

Prof Dr. med. et phil. nat. Rolf Vogel
Chefarzt
Kardiologie soH

Tel. 032 627 3559
Email rolf.vogel@spital.so.ch



Ausbildung/wissenschaftliche Tätigkeit

1990 Eidg. Dipl. Ing ETH Zürich
1999 Staatsexamen Humanmedizin, Universität Bern
2000 Promotion zum Dr. med. et phil nat., Universität Bern
2006 Facharzttitel FMH Kardiologie
2007 Venia docendi für das Fach Kardiologie, Universität Bern
2009 Forschungsprofessur Cardiovascular Engineering, Universität Bern
2011 Titularprofessur für Kardiologie, Universität Bern

Klinische Tätigkeit

2000-2001 Assistenzarzt Innere Medizin, House staff, Inselspital Bern
2002-2005 Assistenzarzt Kardiologie, Universitätsklinik für Kardiologie, Inselspital Bern
2005-2006 Ausbildung Interventionelle Kardiologie, Universitätsklinik für Kardiologie, Inselspital Bern
2006-2008 Oberarzt Interventionelle Kardiologie, Universitätsklinik für Kardiologie, Inselspital Bern
2009-2011 Leitender Arzt Interventionelle Kardiologie, Universitätsklinik für Kardiologie, Inselspital Bern und Forschungsleiter ARTORG Cardiovascular Engineering
<10/2011 Chefarzt Kardiologie soH

Forschungsschwerpunkte

- Zelluläre Elektrophysiologie: Gap junction, Aktionspotentialpropagation
- Kontrast-Ultraschall: Quantitative Gewebepfusion Myokard, Hirn und Niere
- Koronare Hämodynamik
- Human Energy Harvesting
- Miniaturisierte, implantierbare ECG Rekorder: ösophageal, intracardial
- Perkutane Mitralklappenrekonstruktion

Publikationen

Originalarbeiten

Bukauskas FF, Vogel R, Weingart R. Biophysical properties of heterotypic gap junctions newly formed between two types of insect cells. *J of Physiol* 1997;499: 701-713.

Vogel R, Weingart R. Mathematical model of vertebrate gap junctions derived from electrical measurements on homotypic and heterotypic channels. *J of Physiol* 1998;510: 177-189.

Valiunas V, Manthey D, Vogel R, Willecke K, Weingart R. Biophysical properties of mouse connexin30 gap junction channels studied in transfected human HeLa cells. *J of Physiol* 1999;519:631-644.

Valiunas V, Vogel R, Weingart R. The kinetics of gap junction currents are sensitive to the ionic composition of the pipette solution. *Eur J Physiol* 2000;440:835-842.

Henriquez AP, Vogel R, Muller-Borer BJ, Henriquez CS, Weingart R, Cascio WE. Influence of dynamic gap junction resistance on impulse propagation in ventricular myocardium: a computer simulation study. *Biophys J* 2001;81:2112-2121.

Sakai R, Elfgang C, Vogel R, Willecke K, Weingart R. The electrical behaviour of rat connexin46 gap junction channels expressed in transfected HELA cells. *Eur J Physiol* 2003;446:714-727.

Torti SR, Billinger M, Schwerzmann M, Vogel R, Zbinden R, Windecker S, Seiler C. Risk of decompression illness among 230 divers in relation to the presence and size of patent foramen ovale. *Eur Heart J* 2004;25:1014-1020.

Zbinden R, Vogel R, Meier B, Seiler C. Coronary collateral flow and peripheral blood monocyte concentration in patients treated with granulocyte–macrophage colony stimulating factor. *Heart* 2004;90:945-946.

Vogel R, Indermühle A, Reinhardt J, Meier P, Siegrist PT, Namdar M, Kaufmann PA, Seiler C. The quantification of absolute myocardial perfusion in humans by contrast echocardiography: algorithm and validation. *J Am Coll Cardiol* 2005;45:754-762.

Vogel R, Zbinden R, Indermühle A, Windecker S, Meier B, Seiler C. Collateral Flow Measurements in Humans by Myocardial Contrast Echocardiography: Validation of Coronary Pressure Derived Collateral Flow Assessment. *Eur Heart J*, 2006;27:157-165.

Indermühle A, Vogel R (equal first), Meier P, Wirth S, Stoop R, Mohaupt M, Seiler C. The relative myocardial blood volume differentiates between hypertensive heart disease and athlete's heart in humans. *Eur Heart J* 2006;27:1571-1578.

