



MEDIZINISCHE
FAKULTÄT
HEIDELBERG

Ruprecht-Karls-Universität Heidelberg

Pharmakologisches Institut

Publikationen

AG Prof. Dr. Marc Freichel

(Sortierung: Aktualität)

Research Articles:

1. Cortizo FG, Pfaff D, Wirth A, Schlotterer A, Medert R, Morgenstern J, Weber T, Hammes HP, Fleming T, Nawroth PP, **Freichel M**, Teleman AA. The activity of glyoxylase 1 is regulated by glucose-responsive phosphorylation on Tyr136. **Mol Metab.** 55:101406, 2021.
2. Schütz A, Richter C, Weissgerber P, Tsviloskyy V, Hesse M, Ottenheim R, Zimmermann F, Buchholz S, Medert R, Dlugosz S, Kuryshev V, Benes V, Flockerzi V, Fleischmann BK, Cavalié A, **Freichel M**. Trophoblast cell failure leads to peri-implantation lethality in Trpm7-deficient mouse embryos. **Cell Rep.** 37, 3: 109851, 2021
3. Medert R, Bacmeister L, Segin S, **Freichel M**, Camacho Londoño JE. Cardiac Response to β -Adrenergic Stimulation Determined by Pressure-Volume Loop Analysis. **J Vis Exp.** 171: 10.3791/62057, 2021.
4. Bernal L, Sotelo-Hitschfeld P, König C, Sinica V, Wyatt A, Winter Z, Hein A, Touska F, Reinhardt S, Tragl A, Kusuda R, Wartenberg P, Sclaroff A, Pfeifer JD, Ectors F, Dahl A, **Freichel M**, Vlachova V, Brauchi S, Roza C, Boehm U, Clapham DE, Lennerz JK, Zimmermann K. Odontoblast TRPC5 channels signal cold pain in teeth. **Sci Adv.** 7,13: eabf5567, 2021.
5. Medert R, Jungmann A, Hildebrand S, Busch M, Grimm D, Flockerzi V, Müller OJ, Most P, Schumacher D, **Freichel M**. Development of an AAV9-RNAi-mediated silencing strategy to abrogate TRPM4 expression in the adult heart. **Pflugers Arch.** 473: 533-546, 2021.

-
6. Rosenkranz SC, Shaposhnykov AA, Träger S, Engler JB, Witte ME, Roth V, Vieira V, Paauw N, Bauer S, Schwencke-Westphal C, Schubert C, Bal LC, Schattling B, Pless O, van Horssen J, **Freichel M**, Friese MA. Enhancing mitochondrial activity in neurons protects against neurodegeneration in a mouse model of multiple sclerosis. **Elife**. 10: e61798, 2021.
 7. Jeon J, Bu F, Sun G, Tian JB, Ting SM, Li J, Aronowski J, Birnbaumer L, **Freichel M**, Zhu MX. Contribution of TRPC Channels in Neuronal Excitotoxicity Associated With Neurodegenerative Disease and Ischemic Stroke. **Front Cell Dev Biol**. 8: 618663, 2021.
 8. Gnad T, Navarro G, Lahesmaa M, Reverte-Salisa L, Copperi F, Cordomi A, Naumann J, Hochhäuser A, Haufs-Brusberg S, Wenzel D, Suhr F, Jespersen NZ, Scheele C, **Tsvilovskyy V**, Brinkmann C, Rittweger J, Dani C, Kranz M, Deuther-Conrad W, Eltzhig HK, Niemi T, Taittonen M, Brust P, Nuutila P, Pardo L, Fleischmann BK, Blüher M, Franco R, Bloch W, Virtanen KA, Pfeifer A: Adenosine/A2B Receptor Signaling Ameliorates the Effects of Aging and Counteracts Obesity. **Cell Metab**. 32: 56-70, 2020.
 9. Medert R, Pironet A, Bacmeister L, Segin S, Londoño JEC, Vennekens R, **Freichel M**: Genetic background influences expression and function of the cation channel TRPM4 in the mouse heart. **Basic Res Cardiol**. 115: 70, 2020.
 10. Becker A, Mannebach S, Mathar I, Weissgerber P, **Freichel M**, Loodin AP, Fecher-Trost C, Belkacemi A, Beck A, Philipp SE: Control of Insulin Release by Transient Receptor Potential Melastatin 3 (TRPM3) Ion Channels. **Cell Physiol Biochem**. 54:1115-1131, 2020.
 11. Rosenkranz SC, Shaposhnykov A, Schnapauff O, Epping L, Vieira V, Heidermann K, Schattling B, Tsvilovskyy V, Liedtke W, Meuth SG, **Freichel M**, Gelderblom M, Friese MA: TRPV4-Mediated Regulation of the Blood Brain Barrier Is Abolished During Inflammation. **Front Cell Dev Biol**. 8: 849, 2020.
 12. **Freichel M**, Ottenheijm R: L-type blocker STIMulate Ca²⁺ entry in synthetic VSMCs. **Cell Calcium**. 91: 102279, 2020.
 13. Camacho Londoño JE, Kuryshev V, Zorn M, Saar K, Tian Q, Hübner N, Nawroth P, Dieterich A, Birnbaumer L, Lipp P, Dieterich C, **Freichel M**: Transcriptional signatures regulated by TRPC1/C4-

