DCB
Global Center for Technology Innovation in Diabetes

Annual Report 2025/26

Foreword



Derek Brandt
CEO

Dear readers,

The 2025/26 fiscal year was once again characterised by progress and consistent further development for the Diabetes Center Berne (DCB). Building on the milestones of recent years, we have further sharpened our role as an international centre of excellence in diabetes technology and have started to implement key elements of our five-year goals.

Our holocratically organised teams in Data, Partnerships & Innovation, Clinical, Communication and Operations have successfully advanced important projects – from additional clinical studies with invasive and non-invasive glucose monitoring systems to the expansion of our REDCap-based data infrastructure and new algorithms for modelling glucose–insulin regulation.

The professorships in Smart Sensing, Closed Loop Systems, Immunometabolism and Machine Learning in Medicine are visibly contributing through their research programmes to translating scientific results into applications close to patients. With more than 60 researchers working across these four areas, we have built a strong and dynamic foundation to sustainably support the translation of research into benefits for people living with diabetes.

With the Open Innovation Challenge and the Diabetes Venture Fund, we have further strengthened our growing innovation ecosystem and supported numerous start-ups with expertise, networks and funding.

Last but not least, we have increased our visibility in Switzerland and internationally through events, publications and digital formats, thereby consolidating DCB's position as a reliable partner for clinical development and innovation in diabetes technology.

My thanks go to our Board of Directors, our patron Dr h.c. Willy Michel, our partner institutions and, in particular, all our employees, whose commitment has made this progress possible. Together, we look with confidence towards the next steps on our path to sustainably improving the lives of people with diabetes.

Warm regards,



Derek Brandt
Diabetes Center Berne
Berne, May 2026

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Our Vision

Our vision and mission are made up of different pieces of a puzzle, but ultimately share one common goal:

Making life better for people with diabetes.

Our Mission

Technology
We live diabetes technology.

Solutions
Together with our professorships, we translate ideas into solutions.

Well-being
We make a positive impact to reduce healthcare costs and improve environmental & social wellbeing.

Expertise
We close gaps by providing expertise, services, funding and a home for people with great ideas, projects and ventures.

Community
We identify unmet needs through direct dialogue with the diabetes community.

Innovation
We are the one-stop center to co-create diabetes innovation.

Professional network
We establish an international and interdisciplinary network of trusted partners to collaborate and co-create the future of diabetes management.

Collaborative mindset
We create an atmosphere of trust, entrepreneurial spirit, and collaborative mindset – a fun team to work with.

DCB-Facts

ISO 9001:2015 certified: 23.08.2025 to 22.08.2028

21 Team members	4 Professorships	4 In-house clinical studies
380h Mentoring and training	54 Ideas submitted to the Innovation Challenge	35 Countries from which ideas originate

DCB 5-Year Goals (2030)

- Leading European centre for diabetes technology
- Professorships as beacons for the DCB
- Established partner for clinical development
- Vibrant innovation and start-up environment
- Market-ready products supported by the DCB
- Great place to work

The DCB-Team

DCB comprises 21 employees and the associated research groups led by Professors Lilian Witthauer (Sensing & Monitoring Lab), José García-Tirado (PrecisionLab), Lisa Koch (Machine Learning in Medicine Lab) and Maria Luisa Balmer (Translational Immunometabolism Lab). The INSPIRE Lab, led by Dr. Maren Schinz, is also part of DCB's research environment.

Several holocratically organised teams work together to implement the DCB vision:



DCB-Teams

Data Team

Objectives / Activities / Priorities

Building a High-Performance Data Infrastructure and Developing Intelligent Data Products



- *Collaboration with start-ups and industry through statistical support*
- *Contribution to the development and validation of algorithms using state-of-the-art data science*
- *Enabling the collection of clinical data by implementing and maintaining REDCap projects*
- *Building a data infrastructure to support research and development in diabetes technology*

Team



Dr. Madleina Caduff
Data Scientist



Nina Fröhlich
Coordinator



Anika Jacobi
Junior Data Manager



Aritz Lizoain
Statistician



Dr. Simona Rossi
Clinical Data Manager



Dr. Martina Rothenbühler
Scientific Program Manager |
Data Protection Officer

Projects

Changes in insulin sensitivity throughout the menstrual cycle

DCB conducted a decentralised observational study using data donated by people with type 1 diabetes through REDCap surveys. Participants were recruited through the non-profit organisation Tidepool, an open-source diabetes data platform that allows people to securely share information from devices such as continuous glucose monitors and insulin pumps.

This study explored how the menstrual cycle affects blood glucose levels and insulin needs in adults with type 1 diabetes using automated insulin delivery systems. The analysis included real-world data from 77 participants across a total of 380 menstrual cycles, including continuous glucose monitoring, insulin delivery, carbohydrate intake and self-reported cycle information.

The findings showed clear changes in glucose control and insulin requirements across different phases of the menstrual cycle. During the luteal phase, participants generally needed more insulin, consumed more carbohydrates, and experienced higher glucose levels with less time spent in the target glucose range. In contrast, insulin sensitivity was higher during the early follicular phase (at the start of menstruation). While most participants followed this overall pattern, there was considerable variation between individuals.

These results highlight that hormonal changes during the menstrual cycle have an important impact on diabetes management. Current diabetes guidelines and automated insulin delivery systems do not yet account for these sex-specific physiological changes, underscoring the need for more personalised.

The study findings have been presented at several national and international scientific conferences and are contributing to several ongoing and planned publications in peer-reviewed scientific journals.

Prospective study on changes in insulin sensitivity throughout the menstrual cycle

Based on the findings of the retrospective study, the DCB planned the Trajectories in Insulin Sensitivity Across MEnstrual cycleS in Women with Type 1 Diabetes (TIMES) study. The study plans to recruit 350 participants from Germany, Denmark, the United Kingdom, Switzerland and the United States. Study participants will take part from home over a six-month period and share data from their automated insulin delivery systems as well as menstrual cycle tracking and activity data. In addition, they provide contextual information through questionnaires. By specifically linking these data with the menstrual cycle, the study investigates not only how insulin sensitivity changes, but also how people with type 1 diabetes adapt their behaviour to compensate for algorithmic blind spots. Insights from TIMES could form the basis for improved clinical recommendations, raise awareness among healthcare professionals, and support developers in designing algorithms that account for cyclical hormonal changes rather than ignoring them, ultimately reducing the monthly trial-and-error adjustments many women still experience today.

The study is funded by Breakthrough T1D and the Leona M. and Harry B. Helmsley Charitable Trust. The project is embedded in a strong international collaborative network.

Recruitment is currently ongoing. Eligible participants are individuals with type 1 diabetes and a menstrual cycle who live in Switzerland, Germany, Denmark, the United Kingdom, or the United States, are between 18 and 40 years old, and use an automated insulin delivery system.

Model of insulin sensitivity

The DCB developed a mathematical model to estimate how the menstrual cycle affects insulin sensitivity. The model learns from continuous glucose monitoring (CGM) data, insulin dosing, and carbohydrate intake, while accounting for the physiological variability and measurement noise inherent in these data sources. It then quantifies the effect of each menstrual cycle phase on insulin sensitivity.

Applying the model to data from a decentralised DCB study demonstrated that insulin sensitivity varies systematically across the menstrual cycle.

DCB REDCap environment

REDCap decentralised surveys have been successfully implemented across three activated decentralised studies, enabling participants to complete study questionnaires remotely through secure web-based links. Integration with Twilio supports automated SMS survey invitations and reminders, improving participant engagement and retention. Twilio also dynamically assigns the SMS sender phone number based on the participant's country, helping optimize message deliverability, regulatory compliance, and participant recognition of local contact numbers. In addition, REDCap AI translation features were used to translate the study projects into multiple languages, supporting broader accessibility and participation across diverse international populations.

Published analysis

The team recently published an analysis in Diabetes Care assessing the accuracy of continuous glucose monitoring (CGM) in adults with postbariatric hypoglycaemia after Roux-en-Y gastric bypass surgery. The analysis was based on data from a clinical study in which 70 participants underwent standardised mixed-meal testing with repeated venous blood glucose measurements.

Results showed that CGM accuracy was good during stable glucose conditions (MARD 9.6%) but decreased during rapid postmeal glucose fluctuations (MARD 16.4%), particularly during fast glucose declines. At hypoglycaemic levels, CGM values systematically overestimated blood glucose concentrations by an average of 8.2 mg/dL, resulting in 16% of hypoglycaemic events being missed by the sensor system.

These findings highlight the value of CGM for monitoring glucose trends while emphasising the need for caution when interpreting CGM data in this population.

Partnerships & Innovation Team

Objectives / Activities / Priorities

Fostering a Dynamic Innovation and Start-up Environment



- *Expanding Global Network and Visibility: Hosted the Innovation Zone at EASD in Vienna with almost 20 start-ups and the „Ignite“ event at ATTD in Barcelona.*

- *Organising Innovation, Training and Education Programmes and Events: Successfully organised the annual Open Innovation Challenge, the Innovation Bootcamp, the Startup Night, DCB Networking Dinners, DCB Summer School and other events in Switzerland.*

- *Collaborations: Partnered with the Diabetes Technology Society and participated in the Diabetes Technology Meeting in San Francisco, USA.*

- *Trend Identification and Awareness: Identified trends, raised awareness and scouted innovations in the field of diabetes technology worldwide with the DCB community.*

- *Support for Start-ups: Provided ongoing support for start-ups through tailored services, leveraging DCB's in-house expertise and global network, supporting projects of various sizes, from early-stage concepts to large-scale initiatives.*

Team



Derek Brandt
CEO



Greta Ehlers
Business Scout



Ema Grabenweger
Innovation Manager



Cordelia Trümpy
Project Manager

DCB Innovation Ecosystem



Projects

DCBERNE.APP / DCB Tech Assistant

The DCBERNE.APP is publicly accessible and demonstrates how the Diabetes Center Berne (DCB) uses emerging technologies to make the rapidly evolving diabetes technology landscape more transparent and easier to navigate. The application provides a structured overview of sensors, insulin pumps, automated insulin delivery systems, apps, start-ups and research projects, helping healthcare professionals, innovators and other interested stakeholders orient themselves in this complex field.