Vogel R, Valiunas V, Weingart R. Subconductance states of Cx30 gap junction channels: data from transfected HELA cells versus data from a mathematical model. *Biophys J* 2006;91:2337-2348.

Vogel R, Indermühle A, Seiler C. Is there an absolute perfusion threshold that prevents myocardial ischemia in humans. *Heart* 2007;93;115-116.

Cook S, Wenaweser P, Togni M, Billinger M, Morger C, Seiler C, Vogel R, Hess OM, Meier B, Windecker S. Incomplete Stent Apposition and Very Late Stent Thrombosis After Drug-Eluting Stent Implantation. *Circulation* 2007; 115:2426-2434.

Meier P, Gloeckler S, Zbinden R, Beckh S, de Marchi SF, Zbinden S, Wustmann K, Billinger M, Vogel R, Cook S, Wenaweser P, Togni M, Windecker S, Meier B, Seiler C. Beneficial Effect of Recrutable Collaterals. A 10-Year Follow-Up Study in Patients With Stable Coronary Artery Disease Undergoing Quantitative Collateral Measurements. *Circulation* 2007; 116:975 – 983.

Togni M, Eber S, Widmer J, Billinger M, Wenaweser P, Cook S, Vogel R, Seiler C, Eberli FR, Maier W, Corti R, Roffi M, Lüscher TF, Garachemani A, Hess OM, Wandel S, Meier B, Jüni P, Windecker S. Impact of Vessel Size on Outcome After Implantation of Sirolimus-Eluting and Paclitaxel-Eluting Stents: A Subgroup Analysis of the SIRTAX Trial. *J Am Coll Cardiol* 2007;50;1123-1131.

Wenaweser P, Surmely JF, Windecker S, Roffi M, Togni M, Billinger M, Cook S, Vogel R, Seiler C, Hess OM, Meier B. Prognostic value of early exercise testing after coronary stent implantation. *Am J Cardiol*. 2008;101:807-811.

Vogel R, Indermühle A, Meier P, Seiler C. Quantitative Stress Echocardiography in Coronary Artery Disease Using Contrast-Based Myocardial Blood Flow Measurements: Prospective Comparison with Coronary Angiography. *Heart* 2009;95(5):377-384.

Cook S, Ladich E, Nakazawa G, Eshtehardi P, Neidhart M, Vogel R, Togni M, Wenaweser P, Billinger M, Seiler C, Gay S, Meier B, Pichler WJ, Jüni P, Virmani R, Windecker S. Correlation of Intravascular Ultrasound Findings With Histopathologic Analysis of Thrombus Aspirates in Patients With Very Late Drug-Eluting Stent Thrombosis. *Circulation* 2009 ;120:391-399.

Abdelmoneim SS, Dhoble A, Bernier M, Erwin PJ, Korosoglou G, Senior R, Moir S, Kowatsch I, Xian-Hong S, Muro T, Dawson D, Vogel R, Wei K, West CP, Montori VM, Pellikka PA, Abdel-Kader SS, Mulvagh SL. Quantitative myocardial contrast echocardiography during pharmacological stress for diagnosis of coronary artery disease: a systematic review and meta-analysis of diagnostic accuracy. *Eur J Echocardiogr.* 2009;10(7):813-25.

Meier P, Gloekler S, de Marchi S, Indermühle A, Rutz T, Traupe T, Vogel R, Seiler C. Myocardial Salvage Through Coronary Collateral Growth by Granulocyte-Colony Stimulating Factor in Chronic Coronary Artery Disease: A Controlled Randomized Trial. *Circulation* 2009, 120:1355-1363.

Indermühle A, Vogel R, Rutz T, Seiler C. Myocardial contrast echocardiography for the distinction of hypertrophic cardiomyopathy from athlete's heart and hypertensive heart disease. *Swiss Medical Weekly*, 2009 Nov 28;139(47-48):691-8.

Gloekler S, Meier P, de Marchi SF, Rutz T, Traupe T, Rimoldi SF, Wustmann K, Steck H, Cook SP, Vogel R, Togni M, Seiler C. Coronary Collateral Growth by External Counterpulsation: A Randomized Controlled Trial. *Heart* 2010;96:202-207.