-
- mediated Background Ca²⁺ entry after pressure-overload induced cardiac remodelling. **Prog Biophys Mol Biol.** S0079-6107: 30071-7, 2020.
14. Hermann J, Bender M, Schumacher D, Woo MS, Shaposhnykov A, Rosenkranz SC, Kuryshev V, Meier C, Guse AH, Friese MA, **Freichel M**, Tsvilovskyy V: Contribution of NAADP to Glutamate-Evoked Changes in Ca²⁺ Homeostasis in Mouse Hippocampal Neurons. **Front Cell Dev Biol.** 8: 496, 2020.
 15. Weigand T, Colbatzky F, Pfeffer T, Garbade SF, Klingbeil K, Colbatzky F, Becker M, Zemva J, Bulkescher R, Schürfeld R, Thiel C, Volk N, Reuss D, Hoffmann GF, **Freichel M**, Hecker M, Poth T, Fleming T, Poschet G, Schmitt CP, Peters V: A Global Cndp1-Knock-Out Selectively Increases Renal Carnosine and Anserine Concentrations in an Age- and Gender-Specific Manner in Mice. **Int J Mol Sci.** 21: E4887, 2020.
 16. Arlt E, Fraticelli M, Tsvilovskyy V, Nadolni W, Breit A, O'Neill TJ, Resenberger S, Wennemuth G, Wahl-Schott C, Biel M, Grimm C, **Freichel M**, Gudermann T, Klugbauer N, Boekhoff I, Zierler S: TPC1 deficiency or blockade augments systemic anaphylaxis and mast cell activity. **Proc Natl Acad Sci U S A.** 117: 18068-18078, 2020.
 17. Chu WG, Wang FD, Sun ZC, Ma SB, Wang X, Han WJ, Wang F, Bai ZT, Wu SX, Freichel M, Xie RG, Luo C: TRPC1/4/5 channels contribute to morphine-induced analgesic tolerance and hyperalgesia by enhancing spinal synaptic potentiation and structural plasticity. **FASEB J.** 34: 8526-8543, 2020.
 18. Segin S, Berlin M, Richter C, Flockerzi RMV, Worley P, **Freichel M**, Londoño JEC: Cardiomyocyte-Specific Deletion of Orai1 Reveals Its Protective Role in Angiotensin-II-Induced Pathological Cardiac Remodeling. **Cells** 9: 1092, 2020.
 19. Formoso K, Susperreguy S, **Freichel M**, Birnbaumer L: RNA-seq analysis reveals TRPC genes to impact an unexpected number of metabolic and regulatory pathways. **Sci Rep.** 10: 7227, 2020.
 20. Tsvilovskyy V, Solis-Lopez A, Almering J, Richter C, Birnbaumer L, Dietrich A, **Freichel M**: Analysis of Mrgprb2 Receptor-Evoked Ca²⁺ Signaling in Analysis of Mrgprb2 Receptor-Evoked Ca²⁺ Signaling in Bone Marrow Derived (BMMC) and Peritoneal (PMC) Mast Cells of TRPC-Deficient Mice. **Front Immunol.** 11: 564, 2020.

-
21. Eckstein E, Pyrski M, Pinto S, **Freichel M**, Vennekens R, Zufall F: Cyclic regulation of Trpm4 expression in female vomeronasal neurons driven by ovarian sex hormones. **Mol Cell Neurosci.** 105: 103495, 2020.
 22. Sanlialp A, Schumacher D, Kiper L, Varma E, Riechert E, Ho TC, Hofmann C, Kmietczyk V, Zimmermann F, Dlugosz S, Wirth A, Gorska AA, Burghaus J, Camacho Londoño JE, Katus HA, Doroudgar S, **Freichel M**, Völkens M: Saraf-dependent activation of mTORC1 regulates cardiac growth. **J Mol Cell Cardiol.** 141: 30-42, 2020.
 23. Frede W, Medert R, Poth T, Gorenflo M, Vennekens R, **Freichel M**, Uhl S.: TRPM4 Modulates Right Ventricular Remodeling Under Pressure Load Accompanied With Decreased Expression Level. **J Card Fail.** 26: 599-609, 2020.
 24. Camacho Londoño JE, Marx A, Kraft AE, Schürger A, Richter C, Dietrich A, Lipp P, Birnbaumer L, **Freichel M**: Angiotensin-II-Evoked Ca²⁺ Entry in Murine Cardiac Fibroblasts Does Not Depend on TRPC Channels. **Cells** 9: 322, 2020.
 25. Masamune A, Kotani H, Sörgel FL, Chen JM, Hamada S, Sakaguchi R, Masson E, Nakano E, Kakuta Y, Niihori T, Funayama R, Shirota M, Hirano T, Kawamoto T, Hosokoshi A, Kume K, Unger L, Ewers M, Laumen H, Bugert P, Mori MX, Tsvilovskyy V, Weißgerber P, Kriebs U, Fecher-Trost C, **Freichel M**, Diakopoulos KN, Berninger A, Lesina M, Ishii K, Itoi T, Ikeura T, Okazaki K, Kaune T, Rosendahl J, Nagasaki M, Uezono Y, Algül H, Nakayama K, Matsubara Y, Aoki Y, Férec C, Mori Y, Witt H, Shimosegawa T: Variants That Affect Function of Calcium Channel TRPV6 Are Associated With Early-onset Chronic Pancreatitis. **Gastroenterology** 158: 1626-1641, 2020.
 26. Schwarz Y, Oleinikov K, Schindeldecker B, Wyatt A, Weißgerber P, Flockerzi V, Boehm U, **Freichel M**, Bruns D: TRPC channels regulate Ca²⁺-signaling and short-term plasticity of fast glutamatergic synapses. **PLoS Biol.** 17, e3000445, 2019.
 27. Blum T, Moreno-Pérez A, Pyrski M, Bufe B, Arifovic A, Weissgerber P, **Freichel M**, Zufall F, Leinders-Zufall T: Trpc5 deficiency causes hypoprolactinemia and altered function of oscillatory dopamine neurons in the arcuate nucleus. **Proc Natl Acad Sci** 116, 15236-15243, 2019.

