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PATENT

# Device and method of continuous insulin infusion dose with a hybrid corrective and predictive PID monitoring

Market sector: medical devices, drug delivery

Type of opportunity: licensing and/ or co-development

## Scope of the problem

Diabetes is not only a health crisis; it is a global societal catastrophe. Due to its chronic nature, diabetes causes devastating personal suffering and drives families into poverty. Diabetes now affects more than 425 million people, and the estimates of children and adolescents below age 20 with type 1 diabetes has risen to over a million. If nothing is done, the number of people with diabetes may rise to 629 million in 2045.
Type 1 diabetes is caused by an autoimmunereaction where the body's immune system attacks the insulin-producing beta cells in the islets of the pancreas gland. As a result, the body produces none to very little insulin with a relative or absolute deficiency of insulin. The patient is primarily responsible for their metabolic control, which is why, due to an unadjusted application of the therapy, hypoglycemia events can occur that have serious consequences for health, including coma and death. It is difficult to adjust the therapy to a patient because the glucorregulatory system is affected by various factors that alter the insulin-glucose dynamics: diet, variation of insulin sensitivity, menstrual cycle, physical exercise, diabetological education of the patient, etc.
At the moment, the artificial pancreas (AP) is the preferred method to be used to regulate the patient's blood glucose by infusing insulin, and possibly glucagon. The AP allows a more patient-independent control of the illness, however it still has a series of technological and methodological challenges to be solved.

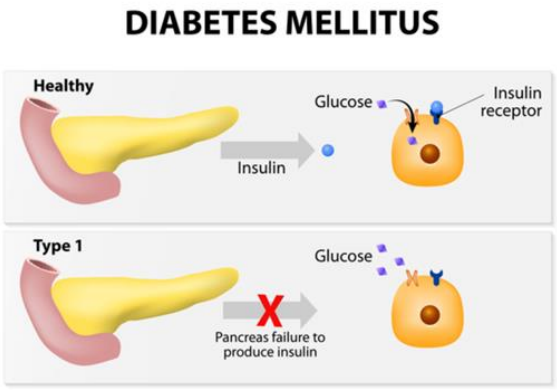
**Patient need addressed:** Diabetes, Type 1

## Our innovation:

- New automatic calculation of the insulin infusion doses that would be applied subcutaneously to a person with diabetes, to discharge him/her from the continuous decision making on their disease control and to induce normoglycemia, thus reducing the health complications derived from poor glycemic control.
- Integration of a glucose predictor algorithm to anticipate the insulin administration
- The insulin dose is conditioned by security and correction systems to avoid hypoglycemia and hyperglycemia events.
- A dose quantifier module adapts the calculated insulin doses to the electromechanical infusion device.
- Implementation in a microprocessor-based system with memory or commercial devices (smartphones, tablets, personal computers).

**Competitive advantages:** Innovative insulin dose calculation, versatile device that can be used in many other fields of medicine, precise drug delivery to improve a physiological dysfunction. It can be also used in the veterinary and industrial sectors.

**Market size/ opportunity:** It is projected that the healthcare expenditure on diabetes will reach USD 776 billion by 2045 (20-79 years). (IDF Diabetes Atlas, 2017).
In 2022, the global health care equipment & supplies market is forecast to have a value of €435.7 billion (18.6% for Other equipment segment). Geographical segmentation: USA 38.3%, Europe 31.7%, Asia-Pacific 24.2%, Middle East 0.8%, Rest of the World 5.1% (Marketline 0199-2067, November 2017).




## Intellectual property

Spanish patent application P201830247 (March 3, 2018)

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