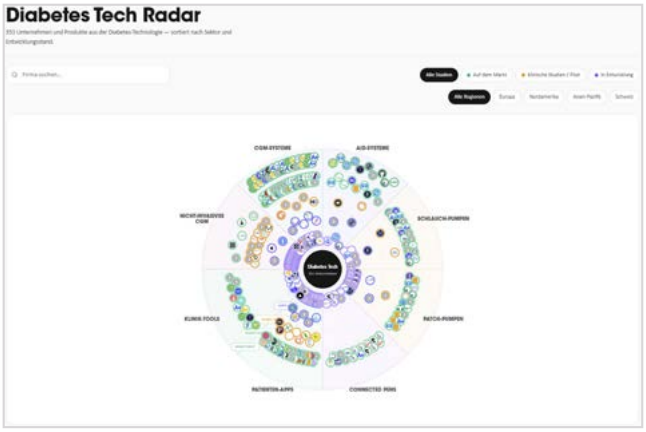
The application was developed through an end-to-end AI-supported process, from data collection and structuring to analysis and interactive visualisation. In a short time, large and heterogeneous sets of information were gathered, organised and transformed into dynamic dashboards. The DCBERNE.APP illustrates how AI can help translate complex information into clear and actionable insights.

Building on this experience, DCB will continue to strengthen its focus on AI in the coming years. The aim is to systematically analyse the growing amount of data from clinical studies, routine care and digital diabetes tools and to use the resulting knowledge for the benefit of people living with diabetes. This may include better decision support for healthcare professionals, more personalised models of care and new digital solutions for everyday life with diabetes.

Explore the DCB Tech Assistant: **www.dcberne.app**







DCB Open Innovation Challenge 2025

A total of 54 ideas were submitted to the DCB Open Innovation Challenge 2025. Five finalists from different countries were selected to pitch their innovations live on stage at sitem-insel in front of a large audience and an international jury.

The winning start-up, Alva Innovations (USA), convinced the jury with its pioneering real-time filtration system for insulin pumps. The technology is designed to prevent infusion-set occlusions and improve therapy safety for people living with diabetes. By increasing the reliability of insulin delivery systems and reducing treatment interruptions, the solution addresses one of the most common challenges in insulin pump therapy today.



The event was hosted and moderated by Ema Grabenweger and Greta Ehlers from the Partnerships & Innovation Team

For the first time, DCB expanded the traditional Startup Night into a full Day of Innovation, held on 5 November 2025 at sitem-insel in Bern. The event also marked five years of innovation activities at DCB. Since its launch in 2020, the DCB Open Innovation Challenge has supported numerous start-ups from around the world, helping accelerate promising innovations in diabetes technology from concept to market. Many alumni have since achieved important regulatory milestones, clinical validation or commercial success.

The Day of Innovation brought together leaders from healthcare, academia, MedTech, industry and policy to discuss future-oriented solutions in medicine and health technology. The event highlighted the importance of collaboration



across sectors to accelerate innovation and translate promising ideas into real-world impact.

The programme featured:

- Start-up pitches from the Top 5 finalists (Alva Innovations, Neuraura, SynchNeuro, Diawiser, MEMS MicroPump Module)
- Keynotes and insights from research, translational medicine and industry (DCB, sitem-insel, CSEM)
- Showcases demonstrating real-world impact and successful commercialisation (T1D1, SNAQ, Piomic, MYNERVA, GO-Pen, Alveolix)
- Perspectives from policy (Christoph Ammann) and medical ethics (Prof. Giovanni Maio) on innovation and artificial intelligence in healthcare
- Networking sessions connecting innovators, investors, clinicians and partners



DCB Summer School



In the past year, DCB held the DCB Summer School for the first time, a three-day training programme, including for early-career professionals entering the diabetes sector. The event took place at Kartause Ittingen and provided participants with in-depth knowledge of current trends, innovations and challenges in diabetes management, combined with practical exercises and interactive sessions.

A particular focus was placed on the perspective of people living with diabetes. The first DCB Summer School was a great success and provides an important basis for further collaboration with the diabetes technology industry.

DCB Innovation Bootcamp

As one of the highlights of the DCB Open Innovation Challenge and part of the prize for the finalists, the DCB Innovation Bootcamp took place again this year, this time on the Griesalp in the Swiss Alps. Over several days, the participating start-up teams from the field of diabetes technology worked intensively on strategy, exchange and personal development. The teams covered a broad spectrum, from medical devices, software and digital health to data solutions and clinical tools. They were accompanied by internal DCB experts as well as selected external experts.

Founder Journeys offered insights into the successes and setbacks of experienced founders. Feedback from the diabetes community, as well as sessions on product and UX design, encouraged the teams to further develop their solutions from different perspectives. A venture session showed what investors look for, professional pitch training sharpened the teams' presentations, and experts provided practical insights into clinical studies as well as regulatory strategies for the FDA and the EU MDR. Individual 1:1 sessions rounded off the programme and provided space for the specific questions of each start-up.



Diabetes Venture Fund (DVF)

The Diabetes Venture Fund brings together a unique group of partners to invest in exceptional start-ups worldwide, across all areas of diabetes technology and related healthcare. This also includes chronic kidney disease, neuropathy, ophthalmology and wound care. The fund draws on the strengths, expertise and networks of Serpentine Ventures, the investment arm of the Swiss Ventures Group, and DCB. This enables the DVF to provide its portfolio companies with a level of support on their journey to success that few other investors can offer.

For the latest information about the investments, please visit: **https://diabetesfund.vc/**

DVF Investments

GlucoSet INTENSIVE CARE MONITORING

GlucoSet's intensive care monitoring solutions help hospitals minimise complications and costs. Their intravascular, hydrogel-based continuous glucose monitor continuously provides accurate glucose level information, making continuous glucose monitoring a reality in the ICU.

OneTwo Analytics.

Healthcare professionals are often overwhelmed by the amount of data that CGM generates. OneTwo Analytics is helping relieve this burden with its AI-powered decision support tool for patient prioritisation and treatment. It transforms data into improved outcomes and quality of life and reduces costs for healthcare providers.

piomic

As populations age and diabetes becomes more prevalent, healthcare systems are increasingly struggling to cope with the problem of hard-to-heal wounds. To address this challenge, Piomic Medical has developed the COMS One therapy system, which promotes wound healing in chronic leg and foot ulcers.

luna

Luna Health is aiming to address a major unmet need – automatic overnight glucose control for people who use insulin pens. They call it "AI", which stands for "Automated Injections". It's a way to combine the convenience of insulin pens with the improved clinical outcomes of automated insulin delivery.

SUPERSAPIENS

Supersapiens is a sports performance brand that focuses on energy management systems designed to help athletes run faster for longer. Combined with the Libre Sense Glucose Sport biosensor from Abbott, Supersapiens provides informative data on the body's fuel reserves through continuous glucose measurement.

SNAQ

SNAQ's diabetes platform helps people with diabetes and healthcare professionals make data-driven decisions about meals. Over 75,000 customers are already using their clinically validated and patented carbohydrate counting technology, which works through image analysis.

BOYDSense

BOYDSense improves quality of life by making health monitoring simple and painless, powered by breath. Their first product, Lassie, enables people with diabetes to accurately measure glucose non-invasively. In future the platform will also enable patients and healthcare professionals to screen, detect and monitor in other therapeutic areas, including sepsis and fatty liver disease.

EASD 2025 in Vienna



At the EASD Annual Meeting in Vienna, DCB hosted the Innovation Zone and provided almost 20 start-ups with the opportunity to showcase their ideas and technologies to an international audience. Through the Innovation Zone, DCB strengthened its visibility within the global diabetes ecosystem and facilitated valuable exchanges between innovators, researchers, healthcare professionals and industry representatives.

ATTD Ignite 2026

At ATTD Ignite 2026 in Barcelona, DCB was represented in two programme highlights focused on patient-led innovation and diabetes technology. Greta Ehlers, Partnerships & Innovation Lead at DCB, moderated the fireside chat “From Personal Pain to Global Impact: The Journey of Patient-Led Innovation” with John Sjölund, Co-founder & CEO of Luna Diabetes.

Later that morning, Dr. Maren Schinz, CEO of DCB spin-off Beyond Diagnostics AG, pitched during “Innovators in Action: Diabetes Tech Tank” and won the ATTD Ignite Diabetes Tech Tank Award. Her pitch presented Beyond Diagnostics’ vision that medicines deserve diagnostics too, starting with insulin. The award underlined the relevance of innovation emerging from the DCB environment and the value of formats that connect start-ups with clinicians, people with diabetes, investors and industry.



Lived Experience Panel

With a dedicated group of 20 experts who live with diabetes every day, DCB is creating additional opportunities to systematically integrate lived experience into innovation processes — for example, in collaboration with start-ups, partners and projects within DCB's innovation environment. Panel members can contribute to surveys, interviews and focus groups, and can also be involved as beta testers for emerging diabetes technology solutions.

The initiative is gaining momentum, with several members already participating in diverse projects. Looking ahead, DCB aims to expand the Lived Experience Panel into a broader community that fosters co-creation, collaboration and user-centred innovation in diabetes technology.