-
28. Bacmeister L, Segin S, Medert R, Lindner D, **Freichel M**, Camacho Londoño JE: Assessment of PEEP-Ventilation and the Time Point of Parallel-Conductance Determination for Pressure-Volume Analysis Under β -Adrenergic Stimulation in Mice. **Front Cardiovasc Med** 6: 36, 2019.
 29. Egorov AV, Schumacher D, Medert R, Birnbaumer L, **Freichel M**, Draguhn A. TRPC channels are not required for graded persistent activity in entorhinal cortex neurons. **Hippocampus** 29: 1038-1048, 2019.
 30. Tiapko O, Shrestha N, Lindinger S, Guedes de la Cruz G, Graziani A, Klec C, Butorac C, Graier WF, Kubista H, **Freichel M**, Birnbaumer L, Romanin C, Glasnov T, Groschner K: Lipid-independent control of endothelial and neuronal TRPC3 channels by light. **Chem Sci** 10, 2837-2842, 2019.
 31. Fecher-Trost C, Lux F, Busch KM, Raza A, Winter M, Hielscher F, Belkacemi T, van der Eerden B, Boehm U, **Freichel M**, Weissgerber P: Maternal Transient Receptor Potential Vanilloid 6 (Trpv6) Is Involved In Offspring Bone Development. **J Bone Miner Res** 34, 699-710, 2019.
 32. Huber M, Cato ACB, Ainooson GK, **Freichel M**, Tsvilovskyy V, Jessberger R, Riedlinger E, Sommerhoff CP, Bischoff SC: Regulation of the pleiotropic effects of tissue-resident mast cells. **J Allergy Clin Immunol** 144: 531-545, 2019.
 33. Sachdeva R, Fleming T, Schumacher D, Homberg S, Stolz K, Mohr F, Wagner AH, Tsvilovskyy V, Mathar I, **Freichel M**: Methylglyoxal evokes acute Ca²⁺ transients in distinct cell types and increases agonist-evoked Ca²⁺ entry in endothelial cells via CRAC channels. **Cell Calcium** 78, 66-75, 2019.
 34. Schumacher D, Morgenstern J, Oguchi Y, Volk N, Kopf S, Groener JB, Nawroth PP, Fleming T, **Freichel M**: Compensatory mechanisms for methylglyoxal detoxification in experimental & clinical diabetes. **Mol Metab** 18, 143-152, 2018.
 35. Cheung SY, Henrot M, Al-Saad M, Baumann M, Muller H, Unger A, Rubaiy HN, Mathar I, Dinkel K, Nussbaumer P, Klebl B, **Freichel M**, Rode B, Trainor S, Clapcote SJ, Christmann M, Waldmann H, Abbas SK, Beech DJ, Vasudev NS: TRPC4/TRPC5 channels mediate adverse reaction to the cancer cell cytotoxic agent (-)-Englerin A. **Oncotarget** 9, 29634-29643, 2018.

