



CVRC

CardioVascular Research Cluster

BERN

Annual Meeting 2024

24 January 2024

Online presentations + On-site posters & Apéro,
Atrium A Ground Floor, Sitem-Insel

- New Aspects in Cardiovascular Imaging
- Acquired Cardiovascular Diseases, Metabolism and Prevention
- Roundtable: Artificial vessels and cardiac organoids - Will we still need animal experimentation in the future?
- Sex Differences, Development (Aging) and Genetic Bases of Cardiovascular Diseases
- Medical Technologies and Structural Heart Diseases
- Vascular Disorders
- Arrhythmias

Meeting Programme

Organization Committee

Dr. Maria Arnold, Scientific and Administrative Manager of the Cardiovascular Research Cluster Bern, Inselspital, Bern University Hospital and University of Bern

Dr. med. Sarah Bernhard, Division of Angiology, Swiss Cardiovascular Centre, Inselspital, Bern University Hospital

Daniela Castillo Robles, Administrative Assistant Cardiovascular Research Cluster Bern, Inselspital, Bern University Hospital and University of Bern

Prof. Dr. Yvonne Döring, Division of Angiology, Swiss Cardiovascular Centre, Inselspital, Bern University Hospital and Department for BioMedical Research, University of Bern

Prof. Dr. Sarah Longnus, Department of Cardiac Surgery, Inselspital, Bern University Hospital and Department for BioMedical Research, University of Bern

Prof. Dr. med. Katja Odening, Translational Cardiology, Department of Cardiology, Inselspital, Bern University Hospital and Department of Physiology, University of Bern

Ass. Prof. Dr. Marco Osterwalder, Department for BioMedical Research, University of Bern

PD Dr. med. Emrush Rexhaj, Department of Cardiology, Inselspital, Bern University Hospital

Meeting Programme Overview

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| 10:00-10:05 | Opening / Welcome (online, Zoom) |
| 10:05-10:45 | Session 1: New Aspects in Cardiovascular Imaging |
| 10:45-10:55 | Break |
| 10:55-11:35 | Session 2: Acquired Cardiovascular Diseases, Metabolism and Prevention |
| 11:35-11:45 | Break |
| 11:45-12:25 | Session 3: Roundtable “Artificial Vessels and Cardiac Organoids - Will we still need animal experimentation in the future?” |
| 12:25-12:55 | Lunch Break |
| 12:55-13:40 | Session 4: Sex Differences, Development (Aging) and Genetic Bases of Cardiovascular Diseases |
| 13:40-13:50 | Break |
| 13:50-14:30 | Session 5: Medical Technologies and Structural Heart Diseases |
| 14:30-14:40 | Break |
| 14:40-15:25 | Session 6: Vascular Disorders |
| 15:25-15:35 | Break |
| 15:35-16:15 | Session 7: Arrhythmias |
| 16:15-16:45 | Break + Poster hanging |
| 16:45-19:00 | Poster presentations (Sitem Atrium A ground floor), Prize announcements and get-together Apéro |

Detailed Scientific Programme

10:00-10:05 Opening / Welcome (online, Zoom)

Session 1: New Aspects in Cardiovascular Imaging

Chairs:

Nicolas Brugger, Department of Cardiology

Kady Fischer, Department of Anaesthesiology and Pain Medicine

10:05 Emerging imaging technologies for noninvasive cardiac tissue characterization
Jessica Bastiaansen, Department of Diagnostic, Interventional and Pediatric Radiology & Translational Imaging Center, sitem-insel

10:25-10:45 Flash presentations from abstracts

- Quantifying the return of diastolic function after elective electrical cardioversion in atrial fibrillation patients with 4D-Flow-MRI
Davide Colatruglio, Department of Anaesthesiology and Pain Medicine
- Digital model of coronary arteries based on computed tomography and optical coherence tomography using image processing
Marc Ilic, Department of Cardiology
- Biventricular systolic function fluctuates during breathing maneuvers simulating the induction of general anaesthesia
Stephanie Keser, Department of Anaesthesiology and Pain Medicine