Räber L, Jüni P, Löffel L, Wandel S, Cook S, Wenaweser P, Togni M, Vogel R, Seiler C, Eberli F, Lüscher Th, Meier B, Windecker S. Impact of Stent Overlap on Angiographic and Long-Term Clinical Outcome in Patients Undergoing Drug-Eluting Stent Implantation. *J Am Coll Cardiol* 2010;55:1178–88.

Eshtehardi P, Cook S, Wandel S, Räber L, Wenaweser P, Togni M, Vogel R, Garachemai A, Eberli FR, Lüscher T, Jüni P, Hess OM, Meier B, Windecker S. Impact of Arterial Injury on Neointimal Hyperplasia After Implantation of Drug-Eluting Stents in Coronary Arteries: An Intravascular Ultrasound Study. *EuroIntervention.* 2010 Sep;6(4):467-74.

Eshtehardi P, Adorjan P, Togni M, Tevaearai H, Vogel R, Seiler C, Meier B, Windecker S, Carrel T, Wenaweser P, Cook S. Iatrogenic Left Main Coronary Artery Dissection: Incidence, Classification, Management, and Long-Term Follow-up. *Am Heart J* 2010;159(6):1147-1153.

Millauer N, Jüni P, Hofmann A, Wandel S, Bhambhani A, Billinger M, Urwyler N, Wenaweser P, Hellige G, Räber L, Cook S, Vogel R, Togni M, Seiler C, Meier B, Windecker S. Sirolimus versus paclitaxel coronary stents in clinical practice. *Catheter Cardiovasc Interv.* 2011;77(1):5-12.

Rutz T, de Marchi SF, Schwerzmann M, Vogel R, Seiler C. Right ventricular absolute myocardial blood flow in complex congenital heart disease. *Heart* 2010;96(13):1056-62.

Rutz T, Gloekler S, deMarchi SF, Estherhardi P, Cook S, Vogel R, Mohacsi P, Seiler C. Coronary Collateral Function in the Transplanted Heart: Propensity Score Matching with Coronary Artery Disease. *Heart* 2011 Apr;97(7):557-63.

Indermühle A, Vogel R, (equal first), Meier P, Zbinden R, Seiler C. Myocardial Blood Volume and Coronary Resistance During and After Coronary Angioplasty. *Am J Physiol Heart Circ Physiol.* 2011 Mar;300(3):H1119-24.

Räber L, Jüni P, Nüesch E, Kalesan B, MSc, Wenaweser P, Moschovitis A, Khattab AA, Bahlo M, Togni M, Cook S, Vogel R, Seiler C, Meier B, Windecker S. Long-term Comparison of Everolimus-Eluting And Sirolimus-Eluting Stents for Coronary Revascularization. *J Am Coll Cardiol* 2011;57:2143–51.

Räber L, Wohlwend L, Wigger M, Togni M, Wandel S, Wenaweser P, Cook S, Moschovitis A, Vogel R, Kalesan B, Seiler C, Eberli F, Lüscher Th, Meier B, Jüni P, Windecker S. Five-Year Clinical and Angiographic Outcomes of a Randomised Comparison of Sirolimus-Eluting And Paclitaxel-Eluting Stents: Results of SIRTAX LATE. *Circulation* 2011;123:2819-2828.

de Marchi SF, Gloekler S, Meier P, Traupe T, Steck H, Cook S, Vogel R, Seiler C. Determinants of Preformed Collateral Vessels in the Human Heart without Coronary Artery Disease. *Cardiology* 2011;118:198–206.

Pilgrim T, Räber L, Limacher A, Löffel L, Wenaweser P, Cook S, Stauffer JC, Togni M, Vogel R, Garachemani A, Moschovitis A, Khattab AA, Seiler C, Meier B, Jüni P, Windecker S. Comparison of titanium-nitride-oxide-coated stents with zotarolimus-eluting stents for coronary revascularization a randomized controlled trial. *JACC Cardiovasc Interv.* 2011 Jun;4(6):672-82.

Serban Puricel, Patrick Adorjan, Markus Oberhansli, Jean-Christophe Stauffer, Aris Moschovitis, Rolf Vogel, Jean-Jacques Goy, Olivier Muller, Eric Eeckhout, Mario Togni, Peter Wenaweser, Bernhard Meier, Stephan Windecker, Stephane Cook. Clinical outcomes after PCI for acute coronary syndrome in unprotected left main coronary artery disease: insights from the Swiss Acute Left Main Coronary Vessel Percutaneous Management (SALVage) study. *EuroIntervention* 2011;7:DOI: 10.4244/EIJV7I5A00

Weber A, Hurni S, Vandenberghe S, Wahl A, Aymard Th, Vogel R, Carrel Th. The Ideal Site for Ventricular Anchoring of Artificial Chordae in Mitral Regurgitation. *J Thorac Cardiovasc Surg* (in press).