-
36. Tsvilovskyy V, Solis-Lopez A, Öhlenschläger K, **Freichel M**: Isolation of Peritoneum-derived Mast Cells and Their Functional Characterization with Ca²⁺-imaging and Degranulation Assays. **J Vis Exp** 137, 2018.
37. Tsvilovskyy V, Solís-López A, Schumacher D, Medert R, Roers A, Kriebs U, **Freichel M**: Deletion of Orai2 augments endogenous CRAC currents and degranulation in mast cells leading to enhanced anaphylaxis. **Cell Calcium** 71, 24-33, 2018.
38. Sachdeva R, Schlotterer A, Schumacher D, Matka C, Mathar I, Dietrich N, Medert R, Kriebs U, Lin J, Nawroth P, Birnbaumer L, Fleming T, Hammes HP, **Freichel M**: TRPC proteins contribute to development of diabetic retinopathy and regulate glyoxalase 1 activity and methylglyoxal accumulation. **Mol Metab** 9, 156-167, 2018.
39. Dutta Banik D, Martin LE, **Freichel M**, Torregrossa AM, Medler KF: TRPM4 and TRPM5 are both required for normal signaling in taste receptor cells. **Proc Natl Acad Sci USA** 115, E772-E781, 2018.
40. Lehmann LH, Jebessa ZH, Kreusser MM, Horsch A, He T, Kronlage M, Dewenter M, Sramek V, Oehl U, Krebs-Haupenthal J, von der Lieth AH, Schmidt A, Sun Q, Ritterhoff J, Finke D, Völkers M, Jungmann A, Sauer SW, Thiel C, Nickel A, Kohlhaas M, Schäfer M, Sticht C, Maack C, Gretz N, Wagner M, El-Armouche A, Maier LS, Londoño JEC, Meder B, **Freichel M**, Gröne HJ, Most P, Müller OJ, Herzig S, Furlong EEM, Katus HA, Backs J: A proteolytic fragment of histone deacetylase 4 protects the heart from failure by regulating the hexosamine biosynthetic pathway. **Nat Med** 24, 62-72, 2018.
41. Bröker-Lai J, Kollwe A, Schindeldecker B, Pohle J, Nguyen Chi V, Mathar I, Guzman R, Schwarz Y, Lai A, Weißgerber P, Schwegler H, Dietrich A, Both M, Sprengel R, Draguhn A, Köhr G, Fakler B, Flockerzi V, Bruns D, **Freichel M**: Heteromeric channels formed by TRPC1, TRPC4 and TRPC5 define hippocampal synaptic transmission and working memory. **EMBO J** 36, 2770-89, 2017.
42. Hartmann AK, Arande Lopez P, Zajac M, **Freichel M**, Schild R, Radsak MP, Stassen M: 9-phenanthrol enhances the generation of an CD8[±] T cell response following transcutaneous immunization with imiquimod in mice. **J Dermatol Sci** 87, 260-7, 2017.

-
43. Beck A, Götz V, Qiao S, Weissgerber P, Flockerzi V, **Freichel M**, Boehm U: Functional characterization of transient receptor potential (TRP) channel C5 in female murine gonadotropes. **Endocrinology** 158, 887-902, 2017.
44. Morgenstern J, Fleming T, Schumacher D, Eckstein V, **Freichel M**, Herzig S, Nawroth P: Loss of glyoxalase 1 induces compensatory mechanism to achieve dicarbonyl detoxification in mammalian Schwann cells. **J Biol Chem** 292, 3224-38, 2017.
45. Solís-López A, Kriebs U, Marx A, Mannebach S, Liedtke WB, Caterina MJ, **Freichel M**, Tsvilovskyy VV: Analysis of TRPV channel activation by stimulation of FCεRI and MRGPRn receptors in mouse peritoneal mast cells. **PLoS One** 12: e0171366, 2017.
46. Danielczok J, Hertz L, Ruppenthal S, Kaiser E, Petkova-Kirova P, Bogdanova A, Krause E, Lipp P, **Freichel M**, Kaestner L, Birnbaumer L: Does erythropoietin regulate TRPC channels in red blood cells? **Cell Physiol Biochem** 41: 1219-228, 2017.
47. Rixecker T, Mathar I, Medert R, Mannebach S, Pfeifer A, Lipp P, Tsvilovskyy V, **Freichel M**: TRPM4-mediated control of FcεRI-evoked Ca²⁺ elevation comprises enhanced plasmalemmal trafficking of TRPM4 channels in connective tissue type mast cells. **Sci Rep** 6: 32981, doi: 10.1038/srep32981, 2016.
48. Kurland DB, Gerzanich V, Karimy JK, Woo SK, Vennekens R, **Freichel M**, Nilius B, Bryan J, Simard JM: The Sur1-Trpm4 channel regulates NOS2 transcription in TLR4-activated microglia. **J Neuroinflammation** 13: 130, 2016.
49. Menigoz A, Ahmed T, Sabanov V, Philippaert K, Pinto S, Kerselaers S, Segal A, **Freichel M**, Voets T, Nilius B, Vennekens R, Balschun D. TRPM4-dependent post-synaptic depolarization is essential for the induction of NMDA receptor-dependent LTP in CA1 hippocampal neurons. **Pflugers Arch** 468: 593-607, 2016.
50. Klepac K, Kilic A, Gnad T, Brown LM, Herrmann B, Wilderman A, Balkow A, Glöde A, Simon K, Lidell ME, Betz MJ, Enerbäck S, Wess J, **Freichel M**, Blüher M, König G, Kostenis E, Insel PA, Pfeifer A. The Gq signalling pathway inhibits brown and beige adipose tissue. **Nat Commun** 7: 10895, 2016.