10:45-10:55 Break

Session 2: Acquired Cardiovascular Diseases, Metabolism and Prevention

Chairs:

Lukas Hunziker, Department of Cardiology

Sarah Longnus, Department of Cardiac Surgery and Department for BioMedical Research

10:55 **Arterial Hypertension**
Emrush Rexhaj, Department of Cardiology

11:15-11:35 **Flash presentations from abstracts**

- ChemR23 expression protects against smooth muscle cell phenotype switching in atherosclerosis
Bryce Evans, Division of Angiology and Department for BioMedical Research
- Circulating factors, measured both in the donor and during ex-vivo heart perfusion, correlate with subsequent heart recovery in a pig model of DCD
Selianne Graf, Department of Cardiac Surgery and Department for BioMedical Research
- AKAP2 is a novel regulator of collagen secretion in cardiac myofibroblasts
Greta Scherler, Department of Biomedical Sciences, University of Lausanne

11:35-11:45 **Break**

Session 3: Roundtable “Artificial Vessels and Cardiac Organoids - Will we still need animal experimentation in the future?”

Chair:

Yvonne Döring, Division of Angiology and Department for BioMedical Research

Dominik Obrist, ARTORG Center for Biomedical Engineering Research

11:45-12:25 **Artificial Vessels and Cardiac Organoids - Will we still need animal experimentation in the future?**

Panelists:

- Olivier Guenat, ARTORG Center for Biomedical Engineering Research
- Drosos Kotelis, Department of Vascular Surgery
- Nadia Mercader, Institute of Anatomy
- Marco Osterwalder, Department for BioMedical Research
- Robert Rieben, Department for BioMedical Research

12:25-12:55 **Lunch Break**

Session 4: Sex Differences, Development (Aging) and Genetic Bases of Cardiovascular Diseases

Chairs:

Jean-Sébastien Rougier, Institute for Biochemistry and Molecular Medicine

Hildegard Tanner, Department of Cardiology

12:55 **Recent advancements in cardiac organoid technologies and their application in our NRP79 „HeartX“ project**
Christian Zuppinger, Department of Cardiology and Department for BioMedical Research

13:15-13:40 **Flash presentations from abstracts**

- Sex differences in cardiac recovery in a rat model of DCD
Alexia Clavier, Department of Cardiac Surgery and Department for BioMedical Research

- Sex differences in atrial electrophysiology: I_{K1} is a major factor that is modulated by sex hormones
Lucilla Giammarino, Translational Cardiology, Department of Physiology and Department of Cardiology
- Epigenomic profiling identifies a non-coding region that calibrates *Tbx5* gene dosage in the developing heart and limb
Vincent Rapp, Department for BioMedical Research
- A novel platform to discover key ligand-receptor interactions regulating zebrafish heart regeneration
João Carvalho, Institute of Anatomy

13:40-13:50 Break

Session 5: Medical Technologies and Structural Heart Diseases

Chairs:

Jonas Lanz, Department of Cardiology

David Reineke, Department of Cardiac Surgery

13:50 Combining patient data, modeling and emerging technology to enhance clinical outcome
Silje Ekroll Jahren, ARTORG Center for Biomedical Engineering Research

14:10-14:30 Flash presentations from abstracts

- Hemodynamic assessment of anomalous aortic origin of a right coronary artery with the use of fractional flow reserve and intra-vascular ultrasound
Anselm Stark, Department of Cardiology
- Heartbeat detection in photoplethysmography signals for the monitoring of cardiac arrhythmias
Jeanningros Loïc, CSEM, EPFL
- Microfluidic model of microvascular obstruction to investigate thrombolysis under flow
Anastasia Milusev, ARTORG Center for Biomedical Engineering Research

14:30-14:40 Break

Session 6: Vascular Disorders

Chairs:

