Ulrich Flögel, PhD

Date and Place of Birth

23.10.1963, Limburg an der Lahn, Germany

Nationality

German

Current Position

Professor of Experimental Cardiovascular Imaging

Head of Magnetic Resonance Imaging and Spectroscopy
Molecular Cardiology, Heinrich-Heine-University Düsseldorf
https://www.nmr.hhu.de

Biographical Sketch and Postgraduate Education

1983-1984 and 1986-1991	Studies of Chemistry, Justus-Liebig-University Gießen, Germany
1984-1986	National Service – non-military option in youth hostels Diez and Mayen, Germany
1991	Diploma thesis, Justus-Liebig-University Gießen, 'Photoisomerisation of halogenodimethyl sulfides', Supervisor: Prof. G. Maier
1994	PhD thesis 'NMR studies of anoxia, ischemia, pH- and volume regulation of brain cell cultures' University of Bremen, Institute of Organic Chemistry, Germany, Supervisor: Prof. D. Leibfritz
2012	Habilitation 'Modern magnetic resonance methods for cardiovascular phenotyping of mice', venia legendi for Experimental Medicine at the Heinrich Heine University of Düsseldorf, Supervisor Prof. J. Schrader

Professional Experience

1990-1991	Scientific assistant, Justus-Liebig-University Gießen, Inst. of Organ. Chemistry
1991-1997	Scientific assistant, University of Bremen, Institute of Organic Chemistry
1994	EU research project, SINTEF Unimed, Magnetic Resonance Center Trondheim, Norway
1997-2014	Principal investigator at the Institute of Cardiovascular Physiology and Molecular Cardiolgy Heinrich-Heine-University Düsseldorf, Chairman Prof. Jürgen Schrader
since 2014	Professor of Experimental Cardiovascular Imaging, Molecular Cardiology Heinrich-Heine-University Düsseldorf

Awards and Scientific Community Services

1995	Scientific Award of the Höchst AG
since 2001	Member of the International Society of Magnetic Resonance in Medicine (ISMRM)
2007	Edenspreis of the Heinrich Heine University Düsseldorf

since 2015	Member of the European Society for Molecular Imaging (ESMI)
2019	Co-editor of the special issue 'fluorine-19 magnetic resonance: technical solutions, research promises and frontier applications' by Magn. Reson. Mater. Phy.
2022	Organizer of the 'Red Hot ^{19}F MRI meets Small Animal MRI Symposium' in Düsseldorf

Reviewer for DFG, Israel Science Foundation, British Heart Foundation, Technology Foundation STW, Research Council University Antwerp, Minerva-Weizmann Programme, NC3Rs, Czech Science Foundation, DRMD/RADD – CHUV, International Society of Magnetic Resonance in Medicine, European Society of Molecular Imaging; Advanced Materials, Journal of Clinical Investigation, Circulation, Theranostics, Circulation Cardiovascular Imaging, Circulation Research, Journal of the American College of Cardiology, Investigative Radiology, JACC Imaging, ACS Applied Materials & Interfaces, ACS Nano, ACS Analytical Chemistry, Biomaterials Science, European Respiratory Journal, ACS Sensors, Journal of Cardiovascular Magnetic Resonance, Journal for ImmunoTherapy of Cancer, Basic Research in Cardiology, Scientific Reports, NMR in Biomedicine, Free Radical Biology and Medicine, Molecules, Cancer Research, Nanomedicine: Nanotechnology, Biology, and Medicine, Nanoscale Advances, Magnetic Resonance Materials in Physics, Biology and Medicine, PLoS One, European Radiology, Roefo, Applied Sciences, Journal of Organic Chemistry, Journal of Visualized Experiments, Biotechniques, Biosensors, Journal of Fluorine Chemistry, British Journal of Pharmacology, Acta Physiologica, Chinese Journal of Chemistry, Neurochemistry International, Pharmacological Research

Main Research Interests

Interplay of function, energetics, metabolism and infammation and its role in the development of cardiovascular diseases using multinuclear MRI/MRS techniques.