-
51. Zhang W, **Freichel M**, van der Hoeven F, Nawroth PP, Katus H, Kälble F, Zitron E, Schwenger V. Novel endothelial cell-specific AQP1 knockout mice confirm the crucial role of endothelial AQP1 in ultrafiltration during peritoneal dialysis. **PLoS One** 11:e0135513, doi: 10.1371/journal.pone.0145513, 2016.
52. Jha A, Singh AK, Weissgerber P, **Freichel M**, Flockerzi V, Flavell RA, Jha MK: Essential roles for Cav β 2 and Cav1 channels in thymocyte development and T cell homeostasis. **Sci Signal** 8: ra103., 2016.
53. Uhl S, **Freichel M**, Mathar I: Contractility measurements on isolated papillary muscles for the investigation of cardiac inotropy in mice. **J Vis Exp** 103: 53076, 2015.
54. Camacho Londoño JE, Tian Q, Hammer K, Schröder L, Camacho Londoño J, Reil JC, He T, Oberhofer M, Mannebach S, Mathar I, Philipp SE, Tabellion W, Schweda F, Dietrich A, Kaestner L, Laufs U, Birnbaumer L, Flockerzi V, **Freichel M***, Lipp P*: A background Ca²⁺ entry pathway mediated by TRPC1/TRPC4 is critical for development of pathological cardiac remodelling. **Eur Heart J** 36: 2257-2266, 2015
*shared senior authorship
55. Kecskés M, Jacobs G, Kerselaers S, Syam N, Menigoz A, Vangheluwe P, **Freichel M**, Flockerzi V, Voets T, Vennekens R: The (Ca²⁺)-activated cation channel TRPM4 is a negative regulator of angiotensin II-induced cardiac hypertrophy. **Basic Res Cardiol** 110: 501, 2015.
56. Uhl S, Mathar I, Vennekens R, **Freichel M**: Adenylyl cyclase-mediated effects contribute to increased Isoprenaline-induced cardiac contractility in TRPM4-deficient mice. **J Mol Cell Cardiol** 74: 307-17, 2014.
57. Kang D, Wang J, Hogan JO, Vennekens R, **Freichel M**, White C, Kim D: Increase in cytosolic Ca²⁺ produced by hypoxia and other depolarizing stimuli activates a non-selective cation channel in chemoreceptor cells of rat carotid body. **J Physiol** 592: 1975-92, 2014.
58. Mathar I, Kecskés M, Van der Mieren G, Jacobs G, Camacho Londoño JE, Uhl S, Flockerzi V, Voets T, **Freichel M**, Nilius B, Herijgers P, Vennekens R: Increased β -adrenergic inotropy in ventricular myocardium from Trpm4^{-/-} mice. **Circ Res** 114: 283-94, 2014.

-
59. Tian J, Thakur DP, Lu Y, Zhu Y, **Freichel M**, Flockerzi V, Zhu MX: Dual depolarization responses generated within the same lateral septal neurons by TRPC4-containing channels. **Pflugers Arch** 466: 1301-16, 2014.
60. Boudes M, Uvin P, Pinto S, **Freichel M**, Birnbaumer L, Voets T, De Ridder D, Vennekens R: Crucial role of TRPC1 and TRPC4 in cystitis-induced neuronal sprouting and bladder overactivity. **PLoS One** 8: e69550, 2013.
61. Loga F, Domes K, **Freichel M**, Flockerzi V, Dietrich A, Birnbaumer L, Hofmann F, Wegener JW. The role of cGMP/cGKI signalling and Trpc channels in regulation of vascular tone. **Cardiovasc Res** 100: 280-7, 2013.
62. Harper MT, Londoño JE, Quick K, Londoño JC, Flockerzi V, Philipp SE, Birnbaumer L, **Freichel M**, Poole AW: Transient receptor potential channels function as a coincidence signal detector mediating phosphatidylserine exposure. **Sci Signal** 6: ra50, 2013.
63. Matti U, Pattu V, Halimani M, Schirra C, Krause E, Liu Y, Weins L, Chang HF, Guzman R, Olausson J, **Freichel M**, Schmitz F, Pasche M, Becherer U, Bruns D, Rettig J: Synaptobrevin2 is the v-SNARE required for cytotoxic T-lymphocyte lytic granule fusion. **Nat Commun** 4: 1439, 2013.
64. Phelan KD, Shwe UT, Abramowitz J, Wu H, Rhee SW, Howell MD, Gottschall PE, **Freichel M**, Flockerzi V, Birnbaumer L, Zheng F: Canonical transient receptor channel 5 (TRPC5) and TRPC1/4 contribute to seizure and excitotoxicity by distinct cellular mechanisms. **Mol Pharmacol** 83: 429-38, 2013.
65. Suresh Babu S, Wojtowicz A, **Freichel M**, Birnbaumer L, Hecker M, Cattaruzza M: Mechanisms of stretch-induced activation of the mechanotransducer zyxin in vascular cells. **Sci Signal** 5: ra91, 2012.
66. Schattling B, Steinbach K, Thies E, Kruse M, Menigoz A, Ufer F, Flockerzi V, Brück W, Pongs O, Vennekens R, Kneussel M, **Freichel M**, Merkler D, Friese MA: TRPM4 cation channel mediates axonal and neuronal degeneration in experimental autoimmune encephalomyelitis and multiple sclerosis. **Nat Med** 18: 1805-11, 2012.
67. Woudenberg-Vrenken TE, Lameris AL, Weißgerber P, Olausson J, Flockerzi V, Bindels RJ, **Freichel M**, Hoenderop JG: Functional TRPV6 channels are crucial for transepithelial Ca²⁺ absorption. **Am J Physiol Gastrointest Liver Physiol** 303: G879-85, 2012.