Britta Engelhardt, Theodor Kocher Institute

Stefan Freigang, Department of Tissue Medicine and Pathology

14:40 New diagnostic and therapeutic options for congenital vascular malformations
Sarah Bernhard, Department of Angiology

15:00-15:25 Flash presentations from abstracts

- A human iPSC-derived isogenic model of the neurovascular unit to explore blood-brain barrier dysfunction in neuroinflammation
Pelin Kasap, Theodor Kocher Institute
- Quantifying flow characteristics in cortical microvascular networks during ischaemic stroke with varying penetrating tree and leptomeningeal collateral densities
Chryso Lambride, ARTORG Center for Biomedical Engineering Research
- Loss of B cell-ACKR3 reduces atherosclerosis by decreasing plasma cells and pro-inflammatory antibody production
Anaïs Yerly, Division of Angiology and Department for BioMedical Research
- Successful replantation of porcine forelimbs 33 hours after amputation utilizing 24-hour ex vivo perfusion for vessel protection
Lei Zhang, Department for BioMedical Research

15:25-15:35 Break

Session 7: Arrhythmias

Chairs:

Katja Odening, Translational Cardiology, Department of Cardiology and Department of Physiology

Laurent Roten, Department of Cardiology

15:35 **Atrial Fibrillation: Rhyme or Reason**

Ange Maguy, Department of Physiology

15:55-16:15 **Flash presentations from abstracts**

- **New pacing paradigms to assess the stability of cardiac conduction**
Stephan De Waard, Department of Physiology
- **Posterior wall ablation by pulsed-field ablation - procedural safety, efficacy and findings on redo procedures**
Küffer Thomas, Department of Cardiology
- **KCNH2-suppression-replacement gene therapy attenuates the pathogenic phenotype in transgenic rabbits with short QT syndrome type**
Saranda Nimani, Translational Cardiology, Department of Physiology and Department of Cardiology

16:15-16:45 **Break + Poster hanging**

16:45-18:45 **Poster presentations (Sitem Atrium A ground floor) and get-together Apéro**

- **16:45-17:30: Poster Session 1, odd numbers**
- **17:30-18:15: Poster Session 2, even numbers**

18:45-19:00 **Prize announcements (Nina Ullrich, Department of Physiology)**

Closing

List of Posters

Odd numbers: Poster presenters will be present at their poster during Poster Session 1.

Even numbers: Poster presenters will be present at their poster during Poster Session 2.

| Poster nb. | Name | Affiliation | Title |
|------------|--------------------------|--|--|
| 1 | Abegg Julia | Department of Anesthesiology and Pain Medicine, Bern University Hospital | Breathing maneuvers have similar effects on myocardial oxygenation changes as the pharmacological vasodilator regadenoson |
| 2 | Alerni Nicolò | Department of Physiology, University of Bern and Department of Cardiology, Bern University Hospital | Exploring the crossroads of electrical and mechanical properties in transgenic rabbits with long-QT and short-QT syndrome |
| 3 | Arduini Marco | Department of Anesthesiology and Pain Medicine, Bern University Hospital | Perioperative left ventricular strain to predict the onset of perioperative myocardial injury |
| 4 | Barbieri Miriam | Department of Physiology, University of Bern and Department of Cardiology, Bern University Hospital | SGK1 inhibition normalizes action potential duration in transgenic LQT2 rabbits but not in LQT1, suggesting a novel gene-specific therapeutic approach in long QT syndrome |
| 5 | Beer Georgia | Department of Cardiac Surgery, University Hospital Bern and Department for BioMedical Research, University of Bern | PhD project plan: ex-vivo heart perfusion - technology that innovates cardiac transplantation and precision therapies |
| 6 | Bornemann Karoline-Marie | ARTORG Center for Biomedical Engineering Research, University of Bern | Quantification of platelet activation and sinus washout in larger aortic roots of transcatheter heart valve thrombosis patients |
| 7 | Clavier Alexia | Department of Cardiac Surgery, University Hospital Bern and Department for BioMedical Research, University of Bern | Sex differences in cardiac recovery in a rat model of DCD |
| 8 | Colatruglio Davide | Department of Anesthesiology and Pain Medicine, Bern University Hospital | Quantifying the return of diastolic function after elective electrical cardioversion in atrial fibrillation patients with 4D-Flow-MRI |
| 9 | Coppe Benedetta | Institute of Anatomy, University of Bern | A paternal cardiac lesion induces cardiac adaptation in the offspring |
| 10 | De Waard Stephan | Department of Physiology, University of Bern | New pacing paradigms to assess the stability of cardiac conduction |