This year, DCB was deeply saddened by the tragic and unexpected loss of Natalia Román, a valued member of the Lived Experience Panel and a friend of DCB. DCB is grateful for everything she contributed to the diabetes community and for her generous support of its work.

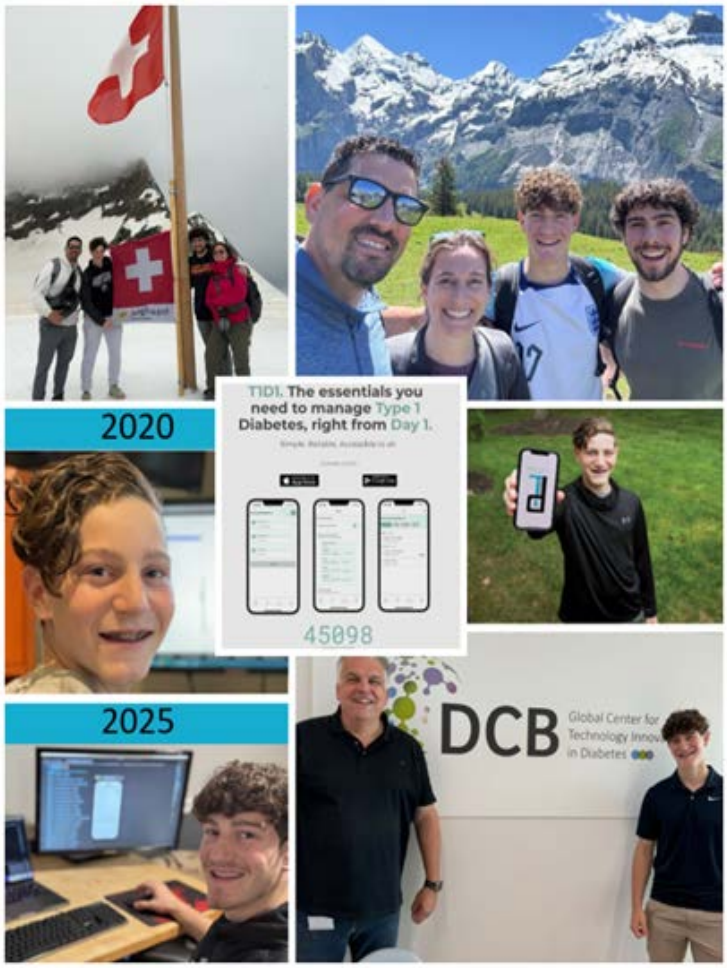


T1D1 App Receives FDA Clearance

In summer 2025, the T1D1 App, developed by young founder and innovator Drew Mendelow, received FDA clearance. Having started the project as a teenager living with type 1 diabetes, Drew transformed a personal challenge into a regulated medical device. The FDA clearance marks a significant milestone: the T1D1 App is the first regulated over-the-counter insulin calculator medical device; at the same time, Drew is one of the youngest inventors ever to be involved in such a regulatory clearance.

DCB is proud to have supported this journey from the initial idea through to regulatory clearance. The success of T1D1 illustrates how targeted innovation support, expert guidance and a strong ecosystem can help transform promising ideas into solutions with real-world impact.

Beyond the achievement itself, the project demonstrates how innovation in diabetes technology can emerge directly from the diabetes community. With the right support, targeted mentorship and strong partnerships, ideas developed by people living with diabetes can evolve into technologies that have the potential to improve care and quality of life for many people.



Start-ups from the DCB ecosystem

Beyond Diagnostics AG: From the INSPIRE Lab at DCB to a pioneering role in medication quality control

The efficacy of insulin is of central importance for people with diabetes. At the same time, insulin, as a protein, is sensitive to heat, light and mechanical stress. As a result, it can lose biological activity without this being visible from the outside. Beyond Diagnostics addresses this previously unresolved challenge with LUMIQ, a rapid test designed to determine the biological activity of insulin directly at the point of care.

The idea behind Beyond Diagnostics, "Bringing Medication Quality to Light", came from Maren Schinz, CEO, who identified the need to reliably assess the quality of insulin and other temperature-sensitive medications directly at the point of care during her role as Innovation Manager at DCB. This question gave rise to the vision of fundamentally transforming medication quality control through innovative rapid tests and digital data interpretation.

The scientific and technological development of LUMIQ is carried out at DCB's INSPIRE Lab. There, the innovation has been gradually advanced into a prototype through close collaboration between research, clinical practice and technology.

Beyond Diagnostics exemplifies how a clinically relevant question and the innovative strength of DCB employees can give rise to an internationally oriented MedTech company with the potential to sustainably change the quality control of biological medications.

enhance-d: From project idea to Swiss pioneer spin-off in diabetes and sport

Physical activity is, alongside insulin and nutrition, the third pillar of diabetes therapy. For people who depend on insulin therapy, however, sport carries a considerable risk of hypoglycaemia. Many therefore avoid regular physical activity or face complex therapy decisions in everyday life.

This is where enhance-d comes in: the app by Sestante Analytics AG supports people with type 1 diabetes and insulin-treated type 2 diabetes with scientifically validated recommendations for adjusting insulin and carbohydrate intake around physical activity.

One of the founders, Sam Scott, PhD, was an Advanced Postdoc at the University of Bern, where he led the Exercise & Diabetes Research Group and developed clinical studies using CGM, wearables and digital health tools. This research environment also gave rise to the collaboration with the Diabetes Center Berne. DCB supported the team from the initial project idea through to the establishment of an independent company, including through mentoring, coaching and participation in the DCB Open Innovation Challenge.

Today, enhance-d is showing strong growth in its user base and institutional partnerships and is regarded as a Swiss pioneer at the intersection of diabetes, physical activity and digital health.

SNAQ AG: From DCB portfolio company to profitable growth story

Misestimating carbohydrate intake is one of the most common causes of unwanted hypoglycaemia and hyperglycaemia. This is a central challenge for people with type 1 diabetes and insulin-dependent type 2 diabetes. This is where SNAQ comes in: the app visually captures meals, estimates carbohydrate content and directly supports self-management for people with diabetes. With more than 300,000 active users worldwide, SNAQ is the only nutrition and carbohydrate management app of its kind to have been tested and validated in randomised clinical studies.

SNAQ has long been part of the DCB portfolio, through its merger with a DCB research project, and has been supported over several years. From 2026, SNAQ will become the first company in this segment to achieve sustainable profitability: a milestone in a market where diabetes apps often remain loss-making or disappear from the market again.

As an established Swiss digital health start-up with global reach, SNAQ demonstrates how clinical validation can develop into an internationally scaled and economically viable solution.

Clinical Team

Objectives / Activities / Priorities

Conducting clinical trials to support start-ups and research partners in evaluating the performance and safety of their ideas and products.



- *Conduct studies all the way from the development of the study design to the final report (one study completed; two studies running; two studies in development; several studies in the pipeline)*

- *Contributing to studies with specific knowledge in the areas of monitoring, data management, study management and statistics (two studies running; one study in preparation)*

- *Simplifying and improving the efficiency of clinical trial processes with regard to regulatory procedures and trial execution (implementation of decentralised study design)*

- *Advising partners on regulatory issues relating to clinical evaluation strategy (two clinical evaluation plans)*

- *Grant submissions (one contribution and one independent submission)*

Team



Gevitha Ananthavettivelu
Clinical Project Manager



Constance Bischoff
Clinical Research Associate



Dr. Marie-Aline Gérard
Clinical Research Specialist



Stefanie Hossmann
Clinical Research Scientist |
Regulatory Affairs Manager



Dr. Martina Rothenbühler
Scientific Program Manager |
Data Protection Officer



Regula Schneider
Clinical Research Associate

Projects

FibreGum Study

The number of children and adolescents with overweight continues to rise in Switzerland, with long-term consequences for health and quality of life. In collaboration with Delica AG, DCB supports the development and clinical evaluation of FibreGum, a chewing gum enriched with soluble fibre.

The aim was to promote microbial diversity in the gut, stimulate the production of health-promoting metabolic products and, at the same time, reduce snacking behaviour. To assess its effectiveness, a randomised, placebo-controlled clinical study involving 105 children and adolescents with obesity was conducted.

The study investigated whether FibreGum can be used as a simple and practical support in paediatric obesity therapy.

→ Further background on the projects of Prof. Dr. Maria Luisa Balmer can be found from p. 45.

Project status:

The study was approved by the Cantonal Ethics Committee of the Canton of Bern on 18 November 2022, and the extension to include a second study site in St Gallen was approved on 31 December 2024. The study has now ended, and the last participant's last visit took place on 23 January 2026. The collected data will be analysed, and the study report will be submitted to the authorities in the coming months.

Project sites:

Children's Hospital, Inselspital,
University Hospital Bern
Principal Investigator: Prof. Maria Luisa Balmer

Eastern Switzerland Children's Hospital,
Adolescent Medicine, St Gallen
Principal Investigator: Dr. med. Pascal Müller

Sponsor: Insel Gruppe AG

Project funding:

Diabetes Center Berne (research project), Von Tobel Foundation (research project), Walter Fuchs Foundation (research project), Swiss National Science Foundation (SNSF)

DCB's role:

As a Contract Research Organisation, DCB was delegated by the sponsor to support the clinical process, from the preparation of the clinical study plan and submission to the Ethics Committee to site monitoring, data cleaning and analysis, and preparation of the study report.

FaibaGo Study

Long-term weight loss through a low-threshold intervention

Obesity and its related comorbidities are increasing worldwide, creating a major socio-economic burden through higher morbidity and mortality. In Switzerland, 19.5% of the population, or approximately 1.5 million people, are living with obesity. Beyond being a chronic disease itself, obesity is a major risk factor for cardiovascular disease, cancer, diabetes and osteoarthritis. As obesity has a multifactorial origin involving genetic and environmental factors, current treatments often have limited success, highlighting the need for new preventive and therapeutic approaches.