Cook S, Eshtehardi P, Kalesan B, Räber L, Wenaweser P, Togni M, Moschovitis A, Vogel R, Seiler C, Eberli FR, Lüscher T, Meier B, Jüni P, Windecker S. Impact of incomplete stent apposition on long-term clinical outcome after drug-eluting stent implantation. *Eur Heart J.* 2012 Jan 26. oi:10.1093/eurheartj/ehr484.

Niederhauser Th, Marisa T, Haeberlin A, Goette J, Jacomet M, Vogel R. High-resolution esophageal long-term ECG allows detailed atrial wave morphology analysis in case of atrial ectopic beats. *Med Biol Eng Comput* 2012; Volume 50, Issue 7,769-772.

Haeberlin A, Niederhauser Th, Tanner H, Vogel R. Atrial waveform analysis using esophageal long-term electrocardiography reveals atrial ectopic activity. *Clin Res Cardiol* 2012; DOI 10.1007/s00392-012-0477-6.

Zurbuchen A, Pfenniger A, Stahel A, Stoeck C, Koch VM, Vandenberghe S, Vogel R. Energy Harvesting from the Beating Heart by a Mass Imbalance Oscillation Generator. *Annals of Biomedical Engineering*, 2013 Volume 41, Issue 1, Page 131-141.

Bulte CS, Slikkerveer J, Meijer RI, Gort D, Kamp O, Loer SA, de Marchi SF, Vogel R, Boer C, Bouwman RA. Contrast-enhanced ultrasound for myocardial perfusion imaging. *Anesth Analg.* 2012 May;114(5):938-45.

Bulte CS, Slikkerveer J, Meijer RI, Gort D, Kamp O, Loer SA, de Marchi SF, Vogel R, Boer C, Bouwman RA. General anesthesia with sevoflurane decreases myocardial blood volume and hyperemic blood flow in healthy humans. *Anesthesia&Analgesia*, 2013;116(4)767-774.

Pfenniger A, Wickramarathna LN, Vogel R, Koch VM. Design and Realization of an Energy Harvester Using Pulsating Arterial Pressure. *Medical Engineering & Physics*, 2013 <http://dx.doi.org/10.1016/j.medengphy.2013.01.001>.

Pfenniger A, Obrist D, Stahel A, Koch VM, Vogel R. Energy Harvesting through Arterial Wall Deformation: Design Considerations for a Magneto-Hydrodynamic Generator. *Medical & Biological Engineering & Computing* 2013, Volume 51, Issue 7 (2013), Page 741-755.

Pascal Meier, Steffen Gloekler, Berna Oezdemir, Andreas Indermuehle, Tobias Traupe, Rolf Vogel, Stefano de Marchi and Christian Seiler. G-CSF Induced Arteriogenesis in Humans: Molecular Insights into a Randomized Controlled Trial *Current Vascular Pharmacology*, 2013, 11, 38-46.

Haeberlin A, Niederhauser Th, Marisa T, Goette J, Jacomet M, Mattle D, Roten L, Fuhrer J, Tanner H, Vogel R. The Optimal Lead Insertion Depth for Esophageal ECG Recordings with Respect to Atrial Signal Quality. *Journal of Electrocardiology*. Accepted for publication.

Niederhauser Th, Haeberlin A, Marisa T, Jungo M, Goette J, Jacomet M, Abächerli R, Vogel R. Electrodes for Long-Term Esophageal Electrocardiography. *Trans Biomed Eng*, 2013, DOI 10.1109/TBME.2013.2261067.

Maria D. Radu, Alois Pfenniger, Lorenz Räber, Stefano F. de Marchi, Dominik Obrist, Henning Kelbæk, Stephan Windecker, Patrick W. Serruys, Rolf Vogel. Flow disturbances in stent-related coronary evaginations – A computational fluid-dynamic simulation study. *EuroIntervention* 2013, accepted for publication.

Conference Papers

Pfenniger A, Volker VM, Stahel A, Vogel R. Energy Harvesting from Variation in Blood Pressure through Deformation of Arterial Wall using Electro-magneto-hydrodynamics. COMSOL Conference, 2010, Paris, France.