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| 11 | Evans Bryce | Division of Angiology, University Hospital of Bern and Department for BioMedical Research, University of Bern | ChemR23 expression protects against smooth muscle cell phenotype switching in atherosclerosis |
| 12 | Ferrari Lorenzo | ARTORG Center for Biomedical Engineering Research, University of Bern | ExtraCorporeal Membrane Oxygenator (ECMO) cannulae evaluation in pulsatile and non-pulsatile pediatric mock circuit |
| 13 | Fujisawa Miwako | Theodor Kocher Institute, University of Bern | New molecular underpinnings of BBB dysfunction in multiple sclerosis |
| 14 | Giammarino Lucilla | Department of Physiology, University of Bern and Department of Cardiology, Bern University Hospital | Sex differences in atrial electrophysiology: I_{K1} is a major factor that is modulated by sex hormones |
| 15 | Graf Selianne | Department of Cardiac Surgery, University Hospital Bern and Department for BioMedical Research, University of Bern | Circulating factors, measured both in the donor and during ex-vivo heart perfusion, correlate with subsequent heart recovery in a pig model of DCD |
| 16 | Helmer Anja | Department of Cardiac Surgery, University Hospital Bern and Department for BioMedical Research, University of Bern | Sex-specific alterations in cardiac metabolic gene expression, as a result of ischemia-induced cardiac injury, represent sex-specific targets for reperfusion therapy in heart transplantation after circulatory death |
| 17 | Ilic Marc | Department of Cardiology, University Hospital Bern | Digital model of coronary arteries based on computed tomography and optical coherence tomography using image processing |
| 18 | Illli Joël | Department of Cardiology, University Hospital Bern | Development and design of a high cardiac output flow-loop for patient-specific right coronary anomaly testing |
| 19 | Illli Joël | Department of Cardiology, University Hospital Bern | Mechanical testing and comparison of porcine tissue, silicone- and 3D-printed materials for cardiovascular phantoms |
| 20 | Jeanningros Loïc | CSEM, EPFL | Heartbeat detection in photoplethysmography signals for the monitoring of cardiac arrhythmias |
| 21 | Kasap Pelin / Borovko Irina | Theodor Kocher Institute, University of Bern | A human iPSC-derived isogenic model of the neurovascular unit to explore blood-brain barrier dysfunction in neuroinflammation |