Granted Patents

'Use of fluorinated compounds for diagnosis with imaging modalities', European patent granted (2 152 369) Inventors: U. Flögel, J. Schrader, European Countries (from EP2 152 369; 08 7118 366,1-1216): Austria, Switzerland, Germany, Spain, France, Great-Britain, Italy, Netherlands.

Research Funding

2002-2012	**SFB 612** 'Molecular analysis of cardiac functions and dysfunctions', subproject Z2 'Phenotypic characterisation of transgenic mice'
2003-2004	'Evaluation of new experimental approaches towards gene cell therapy' funded by the Research Commission of the Heinrich-Heine-University Düsseldorf
2005-2009	Research Training Group **GRK 1089** 'Protein interactions and modifications in the heart', subproject 1 'Interaction of myoglobin with cytosolic proteins and role in substrate selection in the heart'
2007-2008	'Development of cardiomyopathy caused by deficiency of very long chain acyl CoA dehydrogenase (VLCAD)' funded by the Research Commission of the Heinrich-Heine-University Düsseldorf
2008-2009	'*In vivo* visualization of inflammatory processes by MRI' funded by the Anton-Betz-Stiftung of the Rheinische Post
since 2015	**SFB 1116** 'Master switches in cardiac ischemia', subproject B2 'Pro- und anti-inflammatory effects of interleukins in cardiac ischemia:

Function of interleukin-23, interleukin-27 und -35'
subproject B5 'Interrelationships between fatty liver disease/insulin resistance and tolerance to cardiac ischemia'
subproject B10 'Unraveling the role of brown adipose tissue in myocardial ischemia/reperfusion injury'

since 2017 **DFG Funding – FL303/6-1 | TE1209/1-1** 'Simultaneous detection of multiple structures by ^{19}F MRI for in vivo assessment of thrombus stage and inflammatory thrombosis'

2019 **DFG Funding – FL 303/7-1** 'International scientific event: Red Hot 19F Meets Small Animal MRI'

since 2019 **INST 208/764-1 FUGG** NMR spectrometer with microimaging unit (additional MRI scanner)

since 2019 **TRR 259** 'Aortic Diseases',
subproject B03 'The role of local and systemic hemodynamic forces in the development of aortic disease

since 2020 **MSCA-RISE-2019** 'PRISAR2' (Proactive Monitoring of Cancer as an Alternative to Surgery), ERC Horizon 2020 Marie Skłodowska-Curie Innovative Research and Innovation Staff Exchange, WS5 'MRI for long-term monitoring of residual and recurrent tumours'

since 2020 **MSCA-ITN-2019** 'NOVA-MRI' (Novel Applications in ^{19}F Magnetic Resonance Imaging), ERC Horizon 2020 Marie Skłodowska-Curie Innovative Training Network, ESR7 '^{19}F MRI in ischaemic heart disease'

since 2021 **DFG Funding – FL 303/6-2 | GR 4374/2-2 | TE 1209/1-2** 'Concurrent tracking of the trafficking of individual immune cell populations after myocardial infarction by 'multicolor' ^{1}H/^{19}F MRI'

2022 **DFG Funding – FL 303/8-1** 'International scientific event: Red Hot ^{19}F Meets Small Animal MRI'

Original Publications

1. Bouvain P, Ding Z, Kadir S, Kleimann P, Kluge N, Tiren ZB, Steckel B, Flocke V, Zalfen R, Petzsch P, Wachtmeister T, John G, Vijitha N, Krämer W, Strasdeit T, Mehrabipour M, Moll JM, Schubert R, Ahmadian MR, Bönner F, Boeken U, Westenfeld R, Engel D, Kelm M, Schrader J, Köhrer K, Grandoch M*, Temme S*, **Flögel U***: Non-invasive mapping of systemic neutrophil dynamics upon cardiovascular injury. *Nat Cardiovasc Res* **2**: 126-143, 2023.