Niederhauser Th, Häberlin A, Marisa T, Goette J, Jacomet M, Vogel R. Esophageal ECG: The Challenge of Electrode Design. IEEE international symposium on medical measurement and application, May 2011, Bari, Italy.

T. Marisa, T. Niederhauser, A. Haeberlin, J. Goette, M. Jacomet, R. Vogel. Asynchronous ECG Time Sampling: Saving Bits with Golomb-Rice Encoding. Computing in Cardiology 2012, Volume 39 Krakow, Poland.

A Zurbuchen, A Pfenniger, S Omari, R Vogel (2013). Modelling and Validation of a Mass Imbalance Oscillation Generator to Harvest Heart Motion Energy, in proceedings of the 24th IASTED International Conference on Modelling and Simulation, 17-19 July 2013, Banff, Canada.

Marisa T, Niederhauser T, Haeberlin A, Goette J, Jacomet M, Vogel R. ATE : Hermitian Basis Time Compression. IEEE International Conference on Advances in Biomedical Engineering 2013 in Lebanon.

T. Marisa, T. Niederhauser, A. Haeberlin, J. Goette¹, M. Jacomet, R. Vogel. Asynchronous ECG Time Sampling: Saving Bits with Golomb-Rice Encoding. Computing in Cardiology; Annual Conference. CinC2012-Poland.

Thomas Niederhauser, Sergio Sánchez Martínez, Andreas Haeberlin, Thanks Marisa, Josef Goette, Marcel Jacomet and Rolf Vogel. Simultaneous Registration of ECG and Cardiac Motion by a Single Esophageal Probe. Annual Conference CinC, Zaragoza, Spain, 2013.

Übersichtsarbeiten

Vogel R, Weingart R. The electrophysiology of gap junctions and gap junction channels and their mathematical modelling. Biol Cell, 2002;94:501-510.

Vogel R, Traupe T, Stolt V, Seiler C. Physical Coronary Arteriogenesis: A Human „Model“ of Collateral Growth Promotion. Trends Cardiovasc Med 2010; 20: 129-133.

Bulte CSE, Slikkerveer J, Meijer RI, Gort D, Kamp O, Loer SA, de Marchi SF, Vogel R, Boer C, Bouwman RA. Contrast-enhanced ultrasound for myocardial perfusion imaging. Anesth Analg. 2013 Apr;116(4):767-74. doi: 10.1213/ANE.0b013e31827e4e41. Epub 2013 Feb 5.

Pfenniger A, Johnsson M, Zurbuchen A, Kock VM, Vogel R. Energy harvesting from the cardiovascular system, or how to get a little help from Yourself. Ann Biomed Eng, accepted for publication.

Fallberichte

Lämmli B, Vogel R, Marti HU. „Nur“ Perikarditis? Schweiz Med Forum 2004;4:937.

Vogel R, Meier B. Emergent Mechanical and Electrical Guide Wire Pacing of the Right Ventricle for Asystole in the Cardiac Catheterization Laboratory. J Invasive Cardiol 2005;17:490.

Vogel R, Meier B. Iron heart. J Invasive Cardiol 2006;18:134.

Vogel R, Windecker S, Meier B. Transcatheter repair of iatrogenic left ventricular free wall perforation. Catheter Cardiovasc Interv 2006;68:829–831.

Räber L, Stolt V, Gugger M, Meier B, Vogel R. Peripartum myocardial infarction caused by placenta embolus. Circulation 2011; 124(2):e26-7.

Stolt V, Räber L, Wani S, Garachemani A, Vogel R, Seiler C, Windecker S, Meier B. Amplatz Septal Occluder to Treat Iatrogenic Perforations. *Catheter Cardiovasc Interv* 2011 Nov 30. doi: 10.1002/ccd.23027.

Mattle D, Vogel R. An uncommon myocardial infarction. *Cardiovascular Medicine* 2011;14(12):351-354.

Häberlin A, Nidehauser Th., Marisa T, Mattle D, Jacomet M, Goette J, Tanner H, Vogel R. Esophageal long-term ECG reveals paroxysmal atrial fibrillation . *Circulation* 2012;125:2281-2282.

Thomas Pilgrim, Rolf Vogel, Bernhard Meier. Waiting for evidence seems to make sense – but not for the one providing the evidence. *Cardiovascular Medicine*; accepted for publication.