The gut microbiota and its metabolites, particularly short-chain fatty acids (SCFAs), play a key role in obesity and metabolism. Obesity-associated reductions in microbial diversity are linked to altered SCFA production, which may be improved by fibre supplementation such as galactooligosaccharides (GOS). However, GOS are usually delivered as capsules or powders, resulting in transient exposure in the distal gut and likely bypassing the altered oral microbiome.

This study aims to evaluate the effects of a GOS-containing chewing gum on body weight, metabolism, and the oral and intestinal microbiomes in adults with overweight. A total of 120 participants will be recruited for this double-blind, placebo-controlled and randomised study.

Project status:

The study was approved by the Cantonal Ethics Committee of Bern on 30 July 2025, and the first participant was enrolled on 13 October 2025. By the end of March 2026, 30 participants had already been enrolled in the study, and the last participant is expected to be included during the first quarter of 2027.

Project site:

University of Bern TrimLab
Sponsor-Investigator: Prof. Dr. med. Maria Balmer, University of Bern

Project funding:

Pierre Mercier Foundation, Dürmüller-Bol Foundation, Von Tobel Foundation and the UniBE Venture Fellowship

DCB's role:

As a Contract Research Organisation, DCB is delegated by the sponsor to support the clinical process by reviewing study documentation, including the protocol and informed consent documents, preparing amendments, developing and maintaining the clinical database, and submitting documents to the Ethics Committee.

Evo Study

Evaluation of correlations between volatile organic compound (VOC) spectra measured with GC-IMS and MOx sensors and venous blood glucose in subjects with type 2 diabetes

Breath analysis is a viable methodology for non-invasive diabetes management owing to its potential for multiple disease diagnosis. According to earlier studies, there is a strong relationship between ketone bodies such as acetone and blood glucose variation among people without diabetes and people with type 1 or type 2 diabetes. However, the relevance of acetone as the sole biomarker for diabetes monitoring remains uncertain.

BOYDSense, a start-up from France, has developed a prototype non-invasive breath analyser (MIB) that measures a set of VOCs identified in human studies as sensitive to changes in blood glucose levels. The study has two main aims.

The first aim is to identify VOC profiles of different blood glucose levels, normal and high, and their rising and falling patterns using the state-of-the-art measurement technique gas chromatography-ion mobility spectrometry (GC-IMS). The second aim is to examine associations between varying glycaemic states and signals from the MIB.

Project status:
The study was approved by the Ethics Committee KEK Bern. The study has been completed and the data are being analysed.

Project site:
Diabetes Center Berne, sitem-insel

Sponsor: BOYDSense

Study site:
Universitätsklinik für Diabetologie, Endokrinologie, Ernährungsmedizin & Metabolismus (UDEM), Inselspital, Universitätsspital

Principal Investigator: Prof. Dr. med. Markus Laimer

Project funding:
Sponsor's internal funds

DCB's role:
As a Contract Research Organisation, DCB was delegated by the sponsor to support the clinical process, from the preparation of the clinical study plan and submission for approval by the Ethics Committee and Swissmedic to site monitoring, data cleaning and analysis, and preparation of the study report.

AID-JUNCT Study: GIP/GLP-1RA as an Adjunct to Automated Insulin Delivery

Glycaemic control in type 1 diabetes (T1D) remains a challenge, with approximately 32% of adults in Switzerland achieving an A1c target of below 7%. Glucagon-like peptide-1 receptor agonists (GLP-1RAs) and dual glucose-dependent insulinotropic polypeptide (GIP)/GLP-1RAs have emerged as promising therapies in T1D. Retrospective studies have shown that people with T1D can significantly improve glycaemic control, with reductions in insulin dose and body weight, when long-acting GLP-1RAs or GIP/GLP-1RAs are added to insulin therapy.

This study assesses glycaemic control in people with T1D on a stable dose of long-acting GIP/GLP-1RA (tirzepatide) as an adjuvant therapy to automated insulin delivery (AID). It is conducted as a prospective, parallel, open-label, randomised clinical trial to test the hypothesis that available AID systems combined with GIP/GLP-1RA will lead to safe and more efficacious glycaemic control than standard of care (SoC) during the assessment period. The outcome of this study will provide unique data on the safety and efficacy of using GIP/GLP-1RA as an adjuvant therapy to AID systems.

Project status:
The study was approved by the Ethics Committee Northwestern and Central Switzerland (EKNZ) on 11 November 2024 and by Swissmedic on 8 November 2024. The first participant was included on 19 February 2025, and 24 participants have been randomised to date. Two additional study sites, one in Lucerne and one in Chêne-Bougeries, were added to increase recruitment. Recruitment is almost complete, and the study results are expected in Q4 2026.

Project sites:
Kantonsspital Olten, Olten; Luzerner Kantonsspital, Luzern; DiaCenTRE, Chêne-Bougeries

Sponsor:
Prof. Dr. José García-Tirado, University of Bern / Diabetes Center Berne (DCB)
Coordinating Investigator: Prof. Dr. med. Thomas Züger, Chief Physician

Project funding: Sponsor's internal funds

DCB's role:
As a Contract Research Organisation, DCB is delegated by the sponsor to support the clinical process by reviewing study documentation, including the protocol and informed consent documents, developing and maintaining the clinical database, and submitting documents to the Ethics Committee and Swissmedic.

Other Clinical Projects

Definition of clinical processes

The Clinical Team has continued to develop and improve standard operating procedures (SOPs) for clinical activities. This ensures consistency and compliance with Good Clinical Practice, ISO 14155 and ISO 20916, and maintains the high quality of research conducted and/or supported by DCB.

Clinical trial advice

The Clinical Team was available to support and advise the Innovation Challenge start-ups on how to plan their clinical trials and carry out the clinical evaluation of their medical devices. The start-ups made good use of this opportunity and received comprehensive advice on how to conduct studies in accordance with the principles of Good Clinical Practice and how to identify the most suitable study designs to demonstrate the effectiveness of their medical devices.

Regulatory affairs advice

The Clinical Team also contributed to regulatory strategy workshops with start-ups, providing advice on potential regulatory pathways and clinical evaluation requirements.

Communication Team

Objectives / Activities / Priorities

Strategic and operational communication to support and position DCB across all levels, from conceptual planning to targeted implementation across relevant communication channels and audiences.

- *Responsibility for the communication strategy of DCB, including continuous refinement and implementation across all DCB communication channels and stakeholder interfaces*
- *Ensuring consistency in DCB's corporate design, identity, clarity, and tone of voice across all formats and touchpoints.*
- *Providing timely and accurate information on DCB's research and innovation in diabetes technology through appropriate communication formats and media.*
- *Enhancing DCB's digital visibility to ensure consistent recognition as a key player in diabetes technology and innovation, including within AI-based systems such as large language models.*

Team



Sunjoy Mathieu
Communication Manager

Media impressions (selection)

SonntagsZeitung supplement / Gesundheitsguide 12/2025

UNTERNEHMENSBEITRAG

DCB Open Innovation Challenge 2025:
Wer überzeugte beim internationalen Wettbewerb?

Austausch zwischen Forschung, Praxis und Technologie am Day of Innovation in Bern: Eine Technologie zur Verbesserung der Funktion von Insulinpumpen konnte die Jury für sich gewinnen.

Am 5. November 2025 fand im sitem-insel in Bern der diesjährige Day of Innovation des Diabetes Center Berne (DCB) statt – erstmals als ganztägiges Format. Der Anlass widmete sich vollumfänglich neuen Technologien, wissenschaftlichen Erkenntnissen und gemeinsamen Visionen für die Zukunft der Diabetesversorgung.

Im Zentrum stand die DCB Open Innovation Challenge 2025, ein internationaler Wettbewerb zur Förderung neuer Lösungen im Bereich der Diabetestechnologie. Insgesamt wurden 54 Projekte eingereicht; fünf Teams erreichten das Finale und präsentierten ihre Innovationen live auf der Bühne. Bereits im Oktober hatten die Finalistinnen und Finalisten zudem die Möglichkeit, ihre Projekte am Diabetes Technology Meeting in San Francisco einem internationalen Fachpublikum vorzustellen.

FILTERTECHNOLOGIE FÜR INSULINPUMPEN

Am Ende überzeugte das Start-up Alva Innovations aus den USA die Jury mit einer einfachen, aber sehr wirkungsvollen Idee: einem winzigen Filter, der in das Infusionsset einer Insulinpumpe eingesetzt, sogenannte Insulinfibrillen auffängt. Diese Fibrillen können das Infusionsset verstopfen und Okklusionen bilden, haben aber auch die Tendenz eine lokale Entzündung an der Infusionsstelle zu verursachen. Mit dieser Technologie will Alva Innovations die Zuverlässigkeit von Insulinpumpen verbessern, die Tragedauer von Infusionssets deutlich verlängern und damit den Alltag für Menschen mit Diabetes sicherer und bequemer machen.

Für seine Idee erhielt das Unternehmen den ersten Preis der Challenge, dotiert mit 100 000 US-Dollar, bestehend aus finanzieller Unterstützung und fachlichem Coaching durch ein Team von Expertinnen und Experten am DCB.

TAG DER INNOVATION

Erstmals wurde die bisherige «Start-Up Night» zu einem ganztägigen Day of Innovation erweitert. Ziel war es, den Austausch zwischen den verschiedenen Akteurinnen noch stärker zu fördern. Denn Innovation entsteht oft dort, wo sich unterschiedliche Perspektiven begegnen, zwischen Forschung, Praxis, Industrie und den Menschen, die mit Diabetes leben.

