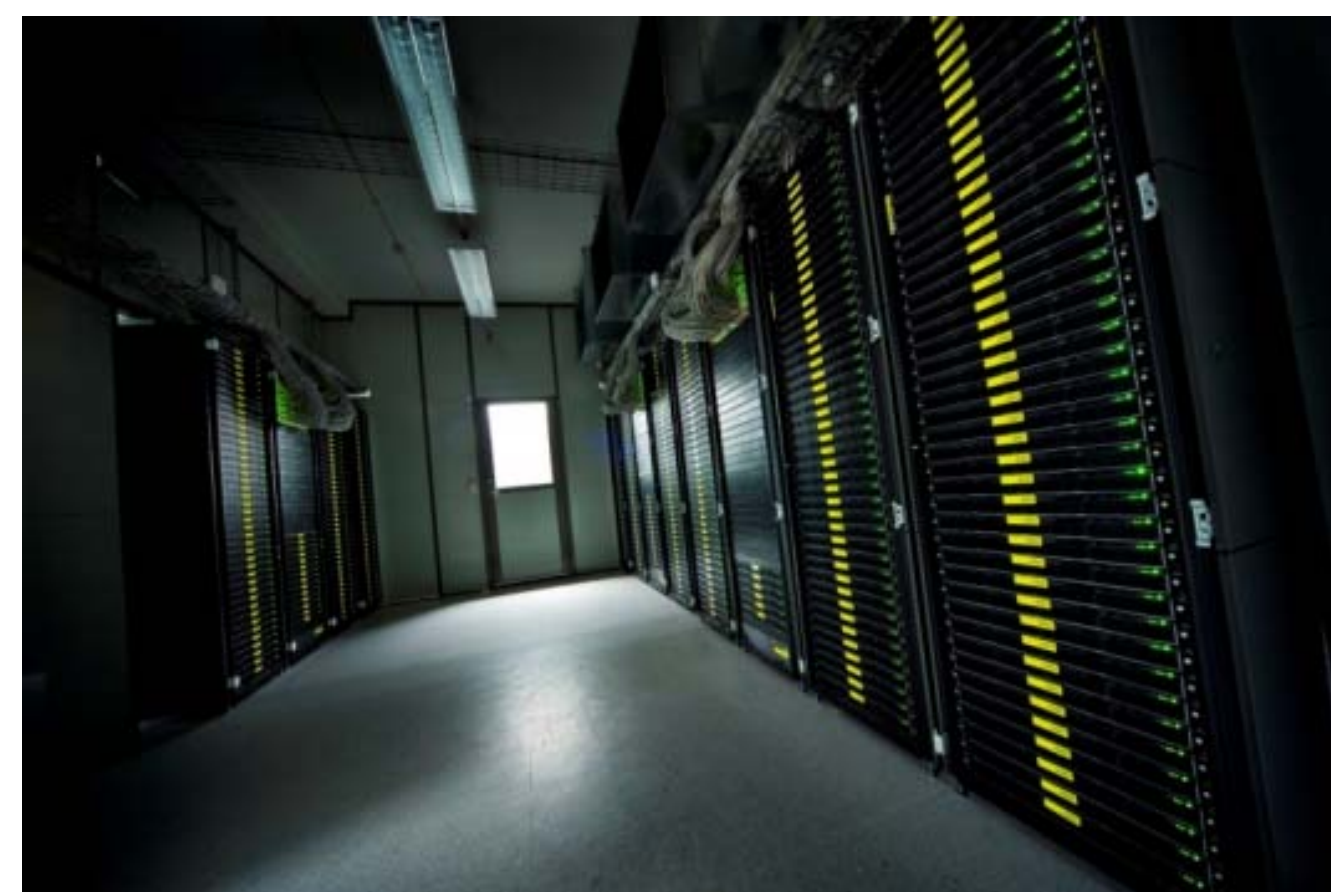
## Portable Artificial Pancreas – Beta Cell

**Insulin Pump + Glucose Sensor**
**Smartphone computer with control algorithm (MPC)**

## Portable Artificial Pancreas

**Insulin Pump + Glucagon Pump + Glucose Sensors**
**Smartphone computer with control algorithm (MPC)**



CONTROL ALGORITHM

INSULIN PUMP

GLUCOSE SENSOR

916MHz Translator

2 x MiniLink Transmitters with Enlite Sensors

BlackBerry Storm™ Phone with PGCS

Paradigm Veo™ Insulin Pump

Remote monitor via cellular network

**Cluster of high performance computers for analysis of data and individualization of the control algorithms**

Raises Blood Sugar    High Blood Sugar    promotes insulin release

Liver    Glucagon    Stimulates breakdown of glycogen    Pancreas

Glycogen    Glucose    Stimulates formation of glycogen    Insulin

Stimulates glucose uptake from blood

Tissue Cells (muscle, kidney, fat)

Lowers Blood Sugar    Low Blood Sugar    promotes glucagon release