2. Stumpe N, Güden-Silber T, Schneckmann R, Wolters K, Lamb H, Grandoch M, **Flögel U**: In vivo mapping of deep tissue pO2 in a murine model of peripheral artery disease by noninvasive 19F MR relaxometry. *Arterioscler Thromb Vasc Biol* 2023, **43**: 597-598, 2023.

3. Bönner F, Jung C, Polzin A, Erkens R, Dannenberg L, Ipek R, Kaldirim M, Cramer M, Wischmann P, Zaharia OP, Meyer C, **Flögel U**, Levkau B, Gödecke A, Fischer J, Klöcker N, Krüger M, Roden M, Kelm M: SYSTEMI - systemic organ communication in STEMI: design and rationale of a cohort study of patients with ST-segment elevation myocardial infarction. BMC Cardiovasc Disord **23**: 232 (9 pages), 2023.

4. Leiss V, Piekorz RP, Vega SC, Jacoby C, **Flögel U**, Pexa K, Schrader J, Pichler BJ, Beer-Hammer S, Nürnberg B: Data on common carotid artery occlusion inducing focalized stroke lesions after Pertussis toxin injection. *Data Brief* **46**: 108851 (8 pages), 2023.

5. Ding Z, Tan K, Alter C, Temme S, Bouvain P, Owenier C, Hänsch S, Wesselborg S, Peter C, Weidtkamp-Peters S, **Flögel U**, Schira-Heinen J, Stühler K, Hesse J, Kögler G, Schrader J: Cardiac injection of USSC boosts remuscularization of the infarcted heart by shaping the T-cell response. *J Mol Cell Cardiol* **175**: 29-43, 2023.

6. Windfelder AG, Müller FHH, Mc Larney B, Hentschel M, Böhringer AC, von Bredow C-R, Leinberger FH, Kampschulte M, Maier L, von Bredow YM, Flocke V, Merzendorfer H, Krombach GA, Vilcinskas A, Grimm J, Trenczek TE, **Flögel U**: High-throughput screening of caterpillars as a platform to study host-microbe interactions and enteric immunity. *Nat Commun* **13**: 7216 (17 pages), 2022.

7. Quast C, Kober F, Becker K, Zweck E, Hoffe J, Jacoby C, Flocke V, Gyamfi-Poku I, Keyser F, Piayda K, Erkens R, Niepmann S, Adam M, Baldus S, Zimmer S, Nickenig G, Grandoch M, Bönner F, Kelm M, **Flögel U**: Multiparametric MRI identifies subtle adaptations for demarcation of disease transition in murine aortic valve stenosis. *Basic Res Cardiol* **117**: 29 (20 pages) 2022.

8. Laussmann T, Urspruch P, Flocke V, Windfelder AG, Aberle H, Lunau K, **Flögel U**: Dynamic monitoring of vital functions and tissue re-organization in Saturnia pavonia (Lepidoptera, Saturniidae) during final metamorphosis by non-invasive MRI. *Sci Rep* **12**: 1105 (15 pages), 2022.

9. Croci D, Santalla Méndez R, Temme S, Soukup K, Fournier N, Zomer A, Colotti R, Wischnewski V, **Flögel U**, van Heeswijk RB, Joyce JA: Multispectral fluorine-19 MRI enables longitudinal and noninvasive monitoring of tumor-associated macrophages. *Sci Transl Med* **14**: eabo2952 (18 pages), 2022;.

10. Funk F, Kronenbitter A, Isić M, Flocke V, Gorreßen S, Semmler D, Brinkmann M, Beck K, Steinhoff O, Srivastava T, Barbosa DM, Voigt K, Wang L, Bottermann K, Kötter S, Grandoch M, **Flögel U**, Krüger M, Schmitt JP: Diabetes disturbs functional adaptation of the remote myocardium after ischemia/reperfusion. *J Mol Cell Cardiol* **173**: 47–60, 2022.

