Value Proposition:
A minimally invasive sensor for continuous glucose monitoring in the skin of diabetic patients

Need?

Diabetes is now affecting 387 million people, and was responsible for 4.9 million deaths worldwide in 2014.

Although diabetes is not curable, proper diabetes management is essential to avoid numerous possible complications, both on a short and a long term, such as hypoglycemia, cardiovascular diseases, neuropathy, retinal damage, nephropathy and amputations.

Currently 10% of healthcare expenses are related to diabetes.

Approach?

Our approach is to use microfabrication technologies to make sensing microprobes thinner than a human hair, and shorter than 700 μm. The designed sensor thus fits in the dermal region of the skin, ideal location to track glucose levels, without causing pain during insertion.

The developed technology has been demonstrated in relevant working conditions (TRL 6). Currently, our work is focus on bringing the technology to TRL 7, by demonstrating operation of a prototype in-vivo, and it is currently under patenting approval. The idea is to commercialize the product in cooperation with a partnering company, or sell the IP to a larger CGM manufacturer.

What makes our approach unique is the use of years of experience in the creation of microstructures for implantable devices and a strategy to automatically assemble the miniaturized parts to enable integration of the complete system during production.

Benefits?

The advantages are in terms of convenience (reduced pain), and thus improved quality of life, and possibly in terms of monitoring quality, and thus health.

The benefits of using this technology are significant, even if only incremental with respect to current technology. The relevance is in particular related to the amount of people that are affected by diabetes, and by the life-long need of self-monitoring of patients affected.

Competition?

Several competing products are already on the market, by companies like La Roche, Abbott, Medtronic and Dexcom. Even though implantable continuous glucose monitoring (CGM) systems have tremendously developed in the last decade, they and are not as reliable as conventional blood stick methods and are still relatively large (5 mm insertion depth), making them quite invasive, especially during the needle-based insertion procedure. Moreover, because of their size, they measure in the hypodermis, which is not the ideal measurement location for fast and reliable glycaemia tracking.

The traditional alternative to CGM is blood monitoring via finger pricks, typically measured 4 to 5 times a day. This approach is very painful, stressful, exposes to infection risks, and especially does not provide a temporal picture of the glucose concentration evolution throughout the day.

Our approach is an almost natural evolution of current CGM systems: continuous monitoring with both a minimally invasive and painless insertion procedure, and an ideal measurement location in the dermis for fast glycaemia tracking.