

German/French smart analytics project for the automated production of nanoparticles

AutoProNano – international cooperation for in vitro and in vivo diagnostics

(Stuttgart/Balingen) – The AutoProNano German/French collaborative project involves developing a process for the automated production of nanoparticles for in vitro and in vivo diagnostics. The project is being launched within the smart analytics cooperation network. This international initiative has been funded by the Central Innovation Programme for SMEs (ZIM) of the German Federal Ministry for Economic Affairs and Climate Action (BMWK) since May 2020, with the aim of driving forward innovative developments, both in the region and further afield. BioRegio STERN Management GmbH is coordinating activities in Germany.

For some time now, it has been predicted that biofunctionalised nanodiagnostics and nanotherapeutics will play a revolutionary role in the fight against serious diseases such as cancer in the future. In biomedicine, there is a growing demand for functional nanoparticles (NPs) with specific optical or magnetic properties, biofunctional surfaces for the detection of antigens, and/or drug loading. However, if nanoparticles are to be put into regular use as medicinal products, they need to comply with stringent requirements. It is particularly important that nanoparticles can be reliably reproduced with the exact properties required. This calls for a robust and precise production process that complies with international standards, is scalable and – ideally – cost-effective, and can be controlled at all times to ensure maximum quality.

As part of the AutoProNano German/French collaborative project, Goldfuss engineering GmbH, a systems engineering specialist based in Balingen, is working with its other German partners – nanoPET Pharma GmbH, the Fraunhofer Institute for Silicate Research ISC, and the Institute of Medical Engineering Schweinfurt (IMES) of the University of Applied Sciences Würzburg-Schweinfurt (THWS) – and its French partners – Cordouan Technologies and Poly-Dtech – to develop an adaptable, automated process for the production and analytics of diagnostically relevant NP

systems. The overall aim of the project is to establish a flexible, robot-based process for the automated production and characterisation of diagnostic NPs for in vitro and in vivo diagnostics.

Fraunhofer ISC and Goldfuss engineering previously collaborated in the joint APRONA project, which was funded by the German Federal Ministry of Education and Research (BMBF), to develop the basic principle for a robotic platform for the automated production of NPs. Following the successful commissioning of the system and the first automated synthesis operations, the robotic platform is now being further developed to enable key NP synthesis processes to be performed on an automated basis by AutoProNano. This means that standardised product quality can be ensured and the relevant quality requirements can be taken into account even during the development stage. The core task involves the flexible transposition of diverse manual synthesis protocols into a continuous, controlled and efficient production process.

The AutoProNano German/French collaborative project has total funding of 1.5 million euros. The German partners receive their funding under the BMWK's ZIM programme, while the French partners are funded by Bpifrance. As Dr. Verena Grimm, who works at BioRegio STERN Management GmbH and is Project Coordinator of the smart analytics ZIM network, emphasises: "AutoProNano is an international R&D collaborative project that demonstrates the promising future potential of the automation and analytics of complex products for life sciences. Cooperation by companies and research institutes – irrespective of regional and national borders – is promoted particularly effectively by international ZIM networks."

Interested companies can still contact Dr. Verena Grimm:
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About smart analytics

The Central Innovation Programme for SMEs (ZIM) run by the German Federal Ministry for Economic Affairs and Climate Action (BMWK) is funding an international cooperation network – smart analytics – for the development of intelligent and innovative analytical methods.

BioRegio STERN Management GmbH is coordinating the international smart analytics ZIM network in Germany. The project is being funded by the BMWK and includes 30 partners from Europe. Other companies are welcome to become project partners. This will give them access to targeted support so that they can submit equally promising research and development applications to ZIM as necessary.

About Goldfuss engineering GmbH

Goldfuss engineering GmbH, based in Balingen, specialises in systems engineering, with its “Lab automation” division designing complex solutions for fully automatic processes for sectors such as the life sciences.

About nanoPET Pharma GmbH

nanoPET Pharma GmbH, a Berlin-based company founded in 2007, focuses on the research, development and marketing of innovative drug substances for diagnostic imaging in highly relevant disease areas.

About the Fraunhofer Institute for Silicate Research ISC

The Fraunhofer Institute for Silicate Research ISC, based in Würzburg, is one of the leading R&D centres for material-based research and development in the fields of resource efficiency, energy, environment and health. With a permanent staff of around 370 scientists and technicians, the Institute works to develop innovative functional materials and technologies for more sustainable products involving less use of resources and to make essential contributions to solving the major global issues and challenges of the future.

About the Institute of Medical Engineering Schweinfurt (IMES)

The Institute of Medical Engineering Schweinfurt (IMES), which is part of the University of Applied Sciences Würzburg-Schweinfurt (THWS) and was created from the laboratory for medical engineering in 2011, focuses on applied research in the medical technology sector and the transfer of knowledge/technology to corporate partners. This is particularly demonstrated by previous research projects that have been successfully conducted with regional SMEs and research projects in the field of laboratory automation.

About Cordouan Technologies SAS

The French company Cordouan Technologies SAS, which is based in Pessac, offers advanced solutions for the characterisation of nanoparticles and nanomaterials. Cordouan specialises in developing, industrialising, producing and selling innovative instruments for academic research and industrial applications.

About Poly-Dtech

Poly-Dtech is a French company based in Strasbourg that specialises in life sciences and in vitro diagnostics (IVD). This company develops and produces high-performance fluorescent nanoparticles and immunoassays with unique properties to improve the detection of biomarkers for scientific research. Poly-Dtech offers enhanced detection sensitivity with user-friendly protocols that are applicable to bioanalytical methods and molecular and cellular biology techniques.

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SEVING THE FUTURE

About BioRegio STERN Management GmbH:

BioRegio STERN Management GmbH promotes economic development in the life sciences industry, helping to strengthen the region as a business location by supporting innovations and start-up companies in the public interest. It is the main point of contact for company founders and entrepreneurs in the Stuttgart and Neckar-Alb regions, including the cities of Tübingen and Reutlingen.

The STERN BioRegion is one of the largest and most successful bioregions in Germany. Its unique selling points include a mix of biotech and medtech companies that is outstanding in Germany and regional clusters in the fields of automation technology and mechanical engineering.

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