11. Hof S, Marcus C, Kuebart A, Schulz J, Truse R, Raupach A, Bauer I, **Flögel U**, Picker O, Herminghaus A, Temme S: A toolbox to investigate the impact of impaired oxygen delivery in experimental disease models. *Front Med (Lausanne)* **9**: 869372, 2022;.

12. Polzin A, Dannenberg L, Benkhoff M, Barcik M, Keul P, Ayhan A, Weske S, Ahlbrecht S, Trojovsky K, Helten C, Haberkorn S, **Flögel U**, Zeus T, Müller T, Gräler MH, Kelm M, Levkau B. Sphingosine-1-phosphate improves outcome of no-reflow acute myocardial infarction via sphingosine-1-phosphate receptor 1. *ESC Heart Fail* 10.1002/ehf2.14176 (8 pages), 2022.

13. Bönner F, Gastl M, Nienhaus F, Rothe M, Jahn A, Pfeiler S, Gross U, Schultheiss H-P, Ibanez B, Kozerke S, Szendroedi J, Roden M, Westenfeld R, Schrader J, **Flögel U**, Heusch G, Kelm M: Regional analysis of inflammation and contractile function in reperfused acute myocardial infarction by in vivo 19F cardiovascular magnetic resonance in pigs. *Basic Res Cardiol* **117**: 21 (15 pages), 2022.

14. Philipp S, Horstmann M, Hose M, Daser A, Görtz G-E, Jesenek C, **Flögel U**, Hansen W, Bechrakis N, Banga JPS, Eckstein A, Berchner-Pfannschmidt U: An early wave of macrophage infiltration intertwined with antigen specific proinflammatory T-cells and browning of adipose tissue

characterizes the onset of orbital inflammation in a mouse model of Graves' orbitopathy. *Thyroid* **32**: 283-293, 2022.

15. **Flögel U**, Temme S, Jacoby C, Oerther T, Keul P, Flocke V, Wang X, Bönner F, Nienhaus F, Peter K, Schrader J, Grandoch M, Kelm M, Levkau B: Multi-targeted 1H/19F MRI unmasks specific danger patterns for emerging cardiovascular disorders. *Nat Commun* **12**: 5847 (12 pages), 2021.

16. Temme S, Yakoub M, Bouvain P, Yang G, Schrader J, Stegbauer J, **Flögel U**: Beyond vessel diameters: Non-invasive monitoring of flow patterns and immune cell recruitment in murine abdominal aortic disorders by multiparametric MRI. *Front Cardiovasc Med* **8**: 750251 (12 pages), 2021.

17. Schneckmann R, Suvorava T, Hundhausen C, Schuler D, Lorenz C, Freudenberger T, Kelm M, Fischer J, **Flögel U**, Grandoch M: Endothelial hyaluronan synthase 3 augments post-ischemic arteriogenesis through CD44/eNOS signaling. *Arterioscler Thromb Vasc Biol* **41**: 2551-2562, 2021.

18. Boehm-Sturm P, Mueller S, Freitag N, Borowski S, Foddis M, Koch SP, Temme S, **Flögel U**, Blois SM: Phenotyping placental oxygenation in Lgals1 deficient mice using 19F MRI. *Sci Rep* **11**: 2126 (10 pages), 2021.

19. Heinen A, Gödecke S, **Flögel U**, Miklos D, Bottermann K, Spychala A, Gödecke A: 4-Hydroxytamoxifen does not deteriorate cardiac function in cardiomyocyte-specific MerCreMer transgenic mice. *Basic Res Cardiol* **116**: 8 (14 pages), 2021.

20. Henning C, Branopolski A, Follert P, Lewandowska O, Ayhan A, Benkhoff M, **Flögel U**, Kelm M, Heiss C, Lammert E: Endothelial β1 integrin-mediated adaptation to myocardial ischemia. *Thromb Haemost* **121**: 741-754, 2021.