«Wir wollten zeigen, dass hinter jeder Technologie echte Geschichten stehen, von Menschen mit Diabetes, Ärztinnen, Gründerinnen und Forschenden, die an Lösungen arbeiten, die den Alltag mit Diabetes erleichtern», erklärte Derek Brandt, CEO des DCB.

Das Programm bot eine abwechslungsreiche Mischung aus Präsentationen, Diskussionen und Begegnungen: Die fünf Finalisten Alva Innovations, Neuraura, SynchNeuro, Diawiser und YW MEMS präsentierten ihre Projekte live auf der Bühne. Expertinnen und Experten aus Forschung und Industrie, darunter Vertreterinnen des DCB, von sitem-insel und CSEM, gaben Einblicke in aktuelle Entwicklungen. In einer Showcase-Session stellten ehemalige Teilnehmende wie TIDI, SNAQ, Piomic, MYNERVA, GO-Pen und AlveoliX ihre Fortschritte und Markterfolge vor. Regierungsrat Christoph Ammann und Professor Giovanni Maio sprachen über die Bedeutung von Innovation und Ethik im Gesundheitswesen. Abgerundet wurde der Tag durch zahlreiche Austauschmöglichkeiten.

5 JAHRE DCB OPEN INNOVATION CHALLENGE

Die DCB Open Innovation Challenge wurde 2020 ins Leben gerufen. Ziel ist es, innovative Ideen im Bereich Diabetestechnologie zu fördern und jungen Unternehmen den Weg in die klinische Praxis zu erleichtern. In den vergangenen fünf Jahren hat das DCB viele Start-ups begleitet, von der frühen Konzeptphase bis hin zu klinischen Studien oder zur Markteinführung.



Einige dieser Unternehmen sind heute erfolgreich im internationalen Markt, andere stehen kurz vor der Zulassung ihrer Produkte.

«Es hat uns sehr gefreut, zu sehen, wie viele ehemalige Teilnehmende heute mit ihren Ideen echten Nutzen für Menschen mit Diabetes schaffen», sagt Ema Grabenweger, Innovation Managerin am DCB und verantwortlich für die DCB Open Innovation Challenge. «Genau darum geht es uns: Potenzial zu erkennen, zu fördern und gemeinsam weiterzuentwickeln.»

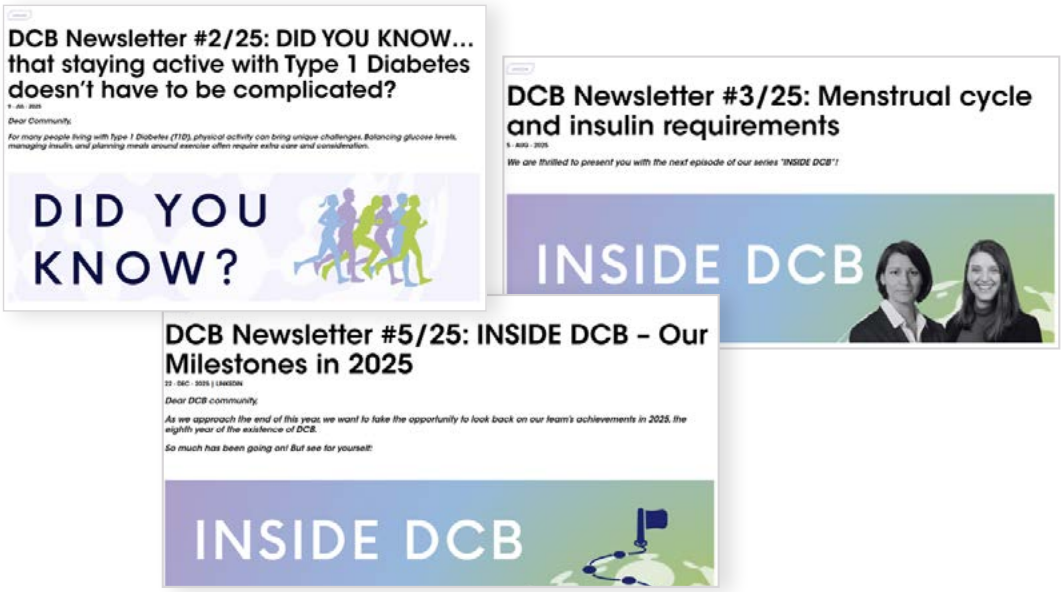
Die Siegerin der diesjährigen DCB Open Innovation Challenge mit Alva Innovations CEO & Gründerin Dr. Ulrike Menkes. (Foto: Carmela Odoni)

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DCB

Newsletter

The DCB LinkedIn newsletter continues to be published regularly and now reaches almost 2,800 subscribers. It is available on both LinkedIn and the DCB website and provides insights into current topics in diabetes technology research and innovation, as well as into the work of the DCB team.



DCB Podcast loop&life

In March 2026, DCB launched loop&life, a new podcast about diabetes technology, innovation and life with diabetes.

With loop&life, DCB explores current developments, innovations and perspectives in diabetes technology. Each episode takes a closer look at emerging trends, relevant topics and key questions in diabetes care. The conversations bring together insights from research, innovation and lived experience.

The result is a format that makes complex topics more accessible and connects different perspectives from the diabetes community.

The first episodes addressed trust and failure in diabetes technology, the promise and limitations of non-invasive glucose monitoring, travelling with diabetes technology, and the connection between the menstrual cycle and diabetes management.





Operations Team

Objectives / Activities / Priorities



Finance / HR
Implementation of the strategy and business plan, as well as ensuring accounting and financial reporting are in compliance with applicable laws and regulations.

Facility and Lab Management / EHS
Ensuring the smooth operation of the DCB facilities and equipment, safeguarding health and safety, and providing services to support project implementation.

Quality Management
Ensuring compliance with ISO 9001 requirements and supporting effective and efficient workflows.

Team



Lorenz Burkhalter
CFO/COO/HRM



Corinne Nydegger
Finance / Operations Assistant



Ivona Weinaug
HR Specialist

Research

Associated research groups:

samlab (Sensing & Monitoring Lab)
led by Prof. Dr. phil. Lilian Witthauer

PrecisionLab
led by Prof. Dr. José García-Tirado

TrimLab (Translational Immunometabolism Lab)
led by Prof. Dr. Maria Luisa Balmer

Machine Learning in Medicine Lab
led by Prof. Dr. Lisa Koch

INSPIRE Lab
led by Dr. Maren Schinz



2025 performance update of the four DCB professorships

Diabetes Center Berne (DCB) is very proud of the joint achievements of its four professors – Prof. Dr. Lilian Witthauer, Prof. Dr. Lisa Koch, Prof. Dr. Maria Luisa Balmer and Prof. Dr. José García-Tirado – and their teams in diabetes technology. Together, they have built a productive, internationally visible and strategically important research environment that drives innovation in diabetes care and strengthens Switzerland's role in this dynamic field.

Over the past year, the four professorships have jointly published or contributed to 32 peer-reviewed scientific articles and delivered 37 presentations at national and international conferences. In doing so, they ensure strong visibility of their results, active knowledge exchange with key opinion leaders, industry partners and clinical experts, and a continuously growing scientific impact.

In recent years, the research groups have secured more than CHF 6 million in competitively acquired third-party funding from public funding programmes, foundations and industry-supported collaborations. Today, 61 researchers work within the four DCB professorships – a marked increase compared with previous years and a clear sign of DCB's attractiveness as a hub for technology-driven innovation in diabetes care.

DCB serves as a home and platform for this ecosystem of specialised experts. By combining academic excellence, clinical expertise, entrepreneurial thinking and strong partnerships with industry and healthcare systems, the four professorships play a decisive role in bringing new solutions for people with diabetes more quickly from research into routine care.

samlab (Sensing & Monitoring Lab)

The Sensing & Monitoring Lab (samlab) develops sensing technologies for the continuous monitoring of physiological and metabolic processes. The research group aims to develop new approaches to precision medicine by combining chemical, physical, engineering and data-driven methods with clinical research.

Its work includes the development of novel sensors and measurement systems, their integration into wearable and contactless platforms, and the analysis of physiological signals using machine learning methods. These include optical and nanomaterial-based biosensors, breath analysis and radar-based techniques.

Current research priorities include the continuous monitoring of metabolic processes, the development of multi-metabolite sensors, the identification of digital biomarkers and the modelling of physiological processes. The research group translates these sensing technologies into clinical applications, particularly in diabetes, cardiovascular disease and other areas of personalised medicine

Team



Prof. Dr. phil. Lilian Witthauer
Tenure Track Professor



Celal Bahtiyar
Research Assistant



Seïf Ben Bader
Postdoctoral Researcher



Annina Burgherr
Doctoral Student (Dr.med.)



Sandro Gantner
Master‘s Student



Mahsa Nasehi
PhD Student



Noel Palmgrove
Master‘s Student



Corvin Ravaioli
Doctoral Student (Dr.med.)



Emmanouil Rousakis
Research Scientist



Guglielmo Risi
Postdoctoral Researcher



Ben Scattolo
Doctoral Student (Dr.med.)