-
68. Quick K, Zhao J, Eijkelkamp N, Linley JE, Rugiero F, Cox JJ, Raouf R, Gringhuis M, Sexton JE, Abramowitz J, Taylor R, Forge A, Ashmore J, Kirkwood N, Kros CJ, Richardson GP, **Freichel M**, Flockerzi V, Birnbaumer L, Wood JN: TRPC3 and TRPC6 are essential for normal mechanotransduction in subsets of sensory neurons and cochlear hair cells. **Open Biol** 2: 120068, 2012.
69. Stroh O, **Freichel M**, Kretz O, Birnbaumer L, Hartmann J, Egger V: NMDA receptor-dependent synaptic activation of TRPC channels in olfactory bulb granule cells. **J Neurosci** 32, 5737-46, 2012.
70. Weissgerber P, Kriebs U, Tsvilovskyy V, Olausson J, Kretz O, Stoerger C, Mannebach S, Wissenbach U, Vennekens R, Middendorff R, Flockerzi V, **Freichel M**: Excision of Trpv6 gene leads to severe defects in epididymal Ca²⁺ absorption and male fertility much like single D541A pore mutation. **J Biol Chem** 287: 17930-41, 2012.
71. Weissmann N, Sydykov A, Kalwa H, Storch U, Fuchs B, Mederos y Schnitzler M, Brandes RP, Grimminger F, Meissner M, **Freichel M**, Offermanns S, Veit F, Pak O, Krause KH, Schermuly RT, Brewer AC, Schmidt HH, Seeger W, Shah AM, Gudermann T, Ghofrani HA, Dietrich A: Activation of TRPC6 channels is essential for lung ischaemia-reperfusion induced oedema in mice. **Nat Commun** 3, 649, 2012.
72. Samapati R, Yang Y, Yin J, Stoerger C, Arenz C, Dietrich A, Gudermann T, Adam D, Wu S, **Freichel M**, Flockerzi V, Uhlig S, Kuebler WM: Lung endothelial Ca²⁺ and permeability response to platelet-activating factor is mediated by acid sphingomyelinase and transient receptor potential classical 6. **Am J Respir Crit Care Med** 185: 160-70, 2012.
73. Sudivakkam PC, **Freichel M**, Singh V, Yuan JP, Vogel SM, Flockerzi V, Malik AB, Tiruppathi C: The Ca²⁺ sensor STIM1 is necessary and sufficient for the store-operated Ca²⁺ entry function of TRPCs in endothelial cells. **Mol Pharmacol** 8: 510-26, 2012.
74. Phelan KD, Mock MM, Kretz O, Shwe UT, Kozhemyakin M, Greenfield LJ, Dietrich A, Birnbaumer L, **Freichel M**, Flockerzi V, Zheng F: Heteromeric TRPC1/TRPC4 channels play a critical role in epileptiform burst firing and seizure-induced neurodegeneration. **Mol Pharmacol** 81: 384-92, 2012.

-
75. van der Eerden BC, Weissgerber P, Fratzl-Zelman N, Olausson J, Hoenderop JG, Schreuders-Koedam M, Eijken M, Roschger P, de Vries TJ, Chiba H, Klaushofer K, Flockerzi V, Bindels RJ, **Freichel M**, van Leeuwen JP: The transient receptor potential channel TRPV6 is dynamically expressed in bone cells but is not crucial for bone mineralization in mice. **J Cell Physiol** 227: 1951-9, 2012.
76. Xue T, Do MT, Riccio A, Jiang Z, Hsieh J, Wang HC, Merbs SL, Welsbie DS, Yoshioka T, Weissgerber P, Stolz S, Flockerzi V, **Freichel M**, Simon MI, Clapham DE, Yau KW: Melanopsin signalling in mammalian iris and retina. **Nature** 479: 67-73, 2011.
77. Klaiber M, Dankworth B, Kruse M, Hartmann M, Nikolaev VO, Yang RB, Völker K, Gassner B, Oberwinkler H, Feil R, **Freichel M**, Groschner K, Skryabin BV, Frantz S, Birnbaumer L, Pongs O, Kuhn M: A cardiac pathway of cyclic GMP-independent signaling of guanylyl cyclase A, the receptor for atrial natriuretic peptide. **Proc Natl Acad Sci U S A** 108: 18500-5, 2011.
78. Weissgerber P, Kriebs U, Tsvilovskyy V, Olausson J, Kretz O, Stoerger C, Vennekens R, Wissenbach U, Middendorff R, Flockerzi V, **Freichel M**: Male fertility depends on Ca²⁺ absorption by TRPV6 in epididymal epithelia. **Sci Signal** 4: ra27, 2011.
79. Custodis F, Gertz K, Balkaya M, Prinz V, Mathar I, Stamm C, Kronenberg G, Kazakov A, **Freichel M**, Böhm M, Endres M, Laufs U: Heart rate contributes to the vascular effects of chronic mental stress: effects on endothelial function and ischemic brain injury in mice. **Stroke** 42: 1742-9, 2011.
80. Meissner M, Weissgerber P, Londoño JE, Prenen J, Link S, Ruppenthal S, Molkentin JD, Lipp P, Nilius B, **Freichel M**, Flockerzi V: Moderate calcium channel dysfunction in adult mice with inducible cardiomyocyte-specific excision of the cacnb2 gene. **J Biol Chem** 286: 15857-82, 2011.
81. Mathar I, Vennekens R, Meissner M, Kees F, VAn der Mieren G, Camacho-Londoño, JE, Uhl S, Voets T, Hummel B, Herijgers P, Nilius B, Flockerzi V, Schweda F, **Freichel M**: Increased catecholamine secretion contributes to hypertension in TRPM4-deficient mice. **J Clin Invest** 120: 3267-79, 2010.
82. Klaiber M, Kruse M, Völker K, Schröter J, Feil R, **Freichel M**, Gerling A, Feil S, Dietrich A, Londoño, JE, Baba HA, Abramowitz J, Birnbaumer L, Penninger JM, Pongs O, Kihn M: Novel insights into the