21. Hundhausen C, Schneckmann R, Ostendorf Y, Rimpler J, von Glinski A, Kohlmorgen C, Pasch N, Rolauer L, von Ameln F, Eckermann O, Altschmied J, Ale-Agha N, Haendeler J, **Flögel U**, Fischer JW, Grandoch M: Endothelial hyaluronan synthase 3 aggravates acute colitis in an experimental model of inflammatory bowel disease. *Matrix Biol* **102**: 20-36, 2021.

22. Hassan SA, Ali AAH, Sohn D, **Flögel U**, Jänicke RU, Korf HW, von Gall C: Does timing matter in radiotherapy of hepatocellular carcinoma? An experimental study in mice. *Cancer Med* **10**: 7712-7725, 2021.

23. Vornholz L, Nienhaus F, Gliem M, Alter C, Henning C, Lang A, Ezzahoini H, Wolff G, Clasen L, Rassaf T, **Flögel U**, Kelm M, Gerdes N, Jander S, Bönner F: Acute heart failure after reperfused ischemic stroke: Association with systemic and cardiac inflammatory responses. Front Physiol 12: 782760 (13 pages), 2021.

24. Kohlmorgen C, Gerfer S, Feldmann K, Twarock S, Hartwig S, Lehr S, Klier M, Krüger I, Helten C, Keul P, Kahl S, Polzin A, Elvers M, **Flögel U**, Kelm M, Levkau B, Roden M, Fischer JW, Grandoch M: Dapagliflozin reduces thrombin generation and platelet activation: implications for cardiovascular risk reduction in type 2 diabetes mellitus. *Diabetologia* **64**:1834-1849, 2021.

25. Wang X, Temme S, Grapentin C, Palasubramaniam J, Walsh A, Krämer W, Kleimann P, Havlas A, Schubert R, Schrader J, **Flögel U***, Peter K*: Fluorine-19 magnetic resonance imaging of activated platelets. *J Am Heart Assoc* **9**: e016971 (4 pages), 2020.

26. Wischmann P, Kuhn V, Suvorava T, Muessig JM, Fischer JW, Isakson BE, Haberkorn SM, **Flögel U**, Schrader J, Jung C, Cortese-Krott MM, Heusch G, Kelm M: Anaemia is associated with severe RBC dysfunction and a reduced circulating NO pool: vascular and cardiac eNOS are crucial for the adaptation to anaemia. *Basic Res Cardiol* **115**: 43 (21 pages), 2020.

27. Straub T, Nave J, Bouvain P, Akbarzadeh M, Dasa SSK, Kistner J, Ding Z, Marzoq A, Stepanow S, Becker K, Hesse J, Köhrer K, **Flögel U**, Ahmadian MR, French BA, Schrader J, Temme S: MRI-based molecular imaging of epicardium-derived stromal cells (EpiSC) by peptide-mediated active targeting. *Sci Rep* **10**: 21669 (14 pages), 2020.

28. Staal AHJ, Becker K, Tagit O, Koen van Riessen N, Koshkina O, Veltien A, Bouvain P, Cortenbach KRG, Scheenen T, **Flögel U**, Temme S, Srinivas M: In vivo clearance of 19F MRI imaging nanocarriers is strongly influenced by nanoparticle ultrastructure. *Biomaterials* **261**: 120307 (13 pages) 2020.

29. Grandoch M, **Flögel U**, Virtue S, Maier J, Jelenik T, Kohlmorgen C, Feldmann F, Ostendorf Y, Castañeda T, Zhou Z, Yamaguchi Y, Nascimento E, Sunkari V, Goy C, Kinzig M, Sörgel F, Bollyky P, Schrauwen P, Al-Hasani H, Roden M, Keipert S, Vidal-Puig A, Jastroch M, Haendeler J, Fischer JW: 4-Methylumbelliferone improves the thermogenic capacity of brown adipose tissue. *Nat Metab* **1**: 546–559, 2019.

