

Press Release

DISRUPTIVE INNOVATION FOR ANTIBODY-BASED IMMUNOTHERAPIES: PLECTONIC DEVELOPS "SWITCH" FOR SPECIFIC TARGETING OF TUMORS

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The Federal Agency for Disruptive Innovation SPRIND will finance the work of Plectonic Biotech GmbH in the coming years. The funding comes from the Federal Ministry for Education and Research and is provided as a loan. The start-up, a spin-off of the Technical University of Munich (TUM), has developed a nanoswitch that binds immune cells to tumor cells. The goal is to facilitate the development of immunotherapies that target tumors specifically and have fewer side effects.

Immunotherapies are regarded as one of the most promising approaches to cancer treatment in the future. These treatments mobilize the body's own immune system to attack cancer cells. An important goal is to achieve high efficacy in the immune response to cancer cells while minimizing side effects. To address this challenge, the Plectonic team, led by founders Dr. Klaus Wagenbauer, Dr. Jonas Funke, Dr. Benjamin Kick and Prof. Hendrik Dietz, has developed an 'on/off switch' for antibody immunotherapies.

The structure, on a scale of just a few nanometers, can dock onto cells on two sides. On one side the researchers place antibodies which it can use to identify tumor cells and to bind itself to the tumors. At the same time, this causes a switch to be flipped that activates other antibodies previously hidden on the other side. These are recognized by the body's own immune cells, which are thus recruited to fight the cancer cells.

"With this technology we can bring together cancer cells and immune cells so that the immune system starts fighting only when a tumor cell is identified. Our goal is to reduce activity on healthy tissue and thus achieve fewer side effects in immunotherapies," says Klaus Wagenbauer. Different antibodies can be placed on the switch to target various tumor types. Due to the 'if/then logic', the team has named the switch the LOGIBODY (LOGIc-gated antiBODY).

The framework of the LOGIBODY is made of DNA. The research team used the extensive experience with DNA origami technology at TUM. The Chair of Biomolecular Nanotechnology has made important contributions to this method, in which DNA is used as a building material for nano-scale tools.

The start-up now plans to develop new drugs for various tumor-related diseases in collaboration with pharmaceutical companies. The goal of the cooperation between SPRIND and Plectonic is to carry out studies needed for investigational new drug (IND) registration and to start a clinical Phase 1 study.

Mario Brandenburg, Parliamentary Secretary of State for Education and Research and a member of the supervisory board of the Federal Agency for Disruptive Innovations SPRIND, says: "Plectonic, with its breakthrough therapeutic approach, is yet another excellent example of SPRIND's role in the innovation ecosystem: With SPRIND, we identify and support technologies with potential for disruptive innovation and support them through the 'valley of death' from fundamental research to market readiness. Companies like Plectonic Biotech GmbH do not receive sufficient capital from private investors at their level of maturity because drug approval, sales and profits cannot be expected for years and the path to achieving them is risky and cost-intensive. This promising new approach, which is so important for many cancer patients, must have a chance to yield medical and economic benefits in Germany. That is why we need instruments like SPRIND."

The Plectonic team developed the technology at the Munich Institute of Biomedical Engineering at TUM. Several patent families have already been granted or registered. The spin-off has received several prestigious funding awards and was supported in the TUM Venture Lab Healthcare. Each of the TUM Venture Labs specializes in an important technological field.

"The foundation story of Plectonic is emblematic of the successful technology transfer from leading-edge research to applications," says TUM President Prof. Thomas F. Hofmann. "At TUM we create optimal conditions, from high-tech labs for research to one of the best start-up promotion programs in Europe. A key aspect of these efforts is the entrepreneurial spirit fostered here, which motivates experienced scientists to turn their ideas into market-ready products. As a result, around 70 technology start-ups are launched at TUM every year. The SPRIND funding is proof of their quality."

More information about Plectonic: <https://plectonic.com/>

About SPRIND

The Federal Agency for Disruptive Innovations (SPRIND) was founded on December 16, 2019, with its registered office in Leipzig. The sole shareholder is the Federal Republic of Germany, represented by the Federal Ministry of Education and Research (BMBF) and the Federal Ministry of Economics and Climate Protection (BMWK). SPRIND fills a gap in the German innovation landscape: it finds new, groundbreaking technologies for the major challenges of our time, while ensuring that the value created by the resulting companies and industries remains in Germany and Europe. SPRIND is financed by funds from the federal budget. SPRIND is managed by Rafael Laguna de la Vera and Berit Dannenberg.

About the TUM

With more than 600 professors, 50,000 students and 11,000 employees, the Technical University of Munich is one of the most research-intensive technical universities in Europe. Its focus is on engineering, natural sciences, life sciences and medicine, linked with economics and social sciences. TUM acts as an entrepreneurial university that promotes

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talent and creates added value for society. In doing so, it benefits from strong partners in science and business. It is represented worldwide by the TUM Asia campus in Singapore and liaison offices in Brussels, Mumbai, Beijing, San Francisco and São Paulo. Nobel laureates and inventors such as Rudolf Diesel, Carl von Linde and Rudolf Mößbauer have conducted research at TUM. In 2006, 2012 and 2019, it was named a university of excellence. In international rankings, it regularly belongs to the best universities in Germany.

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