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| 22 | Keser Stephanie | Department of Anesthesiology and Pain Medicine, Bern University Hospital | Biventricular systolic function fluctuates during breathing maneuvers simulating the induction of general anaesthesia |
| 23 | Küffer Thomas | Department of Cardiology, University Hospital Bern | Posterior wall ablation by pulsed-field ablation - procedural safety, efficacy and findings on redo procedures |
| 24 | Lambride Chryso | Department of Neurology, University Hospital Zurich and ARTORG Center for Biomedical Engineering Research, University of Bern | Quantifying flow characteristics in cortical microvascular networks during ischaemic stroke with varying penetrating tree and leptomenigeal collateral densities |
| 25 | Louradour Julien | Department of Physiology, University of Bern and Department of Cardiology, Bern University Hospital | Simultaneous assessment of mechanical and electrical function in Langendorff-perfused ex-vivo mouse heart |
| 26 | Milusev Anastasia | ARTORG Center for Biomedical Engineering Research, University of Bern | Microfluidic model of microvascular obstruction to investigate thrombolysis under flow |
| 27 | Mokhtari Ali | ARTORG Center for Biomedical Engineering Research, University of Bern | Comparative analysis of 4D flow MRI and CFD simulations in an improved patient-based carotid bifurcation with 80% stenosis |
| 28 | Nimani Saranda | Department of Physiology, University of Bern and Department of Cardiology, Bern University Hospital | KCNH2-suppression-replacement gene therapy attenuates the pathogenic phenotype in transgenic rabbits with short QT syndrome type 1 |
| 29 | Ottersberg Rahel | Department of Cardiac Surgery, University Hospital Bern and Department for BioMedical Research, University of Bern | Optimized ex-vivo heart perfusion protocol to achieve a 24-hour out-of-body time in a porcine model of donation after circulatory death |
| 30 | Rapp Vincent | Department for BioMedical Research, University of Bern | Epigenomic profiling identifies a non-coding region that calibrates <i>Tbx5</i> gene dosage in the developing heart and limb |
| 31 | Roland Virginia | Department for BioMedical Research, University of Bern | Cardiac cell type enhancer architecture in the <i>Gata4-Hand2</i> regulatory axis shapes mammalian heart development |
| 32 | Rösch Yannick | ARTORG Center for Biomedical Engineering Research, University of Bern | Microfluidic model of microvascular obstruction with real porcine microthrombi to investigate effect of proximal intracoronary balloon occlusion on local drug concentration |

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| 33 | Scherler Greta | Department of Biomedical Sciences, University of Lausanne | AKAP2 is a novel regulator of collagen secretion in cardiac myofibroblasts |
| 34 | Schulz Julia | Division of Angiology, University Hospital of Bern and Department for BioMedical Research, University of Bern | ChemR23 modifies PVAT function and crosstalk within the arterial vasculature in atherosclerosis |
| 35 | Schwerzmann Yann | Department of Anesthesiology and Pain Medicine, Bern University Hospital | Retrospective temporal resolution interpolation impacts myocardial strain quantification on compressed sensing cardiovascular magnetic resonance cine images |
| 36 | Stark Anselm | Department of Cardiology, University Hospital Bern | Hemodynamic assessment of anomalous aortic origin of a right coronary artery with the use of fractional flow reserve and intra-vascular ultrasound |
| 37 | Yadav Garima | Department for BioMedical Research, University of Bern | Exploring the role of the glycocalyx in xenotransplantation research |
| 38 | Yerly Anaïs | Division of Angiology, University Hospital of Bern and Department for BioMedical Research, University of Bern | Loss of B cell-ACKR3 reduces atherosclerosis by decreasing plasma cells and pro-inflammatory antibody production |
| 39 | Zhang Lei | Department for BioMedical Research, University of Bern | Successful replantation of porcine forelimbs 33 hours after amputation utilizing 24-hour ex vivo perfusion for vessel protection |
| 40 | Zimmermann Cedric | Department for BioMedical Research, University of Bern | In vitro characterization of the immunological effect of multigene modification in donor pigs for xenotransplantation |
| 41 | Zoia Matteo | Department for BioMedical Research, University of Bern | Multiome profiling identifies compartment- and cell type-specific cardiac enhancers during mammalian heart development |
| 42 | Zuppinger Christian | Department of Cardiology, University Hospital Bern and Department for BioMedical Research, University of Bern | Establishing a hiPSC-derived cardiac organoid model for the identification of non-coding regulatory genomic sequences involved in human heart chamber formation |
| 43 | Carvalho João | Institute of Anatomy, University of Bern | A novel platform to discover key ligand-receptor interactions regulating zebrafish heart regeneration |
| 44 | Horvath Andras | Department of Physiology, University of Bern and Department of Cardiology, Bern University Hospital | Investigation of cellular Na ⁺ Ca ²⁺ -handling and its sex differences in rabbit atrial cardiomyocytes |

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| 45 | Calastra Camilla | Department of Diagnostic, Interventional and Paediatric Radiology (DIPR) | Characterising artero-venous malformations using MR-based data |
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