30. Petz A, Grandoch M, Gorski DJ, Abrams M, Piroth MA, Schneckmann R, Homann S, Müller J, Hartwig S, Lehr S, Yamaguchi Y, Wight TN, Gorressen S, Ding Z, Kötter S, Krüger M, Heinen A, Kelm M, Gödecke A, **Flögel U**, Fischer JW: Cardiac hyaluronan synthesis is critically involved in the cardiac macrophage response and promotes healing after ischemia reperfusion injury. *Circ Res* **124**:1433-1447, 2019.

31. Krämer W, Grapentin C, Bouvain P, Temme S, **Flögel U**, Schubert R: Rational manufacturing of functionalized, long-term stable perfluorocarbon-nanoemulsions for site-specific 19F magnetic resonance imaging. *Eur J Pharm Biopharm* pii: S0939-6411(19)30242-5 (9 pages), 2019.

32. Nienhaus F, Colley D, Jahn A, Pfeiler S, Flocke V, Temme S, Kelm M, Gerdes N, **Flögel U**, Bönner F: Phagocytosis of a PFOB-nanoemulsion for 19F magnetic resonance imaging: First results in monocytes of patients with stable coronary artery disease and ST-elevation myocardial infarction. *Molecules* **24**: pii: E2058 (15 pages), 2019.

33. Rothe M, Jahn A, Weiss K, Hwang JH, Szendroedi J, Kelm M, Schrader J, Roden M, **Flögel U***, Bönner F*: In vivo 19F MR inflammation imaging after myocardial infarction in a large animal model at 3 T. *Magn Reson Mater Phy* **32**: 5-13, 2019.

34. Khalil AA, Mueller S, Foddis M, Mosch L, Lips J, Przesdzing I, Temme S, **Flögel U**, Dirnagl U, Boehm-Sturm P: Longitudinal 19F magnetic resonance imaging of brain oxygenation in a mouse model of vascular cognitive impairment using a cryogenic radiofrequency coil. *Magn Reson Mater Phy* **32**: 105-114, 2019.

35. Bouvain P, Flocke V, Krämer W, Schubert R, Schrader J, **Flögel U***, Temme S*: Dissociation of 19F and fluorescence signal upon cellular uptake of dual-contrast perfluorocarbon nanoemulsions. *Magn Reson Mater Phy* **32**: 133-145, 2019.

36. Alter C, Ding Z, **Flögel U**, Scheller J, Schrader J: A2bR-dependent signaling alters immune cell composition and enhances IL-6 formation in the ischemic heart. *Am J Physiol Heart Circ Physiol* **317**: H190-H200, 2019.

37. Temme S, Baran P, Bouvain P, Grapentin C, Krämer W, Knebel B, Al-Hasani H, Moll JM, Floss D, Schrader J, Schubert R, **Flögel U***, Scheller J*: Synthetic cargo internalization receptor system for nanoparticle tracking of individual cell populations by fluorine magnetic resonance imaging. *ACS Nano* **12**: 11178-11192, 2018.

38. Jelenik T, **Flögel U**, Álvarez-Hernández E, Scheiber D, Zweck E, Ding Z, Rothe M, Mastrototaro L, Kohlhaas V, Kotzka J, Knebel B, Müller-Wieland D, Moellendorf S, Gödecke A, Kelm M, Westenfeld R, Roden M, Szendroedi J: Insulin resistance and vulnerability to cardiac ischemia. *Diabetes* **67**: 2695-2702, 2018.

39. **Flögel U**, Schlüter A, Jacoby C, Temme S, Banga JP, Eckstein A, Schrader J, Berchner-Pfannschmidt U: Multimodal assessment of orbital immune cell infiltration and tissue remodeling during development of graves disease by $^{1}H/^{19}F$ MRI. *Magn Reson Med* **80**: 711-718, 2018.

40. Weske S, Vaidya M, Reese A, von Wnuck Lipinski K, Keul P, Bayer JK, Fischer JW, **Flögel U**, Nelsen J, Epple M, Scatena M, Schwedhelm E, Dörr M, Völzke H, Moritz E, Hannemann A, Rauch BH, Gräler MH, Heusch G, Levkau B: Targeting sphingosine-1-phosphate lyase as an anabolic therapy for bone loss. *Nat Med* **24**: 667-678, 2018.

