

Abstract

FORGETDIABETES introduces a radically new approach to Type 1 Diabetes (T1D) treatment, by developing an immunooptimized, fully-implantable, fully-automated, Bionic Invisible Pancreas (BIP). BIP targets physiological intraperitoneal hormone delivery, enabling an optimal glycemic control. T1D patient number is rising, projected at 63-94 million in 2045. T1D patients require exogenous insulin, resulting in an exorbitant number of actions: 100.000-500.000 in one patient's life. BIP will free T1D subjects from therapeutic actions and from related psychological burden. BIP will become a life-condition (like wearing glasses), allowing T1D patients to live just as everybody else. An interdisciplinary team with top experts in micronano mechatronics, control engineering, biomaterials, endocrinology, surgery and behavioural sciences has been assembled to develop what was regarded as impossible for decades: a long-lasting system relying on a physiological glucose sensing and hormone delivery, orchestrated by personalized adaptive algorithms with advanced self-diagnostic capabilities. Pump refilling through a weekly oral recyclable drug pill will free T1D subjects from the burden of painful and awkward daily measurement and treatment actions.

Wireless power transfer and data transmission to cloud-based data management system round-up to a revolutionary treatment device for this incurable chronic disease. In this project, the key technologies enabling BIP will be developed.

Furthermore, extensive in vivo preclinical experiments along with massive in silico testing will establish the proof-of-principle, paving the way to the ambitious first-in-human inpatient trial of BIP. This paradigm will revolutionize diabetes treatment and stimulate an innovation ecosystem including research bodies, SMEs, patient organizations, diabetes societies and clinicians.

By investing in efforts like FORGETDIABETES, Europe will stand at the forefront of technological innovations for T1D treatment.