Saiyyna Stepanova
Postdoctoral Researcher



Esther Tan
Master's Student and
Research Assistant



Martin Varga
PhD Student



Dayan Daniela Woldu
Master's Student



Zejun Yan
Master Student

Research Projects

ILLUMINATE Project

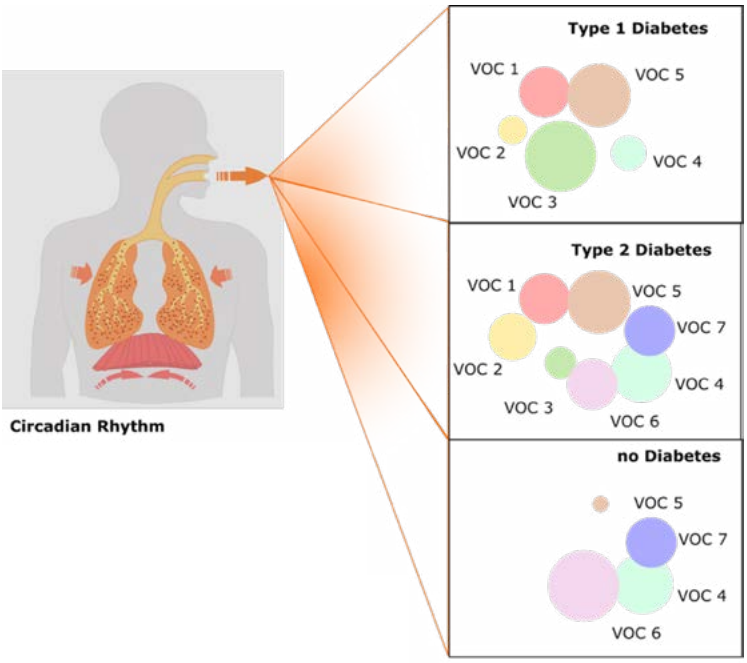
In this project, the team is developing a new sensing technology to improve the monitoring of multiple metabolites. The approach is based on special molecules known as aggregation-induced emission luminogens (AIEgens), which emit exceptionally bright light when they aggregate. These AIEgens are designed to emit light in different spectral ranges, allowing several metabolites, such as glucose, lactate and ketones, to be detected simultaneously. They are embedded in a biocompatible matrix and applied to the tip of an optical sensor, which is then integrated into a wearable device.

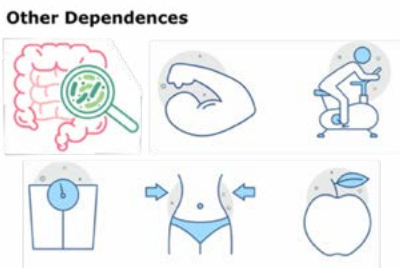
VOCircle Study

The VOCircle study investigates daytime patterns of volatile organic compounds (VOCs) in the exhaled breath of individuals with and without diabetes. The aim is to better understand how metabolic processes, glucose levels, and the microbiota are associated with breath VOC profiles and whether characteristic VOC signatures could support future non-invasive metabolic monitoring.

In this prospective observational study, repeated breath measurements using gas chromatography-ion mobility spectrometry (GC-IMS) are combined with glucose measurements, body composition analysis, and oral and stool microbiota assessments.

The project aims to provide foundational knowledge for future breath-based diagnostic and metabolic monitoring approaches in personalised medicine. The study is currently enrolling participants (ClinicalTrials.gov: NCT05984979).



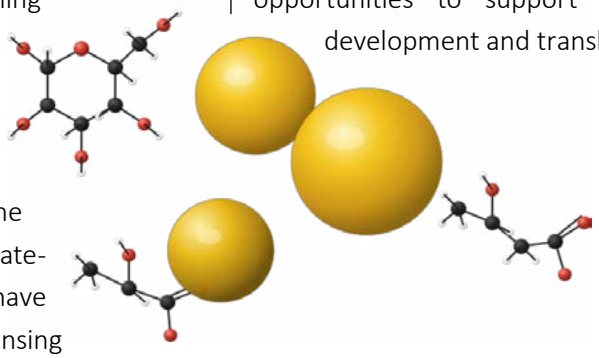


MetaboSense Project

The MetaboSense project was initiated to develop a cardiovascular implant for continuous multi-metabolite monitoring directly in the bloodstream. The platform combines optical glucose and lactate sensing chemistries with functionalised medical-grade nitinol with the aim of enabling lag-free intravascular metabolic monitoring through a wearable transcutaneous readout.

During the current phase of the project, first glucose- and lactate-responsive sensor systems have been developed, and initial sensing elements are now available for characterisation and integration studies.

Current efforts focus on advancing the proof-of-concept platform and identifying additional funding opportunities to support further technological development and translational validation.



PrecisionLab



PrecisionLab develops innovative tools and algorithms to advance future precision therapies for people with diabetes and related metabolic conditions. The team combines methods from control engineering, mathematical modelling and computer science

The lab aims to advance two key areas:

1. The development, testing and implementation of the next generation of fully automated insulin delivery systems (fAID, also known as artificial pancreas systems) for insulin-dependent people with diabetes, with or without additional non-insulin-based therapies.

2. The development and validation of decision support systems (DSS) for people with diabetes who use either intensive insulin therapy involving multiple daily injections (MDI) or a sensor-augmented pump (SAP), with or without concomitant non-insulin-based medication.

Team



Prof. Dr. José García-Tirado
Tenure Track Professor



Gabriel Bunselmeyer
Software Developer



Clara Escorihuela Altaba
PhD Student



Dr. Clara Furio Novejarque
Postdoctoral Researcher



Dr. med. Gani Gashi
Clinical Study Physician



Ceren Asli Kaykayoglu
PhD Student



Eleonora Manzoni
Postdoctoral Fellow



Keidy Luz Morales Rodelo
PhD Student



Dr. Vihangkumar Naik
Postdoctoral Fellow



Anna Tief
Project Manager

Research Projects

AID-JUNCT Study: GIP/GLP-1RA as an Adjunct to Automated Insulin Delivery

Innovative Approaches to Combination Therapy in Type 1 Diabetes

Managing blood glucose levels in type 1 diabetes (T1D) remains challenging. Only around 32% of adults in Switzerland achieve an A1c target below 7%. Glucagon-like peptide-1 receptor agonists (GLP-1RAs) and dual GIP/GLP-1 receptor agonists have shown promise as therapies for T1D. Retrospective studies have shown that adding long-acting GLP-1RAs or GIP/GLP-1RAs to insulin therapy can significantly improve glucose management in people with T1D, while also reducing insulin requirements and body weight.

This study investigates blood glucose management in people with T1D receiving a stable dose of a long-acting GIP/GLP-1RA (tirzepatide) as an adjunct to automated insulin delivery (AID). The study is being conducted as a prospective, parallel-group, open-label, randomised clinical trial. It tests the hypothesis that available AID systems combined with GIP/GLP-1RA lead to safer and more effective glucose management during the assessment period than standard of care (SoC).

AID-JUNCT is a multicentre study conducted at three sites in Switzerland. Recruitment is almost complete, and the data collected so far show very promising results. The study will provide unique data on the safety and efficacy of GIP/GLP-1RA as an adjunct to AID systems.

UBLoop Study:

Early Feasibility Evaluation

The UBLoop study is developing a next-generation artificial pancreas system designed entirely in Switzerland for people with type 1 diabetes. The aim is to further improve automated insulin delivery while significantly reducing the daily burden on people living with diabetes. The system combines continuous glucose measurements with personalised mathematical and physiological models that predict individual metabolic responses and adjust insulin delivery in real time.

Unlike conventional systems, UBLoop takes a holistic approach: in addition to glucose levels, it considers further data such as meals, physical activity, heart rate and other metabolic parameters. In the long term, the aim is not only to optimise glucose management but also to better address the risk of diabetes-related complications.

Particular emphasis is placed on the transparency and safety of the algorithms. The underlying models enable healthcare professionals to understand the system's treatment decisions – an important prerequisite for clinical applications and regulatory approval. In parallel, the team is investigating how artificial intelligence could enable further improvements in the future.

The initial clinical tests were carried out under strictly controlled conditions by an interdisciplinary team of physicians, engineers and data scientists. Following the initial supervised phases, participants also used the system in everyday life at home. The clinical study has been completed and recruitment has ended. The results are very positive and promising in terms of the system's safety, precision and suitability for everyday use.

Based on these findings, larger clinical studies are planned to pave the way for future regulatory approval and broader clinical use. The results to date offer promising prospects for a new generation of personalised and largely autonomous diabetes therapies.



Because life doesn't pause for diabetes

Trim Lab

Team



Prof. Dr. Maria Luisa Balmer
SNSF-Eccellenza Professor,
Group Leader



Luna Ballinari
Master's Student



Andrea Celoria
PhD Student



Gioia Colacicco
Master's Student



Amira Nadia El Hachimi
Medical Student



Kristyna Filipova
Laboratory Technician



Babette Josi
Master's Student



Danai Chrysoula Kokona, MSc
PhD Student



Anaïs Krantz
Medical Student



Anina Leimer
Master's Student



Dr. Yousef Maali
Postdoc



Patrick Roetheli
Medical Student



Dr. Melanie Scalise
Research Assistant



Melanie Soldati
Research Assistant



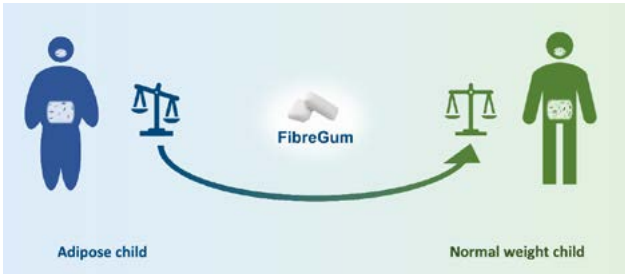
Dr. Martina Thier
Research Assistant



Jana Zeiter
Master's Student

Research Projects

FajbaGum Study



The Fajba project aims to develop personalised nutrition interventions based on prebiotic fibres for the prevention and treatment of metabolic diseases. To this end, clinical intervention studies in children (FibreGum) and adults (FajbaGo) are combined with mechanistic investigations of microbiome, metabolome and immune responses.