41. Haberkorn SM, Spieker M, Jacoby C, **Flögel U**, Kelm M, Bönner F: State of the art in cardio-vascular T2 mapping: On the way to a cardiac biomarker? *Curr Cardiovasc Imaging Rep* **15**: 11 (10 pages), 2018.

42. Ramos IT, Markus Henningsson M, Nezafat M, Lavin B, Lorrio S, Gebhardt P, Protti A, Eykyn TR, Andia ME, **Flögel U**, Phinikaridou A, Shah AM, Botnar RM: Simultaneous assessment of cardiac inflammation and extracellular matrix remodeling after myocardial infarction. *Circ Cardiovasc Imaging* **11**: e007453 (13 pages), 2018.

43. Schlüter A, **Flögel U**, Diaz-Cano S, Görtz GE, Stähr K, Oeverhaus M, Plöhn S, Mattheis S, Moeller LC, Lang S, Bechrakis NE, Banga JP, Eckstein A, Berchner-Pfannschmidt U: Graves' orbitopathy occurs sex-independently in an autoimmune hyperthyroid mouse model. *Sci Rep* **8**: 13096 (13 pages), 2018.

44. Heinen A, Raupach A, Behmenburg F, Hölscher N, **Flögel U**, Kelm M, Kaisers W, Nederlof R, Huhn R, Gödecke A: Echocardiographic analysis of cardiac function after infarction in mice: Validation of single-plane long-axis view measurements and the bi-plane Simpson method. *Ultrasound Med Biol* **44**: 1544-1555, 2018.

45. Engelowski E, Modares NF, Gorressen S, Bouvain P, Semmler D, Alter C, Ding Z, **Flögel U**, Schrader J, Xu H, Lang PA, Fischer J, Floss DM, Scheller J: IL-23R signaling plays no role in myocardial infarction. *Sci Rep* **8**: 17078 (15 pages), 2018.

46. Schlüter A, Horstmann M, Diaz-Cano S, Plöhn S, Stähr K, Mattheis S, Oeverhaus M, Lang S, **Flögel U**, Berchner-Pfannschmidt U, Eckstein A, Banga JP: Genetic immunization with mouse thyrotrophin hormone receptor plasmid breaks self-tolerance for a murine model of autoimmune thyroid disease and Graves' orbitopathy. *Clin Exp Immunol* **191**: 255-267, 2018.

47. Erkens R, Suvorava T, Sutton TR, Fernandez BO, Mikus-Lelinska M, Barbarino F, **Flögel U**, Kelm M, Feelisch M, Cortese-Krott MM: Nrf2 deficiency unmasks the significance of nitric oxide synthase activity for cardioprotection. *Oxid Med Cell Longev* 2018:8309698 (15 pages), 2018.

48. Haberkorn SM, Jacoby C, Ding Z, Keul P, Bönner F, Polzin A, Levkau B, Schrader J, Kelm M, **Flögel U**: Cardiovascular magnetic resonance relaxometry predicts regional functional outcome after experimental myocardial infarction. *Circ Cardiovasc Imaging* **10**: pii e006025 (12 pages), 2017.

49. Borg N, Alter C, Görldt N, Jacoby C, Ding Z, Steckel B, Quast C, Bönner F, Friebe D, Temme S, **Flögel U**, Schrader J: CD73 on T-cells orchestrates cardiac wound healing after myocardial infarction by purinergic metabolic reprogramming. *Circulation* **136**: 297-313, 2017.

50. Jelenik T, Kaul K, Séquaris G, **Flögel U**, Phielix E, Kotzka J, Knebel B, Fahlbusch P, Hörbelt T, Lehr S, Reinbeck AL, Müller-Wieland D, Esposito I, Shulman GI, Szendroedi J, Roden M: Mechanisms of insulin resistance in primary and secondary non-alcoholic fatty liver. *Diabetes* **66**: 2241-2253, 2017.