-
- mechanisms mediating the local antihypertrophic effects of cardiac atrial natriuretic peptide: role of cGMP-dependent protein kinase and RGS2. **Basic Res Cardiol** 105: 583-95, 2010.
83. Jha MK, Badou A, Meissner M, McRory JE, **Freichel M**, Flockerzi V, Flavell RA: Defective survival of naïve CD8⁺ T lymphocytes in the absence of β_3 regulatory subunit of Ca_v channels. **Nat Immunol** 10: 1275-82, 2009.
84. Link S, Meissner M, Held B, Beck A, Weißgerber P, **Freichel M**, Flockerzi V: Diversity and developmental expression of Ca_vb2 proteins in the murine heart and their influence on calcium current in murine heart. **J Biol Chem** 284: 30129-37, 2009.
85. Kuhn S, Knirsch M, Rüttinger L, Kasperek S, Winter H, **Freichel M**, Flockerzi V, Knipper M, Engel J: Ba²⁺ currents in inner and outer hair cells of mice lacking the voltage-dependent Ca²⁺ channel subunits β_3 or β_4 . **Channels (Austin)** 3: 366-76, 2009.
86. Tsvilovskyy VV, Zholos AV, Aberle T, Philipp SE, Dietrich A, Zhu MX, Birnbaumer L, **Freichel M**, Flockerzi V: Deletion of TRPC4 and TRPC6 impairs smooth muscle contraction and intestinal motility *in vivo*. **Gastroenterology** 137: 1415-24, 2009.
87. Gerzanich V, Woo K, Vennekens R, Tsymbalyuk SO, Ivanova S, Ivanov A, Geng Z, Chen Z, Flockerzi V, Nilius B, **Freichel M**, Simard JM: De novo expression of TRPM4 initiates secondary hemorrhage in spinal cord injury. **Nat Med** 15: 185-91, 2009.
88. Bair AM, Thippogowda PB, **Freichel M**, Cheng N, Ye RD, Vogel SM, Yu Y, Flockerzi V, Malik AB, Tiruppathi C: Ca²⁺ entry via TRPC channels is necessary for thrombin-induced NF- κ B activation in endothelial cells through AMP-activated protein kinase and protein kinase C δ . **J Biol Chem** 284: 563-74, 2009.
89. Shimizu T, Owsianik G, **Freichel M**, Flockerzi V, Nilius B, Vennekens R: TRPM4 regulates migration of mast cells in mice. **Cell Calcium** 45: 226-32, 2009.
90. Hartmann J, Dragicevic E, Adelsberger H, Henning H, Sumsser M, Abramowitz J, Blum R, Dietrich M, **Freichel M**, Flockerzi V, Birnbaumer L, Konnerth A: TRPC3 channels are required for synaptic transmission and motor coordination. **Neuron** 59: 392-8, 2008.

