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BioAlps Western Switzerland Life Sciences Cluster

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Biofactory Competence Center (BCC): A Swiss Hub for Applied Biotech Innovation

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Since its founding in 2015, the Biofactory Competence Center (BCC) in Fribourg is a unique biopharmaceutical training and research institution in Switzerland and part of HEIA-FR, the School of Engineering and Architecture of Fribourg. The center has grown into a pivotal player in the Swiss biotech landscape. Located at the crossroads of applied research, industry collaboration, and academic excellence, BCC is making significant contributions to the biopharmaceutical and food sectors, all while maintaining a compact and agile team of five to ten specialists, depending on project demand.

A Strong Foundation in Academia and Industry

Led by Dr. Carmen Jungo Rhême, a PhD graduate in biotechnology from EPFL and full professor at HEIA-FR (part of the HES-SO network), BCC began as a private company closely tied to the School of Engineering and Architecture of Fribourg. In 2020, BCC was fully integrated into HEIA-FR as a research center. Its state-of-the-art Gene Therapy Laboratory was inaugurated in September 2022, marking another milestone in its mission to provide practical, scalable biotech solutions.

Applied R&D Across Biopharma and Food Innovation

BCC operates as a research center focused on applied R&D, specializing in biopharmaceutical processes, digital bioprocessing, and food biotechnology. Among its notable areas of work is the development of alternative therapies to combat antimicrobial resistance, identified by the WHO as one of the top 10 threats to global health.

One such area is phage therapy, which explores the use of bacteriophages—viruses that target bacteria—as an alternative to antibiotics. BCC collaborates with the CHUV, INSEL Spital, and biotech companies like Micreos in Zurich to develop and optimize GMP-compatible bioprocesses. These efforts include robust process characterization using the Quality by Design approach.

Digitizing Bioprocesses and AI Integration

BCC is also at the forefront of bioprocess digitalization, collaborating with partners like DataHow, Beckman Coulter and Mettler Toledo. The project in collaboration with DataHow and Beckmann Coulter aims to build a digital twin of a bioprocess, reducing the need for physical trials by modeling and optimizing production virtually to accelerate process development. Another initiative involves real-time glucose concentration monitoring using a new sensor developed by Mettler Toledo.

Innovations in Regenerative Medicine and Food Biotech

In partnership with Regenosca, BCC contributes to developing collagen-based implants for urethral repair, a technology that has already been tested on five patients and recently secured funding also from the Canton of Fribourg and several other partners including Mecaplast, Medistri and Confinis, as well HEIA-FR's institute of Applied Plastics Research (iRAP).

On the food front, BCC leads projects like Algawhey, which valorizes whey, a byproduct of cheese production, into high-value nutrients. This initiative, in collaboration with HEG Fribourg and Agroscope, addresses a major sustainability issue: for every kilogram of Gruyère cheese produced, nine kilograms of whey are generated and need to be valorized.

BCC also explores bacteriophage use in agriculture, developing targeted solutions against plant pathogens like those causing soft rot in potatoes. This effort is supported by Fribourg Agri & Food.

Training the Next Generation of Biotech Professionals

In addition to research, BCC plays a vital role in continuing education. The center offers theoretical and hands-on training programmes in cell culture, protein purification, and GMP-compliant process development. Its facilities simulate pharmaceutical industry environments, preparing students and professionals to meet real-world demands.

A Vision for the Future

« Looking ahead, BCC remains committed to solving real societal challenges through applied research, digital innovation, and cross-sector collaboration. Maintaining its human-scale structure allows for flexibility and focus, while its strategic location in bilingual Fribourg offers access to both Swiss and European networks », explains Dr. Jungo Rhême.

Key industry partners include Cytiva, which has a European office in Fribourg and has played a foundational role since BCC's inception (originally as GE Healthcare / Pall Life Sciences).

Quality, Translatability, and Impact

Drawing from her 17 years in the biopharmaceutical industry, Dr. Jungo Rhême emphasizes the importance of developing translatable processes that meet GMP standards. BCC adheres to strict regulatory frameworks and performance criteria, integrating quality by design and anticipating future regulatory requirements.

As a center of excellence, BCC will continue to drive innovation, expand its ecosystem, and play a strategic role in Switzerland's biotech future—at the interface of research, industry, and society.

Passage du Cardinal 13b, 1700 Fribourg +41 26 429 66 22 bcc@hefr.ch

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