51. Behmenburg F, Hölscher N, **Flögel U**, Hollmann MW, Heinen A, Huhn R: Opening of calcium-activated potassium channels improves long-term left-ventricular function after coronary artery occlusion in mice. *Int J Cardiol* **241**:351-357, 2017

52. Tucci S, **Flögel U**, Beermann F, Behringer S, Spiekerkoetter U: Triheptanoin: long-term effects in the very long-chain acyl-CoA dehydrogenase-deficient mouse. *J Lipid Res* **58**: 196-207, 2017.

53. Hendgen-Cotta UB, Esfeld S, Coman C, Ahrends R, Klein-Hitpass L, **Flögel U**, Rassaf T, Totzeck M: A novel physiological role for cardiac myoglobin in lipid metabolism. *Sci Rep* **7**: 43219 (13 pages), 2017.

54. Haddad S, Wang Y, Galy B, Korf-Klingebiel M, Hirsch V, Baru AM, Rostami F, Reboll MR, Heineke J, **Flögel U**, Groos S, Renner A, Toischer K, Zimmermann F, Engeli S, Jordan J, Bauersachs J, Hentze MW, Wollert KC, Kempf T: Iron-regulatory proteins secure iron availability in cardiomyocytes to prevent heart failure. *Eur Heart J* **38**: 362-372, 2017.

55. Colotti R, Bastiaansen JA, Wilson A, **Flögel U**, Gonzales C, Schwitter J, Stuber M, van Heeswijk RB: Characterization of perfluorocarbon relaxation times and their influence on the optimization of fluorine-19 MRI at 3 Tesla. *Magn Reson Med* 77: 2263-2271 2017.

56. Rammos C, Hendgen-Cotta UB, Totzeck M, Pohl J, Lüdike P, **Flögel U**, Deenen R, Köhrer K, French BA, Gödecke A, Kelm M, Rassaf T: Impact of dietary nitrate on age-related diastolic dysfunction. *Eur J Heart Fail* **18:** 599-610, 2016.

57. Bönner F, Spieker M, Haberkorn S, Jacoby C, **Flögel U**, Schnackenburg B, Horn P, Reinecke P, Neizel-Wittke M, Kelm M, Westenfeld R: Myocardial T2 mapping increases noninvasive diagnostic accuracy for biopsy-proven myocarditis. *JACC Cardiovasc Imaging* **9:** 1467-1469, 2016.

58. Ding Z, Temme S, Quast C, Friebe D, Jacoby C, Zanger K, Bidmon HJ, Grapentin C, Schubert R, **Flögel U**, Schrader J: Epicardium-derived cells formed after myocardial injury display phagocytic activity permitting in vivo labeling and tracking. *Stem Cells Transl Med* **5:** 639-650, 2016.

59. Temme S, Grapentin C, Quast C, Jacoby C, Grandoch M, Ding Z, Owenier C, Mayenfels F, Fischer JW, Schubert R, Schrader J, **Flögel U**: Noninvasive imaging of early venous thrombosis by ^{19}F magnetic resonance imaging with targeted perfluorocarbon nanoemulsions. *Circulation* **131:** 1405-1414, 2015.

60. van Heeswijk RB, Pellegrin M, **Flögel U**, Gonzales C, Aubert JF, Mazzolai L, Schwitter J, Stuber M: Fluorine MR imaging of inflammation in atherosclerotic plaque in vivo. *Radiology* **275:** 421-429, 2015.

61. Tucci S, **Flögel U**, Spiekerkoetter U: Sexual dimorphism of lipid metabolism in very long-chain acyl-CoA dehydrogenase deficient (VLCAD$^{-/-}$) mice in response to medium-chain triglycerides (MCT). *Biochim Biophys Acta* **1852:** 1442-1450, 2015.

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*Equal contribution

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