

15 MOST PROMISING BIOTECH STARTUPS IN EUROPE - 2019

s new technologies emerge, numerous biotech startups are launched across Europe every year. With specialised venture capital firms and technology companies pouring money into the sector, biotech startups now attract a record amount of investment. Most of these investments focus on predicting which drugs will work and be safe for humans, well before the testing process begins. In the case of diseases such as Alzheimer's, current animal models do not ensure effective evaluation of whether a drug will work in humans. But with today's biotech offerings in the market, scientists are able to convert any human cell into a stem cell to create custom' disease in a dish' models for enhanced predictability.

By leveraging modern technologies, biotech startups have also significantly reduced the expenditure of reading the entire sequence of a person's genome. With cost-effective genome sequencing, researchers are now able to screen the DNA of patients to find genetic biomarkers and in turn, select the most suitable treatment for a person based on their genetics. Building on this trend, technologies such as organoids, organson-chips, and 3D bioprinting are helping mimic the real behaviour of human tissues in the lab, thus improving the entire testing process.

As biotech startups continue to evolve by embracing new technologies, organisations must opt for solutions and services most relevant to their business requirements. To assist them with the same, our distinguished panel comprising key decision makers and experts along with StartupCity's editorial board has shortlisted some of the most promising biotech startups in Europe.

We present to you StartupCity's "15 Most Promising BioTech Startups in Europe - 2019."



LIPOCOAT

DESCRIPTION:

ENGINEERS AND MANUFACTURES **BIO-INSPIRED COATINGS TO** IMPROVE THE COMFORT, SAFETY, AND PERFORMANCE OF MEDICAL DEVICES SUCH AS CONTACT LENSES, CATHETERS, AND IMPLANTS

KEY PERSON: JASPER VAN WEERD FOUNDER & CEO

WEBSITE:

LIPOCOAT.COM



LipoCoat Bio-Inspired Coatings for Medical Devices

edical devices such as contact lenses, catheters, and implants of various kinds have been solving a number of human body-related challenges. These devices, however, come with their negatives too, as a device with inappropriate surface properties may lead to harmful infections and discomfort for the patient. As a solution, what if the coatings used in medical devices were inspired by the naturally existing cell membrane, helping reduce healthcareassociated infections and improving medical device comfort and performance?

The cell membrane, or more specifically the phospholipid bilayer, serves as a universal interface between distinct chemical environments—the contents of the cell and its surroundings. It regulates the passage of molecules and proteins into and out



of the cell, acting as a biological 'customs border'. In essence, the membrane is a highly dynamic fluid layer whose functions can be altered and customised to individual environments. These properties caught the eye of Jasper van Weerd in 2010 during his PhD research project at the University of Twente, Netherlands. He, along with two of his professors, started working on the idea of developing a surface treatment technology that could address the problems associated with medical devices.

"As a majority of medical devices' side effects and the root causes of their underperformance are governed by surface to surface interactions, we prepared a list of requirements. Bacterial and fungal contamination of the surface often results in infections, and hence, we first wanted to equip the surface with anti-fouling capabilities. In addition, if we could fine-tune other coating properties such as wetting and lubricity, then we might have found the holy grail of surface treatments," explains van Weerd. Driven by the philosophy of applying the cell membrane fundamentals to surface coatings, van Weerd and his professors founded LipoCoat in 2016, as a spin-off from the MESA⁺ Institute for Nanotechnology at the University of Twente. The start-up company develops highperformance biocompatible coatings by mimicking the lipid bilayer of the natural cell membrane along with retaining its dynamicity. The coating can self-repair in case small defects like scratches expose the medical device to the biological

environment, with molecules reorganising themselves to fill in the gaps.

APPLICATION AREAS: CONTACT LENSES, CATHETERS, AND IMPLANTS

LipoCoat's bio-inspired membranemimetic coatings feature antifouling, wetting, and lubricous properties, and are designed to comprehensively enhance the comfort, safety, and performance of medical devices including contact lenses, catheters, and implants. The company predominantly focuses on the eye care market with products that can be adapted for use on rigid gas permeable as well as soft contact lenses and can also be provided as an additive to lens care solutions. Each of LipoCoat's contact lens coating products is prepared for CE-clearance. Besides delivering a more comfortable experience to the wearer by improving the surface wetting and lubricity, the company makes these lenses safer by preventing bacteria from building up on the lens material. "Tests results show an impressive 95 percent reduction in bacterial contamination using our coating. Furthermore, the quest for bacteriafree surfaces acts as a stepping stone for our subsequent application area-catheters. We have observed that more than half of the infections occurring in the healthcare space are caused by contaminated medical devices, and catheters are at the forefront," points Jasper van Weerd, founder and CEO of LipoCoat.

LipoCoat catheter products provide a passive and drug-less solution to reduce biofilm formation



on the surface, improve blood compatibility, and prevent tissue damage. These coatings can be applied without the need for curing steps, polymerisation, or ultraviolet (UV) treatment, while process and thickness control is programmed into their molecular design. As a result, manufacturers find it extremely easy to integrate LipoCoat's technology into their existing production processes. In addition, no harsh chemicals, pharmaceuticals or active compounds are processed into LipoCoat's final products, unlike most competitors that release antibiotics or introduce silver nanoparticles to actively kill the surface bacteria. "However, the clinical efficacy and sustainability of these techniques are not at the point where they should be. Also, excess antibiotics tend to increase the risk of developing multidrug-resistant bacteria. On the contrary, we opt for a passive approach by eliminating the prime cause of contamination," adds Alain le Loux, co-founder and CFO at LipoCoat.

As part of the company's long-term vision, LipoCoat is extending its technology to a wide range of implants to boost the performance and integration of an implant within the tissue. Additionally, in the case of orthopaedic implants, LipoCoat is working on improving osseointegration—the direct structural and functional connection between a living bone and the surface of a load-bearing artificial implant.

INDUSTRIAL APPLICATIONS AND THE FUTURE

Since becoming operational as a start-up in January 2017, LipoCoat has collected various national and European grants, angel investments, and seed funding, and is now preparing to launch its first product. "All of the pre-clinical testing for contact lens applications has been completed, and we are translating it into prototypes and working products that can be used and sold. Also, we have attracted a seasoned management team to streamline our processes and boost the R&D efforts," states van Weerd.

LipoCoat's bio-inspired membrane-mimetic coatings feature anti-fouling, wetting, and lubricous properties, and are designed to comprehensively enhance the comfort, safety, and performance of medical devices



LipoCoat now plans to expand into industrial applications that include water purification, pharma, and food processing. Contamination of membranes is a major issue in water purification plants while in the dairy industry, equipment surfaces are required to constantly stay clean and free of contaminants. LipoCoat looks forward to utilising its bioinspired coatings to address these problems along with assisting the maritime industry in reducing the surface friction or drag and increasing the efficiency of large shipping vessels. "Although we have development work ahead, we aspire to be recognised as the benchmark for surface treatments. We continually march towards changing the world five nanometres at a time, referring to the thickness of the coating we apply," concludes van Weerd. @



LipoCoat

Recognized by **STARTUP** magazine as



In commendation of their relentless pursuit of excellence and innovation in the BioTech space

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Kenneth Thomas Managing Editor