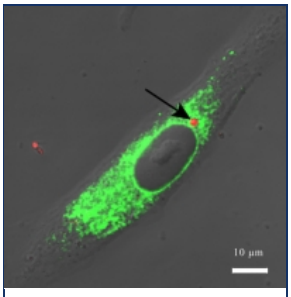
# Biotechnology cooperation between Jacobs and Hochschule Bremen is funded by BMBF with almost €1m




Micro capsule (red with arrow) inside a living cell (green: endoplasmic reticulum)

**Sebastian Springer, Professor of Biochemistry and Cell Biology at Jacobs University, his colleague Mathias Winterhalter, Professor of Biophysics, and Gerd Klöck, Professor of Bioprocess Engineering at Hochschule Bremen (University of Applied Sciences) are developing a new detection method for biologically valuable substances. The new biotechnological process can be used – for example – to monitor the production of insulin or antibodies for immunotherapies.**

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The **German Federal Ministry for Education and Research (Bundesministerium für Bildung und Forschung / BMBF)** is funding the cooperation with €988,000 as part of its **"Strategy process biotechnology 2020+" ("Strategieprozess Biotechologie 2020+")**.

Jacobs University receives roughly €787,000 of the funds. With the funding program the German government aims to maintain and further Germany's leading position in biotechnology.

Many medically important proteins, such as the hormone insulin or antibodies for immunotherapy, are generated through biotechnological processes. While growing in a nutrient solution within large tanks for a certain period of time, bacteria or mouse cells, for example, will produce the required proteins.

So far, researchers have not been able to monitor these production processes accurately enough, since the sensors currently available can only detect a limited number of substances. Contaminations such as undesired bi-products or bacterial infections were often only discovered at a late stage, leading to high costs.

**Prof. Dr. Springer** and his partners are now planning to develop a universal detection method using plastic micro capsules that are only a thousandth of a millimeter in size. The capsules lock themselves to the substance to be detected. Their accumulation can then be verified with an optical process. In principle, this method can be employed to any substance, be it protein, DNA or small molecules.

The Bremen project occupies a special position within the German government's "Strategy process Biotechnology 2020+": Rather than developing a new technique for just one particular production process, the researchers are developing a modular method that can be integrated in many different applications. The new detection system can assist in detecting and eradicating contaminations much earlier; at the same time the product formation can be witnessed "live" enabling biotechnologists to adjust conditions accordingly.

"Mathias Winterhalter and I have been working on similar transdisciplinary projects that combine biophysics, biotechnology, and cell biology," says Prof. Springer. "Since 2006, we have been researching the behavior of micro capsules in biological systems. When talking to Gerd Klöck from Hochschule Bremen two years ago, we had the idea to pool our knowledge in order to develop a new measurement procedure, which turned out to be extremely well suited for the BMBF funding program. We are very much looking forward to cooperating with the other projects of the program."

The researchers view their project as another great example of cooperation between Bremen's scientific institutions. "It shows how Jacobs University and Hochschule

Bremen are beneficially combining their expertise and research foci. Gerd Klöck's biotechnological knowledge has determined the goal of our work, while our preparatory research in physics and biology has paved the way," explains **Prof. Dr. Winterhalter**.

"None of the universities involved could have generated the third-party funds let alone realize the project on their own," adds Prof. Dr. Springer.

The three professors also consider their research collaboration a long-term endeavor. "Once the new detection method is established, we are planning to modify it in a way that allows measurements within living cells," explains **Prof. Dr. Klöck**.

Aside from their lab work, the scientists are also working together in an educational capacity jointly supervising master students. Furthermore, Prof. Klöck will give a lecture as part of the undergraduate program in biotechnology at Jacobs this year.

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