The insights gained will form the basis for the development of a scientifically validated platform, Fajba, which is intended to enable individualised recommendations (FajbaYou), digital support (FajbaWe) and innovative prebiotic products for different population groups in the future.

The project combines translational research with the goal of sustainable implementation in prevention and personalised healthcare.

Cause and effect relationship between Obesity and gut microbiome

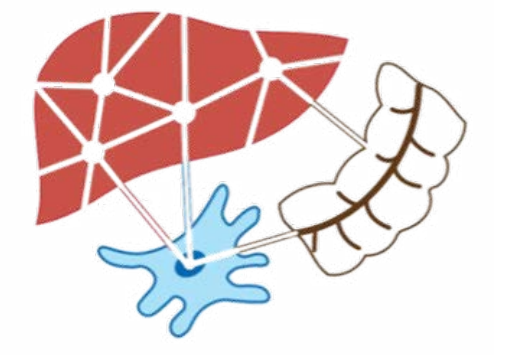
The global rise in metabolic diseases such as obesity and diabetes poses a significant medical and socioeconomic challenge, influenced by a variety of genetic and environmental factors. Chronic inflammation plays a central role in this process and is closely linked to changes in the gut microbiome.

While earlier approaches primarily examined the composition of the gut microbiota ("who is there?"), the project increaasingly focuses on the functional properties and evolutionary dynamics of microbial communities ("what do they do?"). In particular, the team investigates how bacterial adaptation and evolutionary processes in the gut may contribute to the development and maintenance of obesity. To better understand the underlying mechanisms, the team uses innovative methods from genomics, metagenomics and metabolomics, combined with experimental and evolutionary approaches. The goal is to identify causal relationships between microbial functions, metabolism, and immune response and to develop new strategies for the prevention and treatment of metabolic diseases.



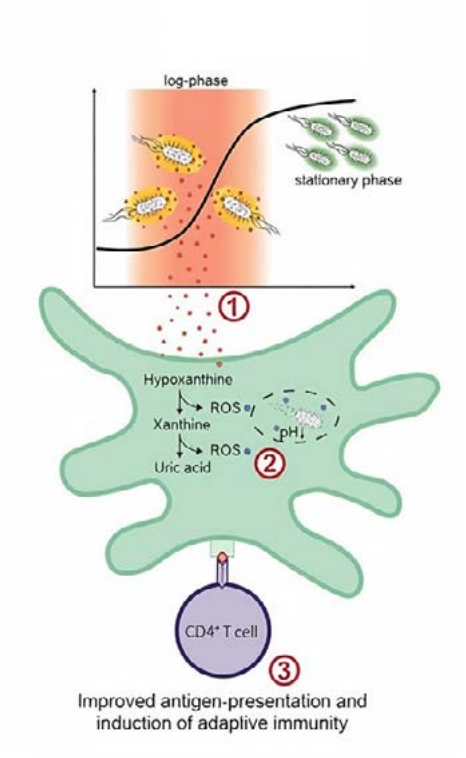
Wound infection project

Obesity and diabetes are increasing rapidly in prevalence worldwide. Both conditions have a multifactorial pathogenesis involving genetic and environmental factors. Environmental factors include the gut microbiota and bacterial metabolites, which have been shown to contribute to disease development. Both obesity and diabetes are characterised by chronic low-grade inflammation ("metaflammation"). Despite this chronic immune activation, people with obesity and diabetes are considered immunosuppressed, resulting in a higher risk of infection and poorer outcomes. This contributes to increased morbidity and mortality. The mechanisms underlying immune dysfunction and increased infections in obesity and diabetes remain unclear and are the focus of this project.



Hypoxanthine Project

The human gut microbiota, a complex and dynamic community of microorganisms residing in the human digestive tract, plays a pivotal role in health and disease. Emerging research reveals a fascinating interplay between the gut microbiota, the immune system, and metabolism. The gut microbiome engages in a constant dialogue with immune cells, educating and regulating them, which in turn maintains gut health and guards against pathogens. This project aims to unravel the hidden mechanisms underlying the interactions between bacterial metabolites in the microenvironment and the activation of immune cells, with a particular focus on the impact of hypoxanthine (HPX) on dendritic cell metabolism and biological function. Preliminary data showed that HPX is highly produced by bacteria expanding logarithmically and it can be sensed by DCs, fueling their activation.



Machine Learning in Medicine Lab

About the Machine Learning in Medicine Lab

The Machine Learning in Medicine Lab focuses on developing trustworthy and interpretable artificial intelligence methods for use in clinical and biomedical applications. The team's methodological interests include interpretable machine learning, generalisability and performance prediction, automated identification of relevant subgroups, and techniques for learning structured and disentangled data representations.

In terms of application, the lab's research spans a range of areas, including medical image analysis – such as image classification, segmentation, and modelling of disease progression – as well as the interpretation of continuous glucose monitoring (CGM) data. This includes work on CGM forecasting and the prediction of individual risk factors, contributing to more personalised and reliable decision support in medicine.

Team



Prof. Dr. Lisa Koch
Tenure track professor



Abdelrahman Faqieh
Master's Student



Tim Flühmann
PhD Student



Julius Gervelmeyer
PhD Student



Trung Dũng Hoàng
PhD Student



Tim Flühmann
PhD Student



Mareen Kalis
Master's Student



Jan Suter
Master's Student



Nicolas Wyss
Master's Student

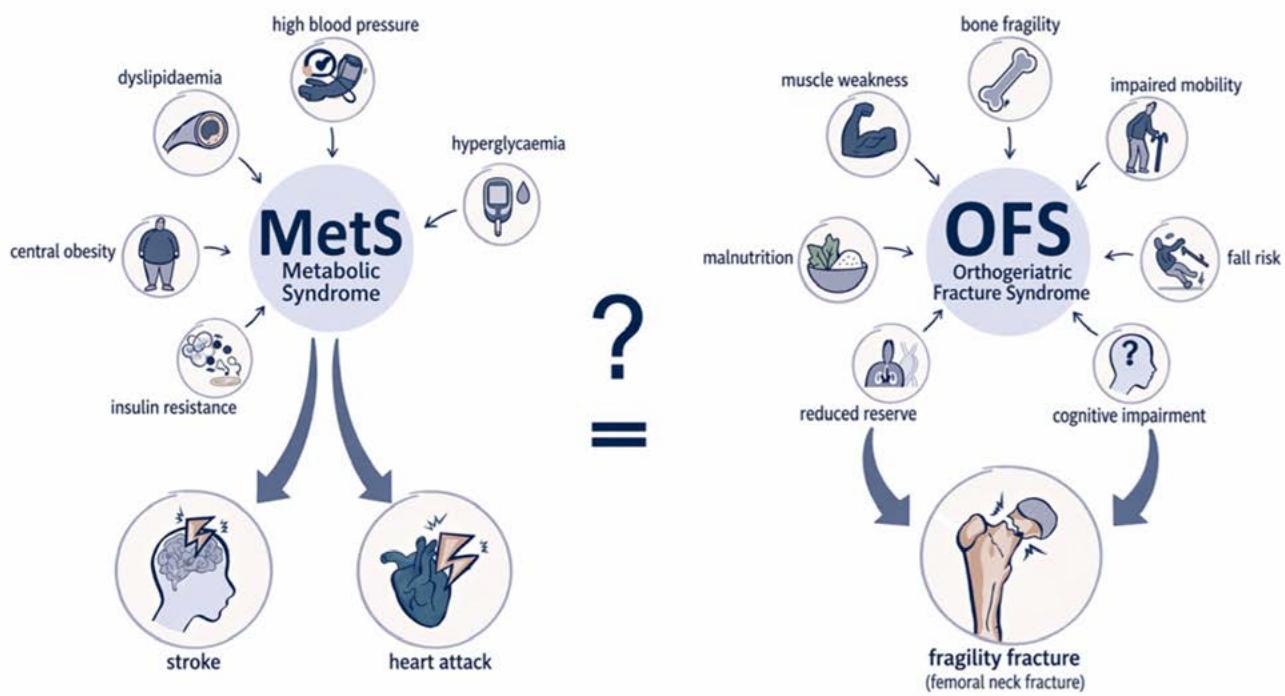
Research Projects

From Metabolic Syndrome to Orthogeriatric Fracture Syndrome: A Bibliometric Approach to Defining Clinical Constellations

The concept of a clinical syndrome – a recognisable pattern of co-occurring conditions sharing a common pathophysiological basis – has proved highly effective in medicine. A well-known example is metabolic syndrome, which combines central obesity, insulin resistance, dyslipidaemia and hypertension into a clinically relevant risk profile. Its formal recognition has changed how clinicians identify and prevent cardiovascular disease.

The research group investigated whether a comparable syndromic framework could be established for another equally multidimensional constellation: the interaction of osteoporosis, sarcopenia, frailty, malnutrition and gait impairment that contributes to fragility fractures in older people. This proposed concept is referred to as Orthogeriatric Fracture Syndrome (OFS). Rather than collecting clinical cohort data, the research group chose a bibliometric approach, analysing 26 million PubMed abstracts using large-scale text analysis. The aim was to investigate whether OFS-related concepts co-occur in the medical literature in a structured rather than random manner.

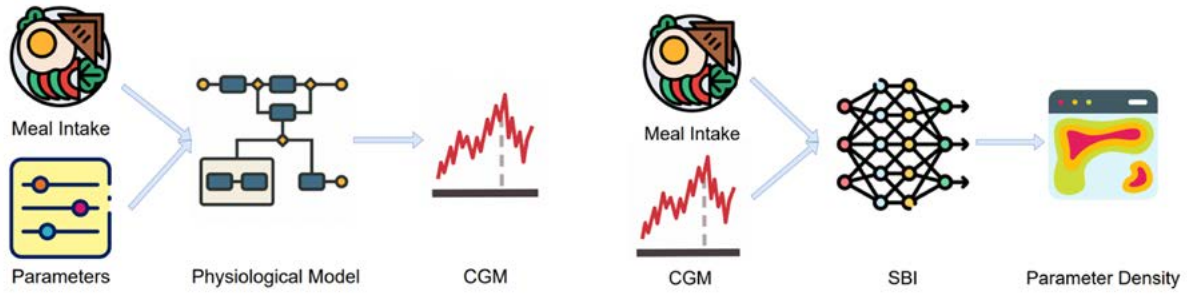
The answer was yes: the correlation patterns of key OFS terms were statistically comparable to those of metabolic syndrome. Osteoporosis emerged as a central element linking the different components of the syndrome. The analysis therefore shows that OFS forms a conceptually coherent framework structurally similar to metabolic syndrome. OFS could thus have comparable potential to promote interdisciplinary awareness and coordinated prevention – factors that have also made metabolic syndrome clinically effective.



Publication:
Bissoto, A.; Bischoff-Ferrari, H.A.; Blum, K.; Brunner, S.; Dietrich, M.; Ferrari, S.; Goetz, S.; Rogan, S.; Scheel-Sailer, A.; Koch, L.M.; et al. Orthogeriatric Fracture Syndrome: A Large-Scale Bibliometric Analysis of a Proposed Concept for Cross-Disciplinary Awareness and Coordinated Care. J. Clin. Med. 2026, 15, 3105. https://doi.org/10.3390/jcm15083105

A Real-Time Digital Twin for Type 1 Diabetes

Physiological modelling of type 1 diabetes offers a compelling vision: a personalised computational replica of the glucose dynamics of a person with diabetes, a digital twin, that can be used to simulate treatment adjustments, optimise insulin dosing, or anticipate adverse events before they occur. The barrier to realising this vision in clinical practice has been computational: existing approaches to personalising such models require hours of processing time and are restricted to idealised fasting conditions, making them unsuitable for real-world, real-time use. The research group addressed this by combining an established open-source diabetes simulation framework with modern deep generative models, specifically simulation-based inference, to estimate patient-specific parameters from continuous glucose monitor (CGM) traces in under one second, compared to nearly 45 minutes with conventional methods, and with substantially better accuracy. Trained on 5,000 simulated 24-hour CGM profiles and evaluated across a range of virtual patients spanning children, adolescents, and adults, the approach represents an important step toward digital twins that are fast enough for routine clinical deployment. Ongoing work focuses on improving the estimation of parameters that remain difficult to fit, which is a prerequisite for reliably simulating interventions such as changes to basal insulin or meal timing.



(a) Physiological model (b) Simulation-based inference

Publications:

- Hoang, Trung-Dung, et al. „A REAL-TIME DIGITAL TWIN FOR TYPE 1 DIABETES BASED ON DEEP GENERATIVE MODELS.“ DIABETES TECHNOLOGY & THERAPEUTICS. Vol. 28. 2455 TELLER RD, THOUSAND OAKS, CA 91320 USA: SAGE PUBLICATIONS INC, 2026.
- Hoang, Trung-Dung, et al. „A Real-Time Digital Twin for Type 1 Diabetes Using Simulation-Based Inference.“ International Workshop on Digital Twin for Healthcare. Cham: Springer Nature Switzerland, 2025.

Keeping AI Models Trustworthy Over Time: Label-Free Performance Monitoring

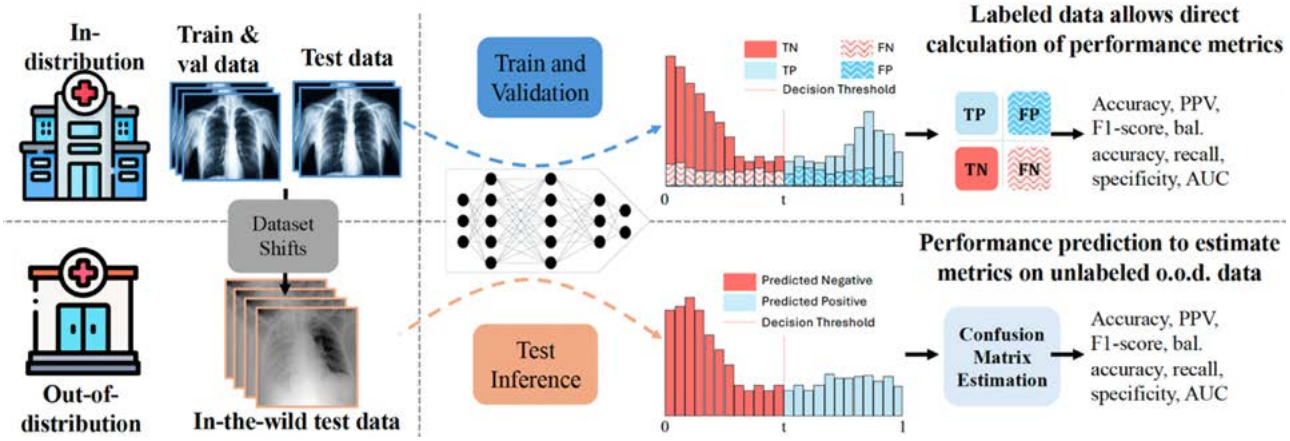
A central challenge in clinical AI is not only to develop a model that works, but also to ensure that it remains reliable after deployment. A model trained on data from a particular institution or period may lose performance unnoticed in a new context. This phenomenon is known as distribution shift and often occurs without an obvious warning signal.

Continuous performance monitoring is therefore essential for safe clinical use. At the same time, there is a fundamental challenge: the gold standard for assessing model performance requires labelled data. Obtaining such clinical labels is expensive, time-consuming and often not part of routine clinical practice.

The research group developed methods for evaluating performance without new labels. These methods infer how well a classification model is performing using only the probabilities output by the model, without additional annotations. Crucially, they estimate not only accuracy but also the full confusion matrix. This makes it possible to determine clinically relevant metrics such as sensitivity, specificity, positive and negative predictive values, and the area under the curve (AUC).

As a proof of concept, the team developed corresponding models for interpreting chest X-rays. The approach is currently being validated for the automated detection of diabetic retinopathy in fundus images, one of the most established and widely used AI applications in diabetology. In this context, false-negative results – missed signs of retinopathy – are clinically relevant. An undetected decline in performance across screening sites or over time therefore poses a real patient safety risk.

The method offers a practical route towards continuously monitored and trustworthy AI-supported screening processes that can detect declining performance before it affects people undergoing screening.



Publication:
Flühmann, T., Bissoto, A., Hoang, T.-D., & Koch, L. M. (2025). Label-free estimation of clinically relevant performance metrics under distribution shifts. Proc. Uncertainty for Safe Utilization of Machine Learning in Medical Imaging (UNSURE).

INSPIRE Lab

Team



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Research Project

Insulin Activity Project: Innovation for Everyday Insulin Use

Insulin can lose efficacy when exposed to heat, light or mechanical stress. How active and effective insulin remains during everyday treatment has so far received little systematic investigation. Through the Insulin Activity Project, the INSPIRE Lab investigates insulin degradation under stress and develops methods to measure the resulting loss of activity.

Using functional cell-based assays, in vivo studies and biophysical methods, the team quantifies how heat, light and mechanical stress affect insulin's structure and efficacy. To this end, DCB established its own cell-based reference method for characterising insulin activity. The data obtained were used to develop a model linking structural changes to loss of function.

The project is funded by Innosuisse and carried out in close collaboration with FHNW, CSEM and partners from industry and academia. The team's first publications in the Journal of Diabetes Science and Technology (JDST) underline its focus on people living with diabetes and their insulin therapy: "Real-World Experience With Insulin Activity Among People With Type 1 Diabetes: Results of a Multinational Survey" and "Metabolic Activity of Insulin and Temperature Exposure in the Real World: Challenges for People Living With Diabetes". The research findings were also presented for the first time by doctoral researcher Danai Kokona at ATTD 2026: "Quantifying the Biological Activity of Thermally Stressed Insulins In Vitro" and "Developing Statistical Models to Predict the Potency of Stressed Insulins".

Findings on insulin activity from the INSPIRE Lab provide the scientific basis for DCB spin-off Beyond Diagnostics AG, founded in February 2026. Beyond Diagnostics is developing LUMIQ, a point-of-care test to assess insulin quality. The perspectives of people living with diabetes are central to this work: a dedicated Lived Experience Panel actively contributes their experiences to development.

Quality

DCB is ISO 9001 certified

Diabetes Center Berne (DCB) has been certified to ISO 9001 since August 2022. The certification is valid until August 2028. A surveillance audit was successfully completed in March 2026, with no nonconformities identified.

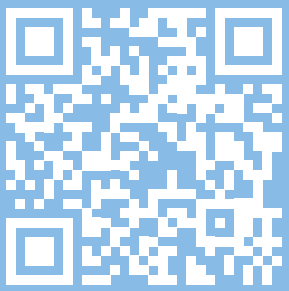
Quality management system

Since April 2022, DCB has operated a flexible, process-oriented electronic management system (EMS) in accordance with ISO 9001:2015. In addition to general quality processes, it covers core clinical processes based on ICH-GCP. This enables functions such as review and approval processes to be carried out electronically. It also facilitates training planning and supports the continuous development of employees' skills.



Imprint

Imprint
Publisher: DCB Research AG
Text and concept: DCB Research AG
Design: HYVE Innovate GmbH
Photos: Sandra Blaser
This annual report was written in German and English.



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