-
91. Otsuguro K, Tang J, Tang Y, Xiao R, **Freichel M**, Tsvilovskyy VV, Ito S, Flockerzi V, Zhu MX, Zholos AV: Isoform-specific inhibition of TRPC4 channel by phosphatidylinositol 4,5-bisphosphate. **J Biol Chem** 238: 10026-36, 2008.
92. Vennekens R, Olausson J, Meissner M, Bloch W, Mathar I, Philipp SE, Schmitz F, Weissgerber P, Nilius B, Flockerzi V, **Freichel M**: Increased IgE-dependent mast cell activation and anaphylactic responses in mice lacking the calcium-activated nonselective cation channel TRPM4. **Nat Immunol** 8: 312-20, 2007.
93. Andronache Z, Ursu D, Lehnert S, **Freichel M**, Flockerzi V, Melzer W: The auxiliary subunit γ_1 of the skeletal muscle L-type calcium channel is an endogenous calcium antagonist. **Proc Natl Acad Sci U S A** 104: 17885-90, 2007.
94. Held B, Tsvilovskyy V, Meissner M, Kästner L, Ludwig A, Mossmang S, Lipp P, **Freichel M**, Flockerzi V: Ca^{2+} channel currents and contraction in $\text{Ca}_v\beta_3$ -deficient ileum smooth muscle from mouse. **Cell Calcium** 42: 477-87, 2007.
95. Gross SA, Wissenbach U, Philipp SE, **Freichel M**, Cavalié A, Flockerzi V: Murine ORAI2 splice variants form functional CRAC channels. **J Biol Chem** 282: 19375-84, 2007.
96. Singh U, Sun T, Looman C, Heuchel R, Elliot R, **Freichel M**, Meissner M, Flockerzi V, Fundele R: Expression and function of the gene encoding the voltage-dependent calcium channel beta3-subunit in the mouse placenta. **Placenta** 28: 412-20, 2007.
97. Badou A, Jha MK, Matza D, Mehal WZ, **Freichel M**, Flockerzi V, Flavell RA: Critical role for the beta regulatory subunits of Cav channels in T lymphocyte function. **Proc Natl Acad Sci USA** 103: 15529-34, 2006.
98. Weißgerber P, Held B, Bloch W, Kästner L, Chien K, Fleischmann B, Lipp P, Flockerzi V, **Freichel M**: Reduced cardiac L-type Ca^{2+} current in $\text{Ca}_v\beta_2^{-/-}$ embryos impairs cardiac development and contraction with secondary defects in vascular maturation. **Circ Res** 99: 749-57, 2006.
99. Aneiros E, Philipp S, Lis A, **Freichel M**, Cavalié A: Modulation of Ca^{2+} signalling by $\text{Na}^+/\text{Ca}^{2+}$ exchangers in mast cells. **J Immunol** 174: 119-30, 2005.

-
100. Berggren PO, Yang S, Murakami M, Efanov A, Uhles S, Köhler M, Moede T, Fernström A, Appelskog I, Aspinwall C, Zaitsev S, Larsson O, Moitosos de Vargas L, Fecher-Trost C, Weißgerber P, Ludwig A, Leibiger B, Juntti-Bergen L, Barker CJ, Gromada J, **Freichel M**, Leibiger I, Flockerzi V: Removal of Ca²⁺ channel β_3 subunit enhances Ca²⁺ oscillations frequency and insulin exocytosis. **Cell** 119: 273-84, 2004.
101. Ursu D, Schuhmeier RP, **Freichel M**, Flockerzi V, Melzer D: Altered Ca²⁺ current, Ca²⁺ release and force in adult mouse muscle fibers deficient of the DHP-receptor γ_1 subunit. **J Gen Physiol** 124: 605-18, 2004.
102. Munsch T, **Freichel M**, Flockerzi V, Pape H: Contribution of transient receptor potential channels to serotonin-mediated increase in GABA release from dendrites. **Proc Natl Acad Sci USA** 100: 16065-70, 2003.
103. Nilius B, Prenen J, Droogmanns G, Voets T, Vennekens R, **Freichel M**, Wissenbach U, Flockerzi V: Voltage dependence of the Ca²⁺ activated cation channel TRPM4. **J Biol Chem** 278: 30813-20, 2003.
104. Hirnet D*, Olausson J*, Fecher-Trost C, Bödding M, Nastainczyk W, Wissenbach U, Flockerzi V, **Freichel M**: The TRPV6 gene, cDNA and protein. **Cell Calcium** 33: 509-18, 2003.
105. Bosel J, John M, **Freichel M**, Blind E: Signaling of the human calcium-sensing receptor expressed in HEK293-cells is modulated by protein kinases A and C. **Exp Clin Endocrinol Diabetes** 111: 21-6, 2003.
106. Murakami M, Fleischmann B, De Felipe C, **Freichel M**, Trost C, Ludwig A, Wissenbach U, Schwegler H, Hofmann F, Hescheler J, Flockerzi V, Cavalié A: Pain perception in mice lacking the β_3 subunit of voltage-activated calcium channels. **J Biol Chem** 277: 40342-51, 2002.
107. Tiruppathi C, **Freichel M**, Vogel SM, Paria BC, Metha D, Flockerzi V, Malik AB: Impairment of store-operated Ca²⁺ entry in TRPC4^{-/-} mice interferes with thrombin-induced increase in lung microvascular permeability. **Circ Res** 91: 70-6, 2002.

-
108. Held B, Freise D, **Freichel M**, Hoth M, Flockerzi V: Skeletal muscle L-type Ca^{2+} current modulation in γ_1 -deficient and wildtype myotubes by the γ_1 subunit and cAMP. **J Physiol** 539: 459-68, 2002.
109. **Freichel M**, Suh SH, Pfeifer A, Schweig U, Trost C, Weißgerber P, Biel M, Philipp S, Freise D, Droogmans G, Hofmann F, Flockerzi V, Nilius B: Lack of an endothelial store-operated Ca^{2+} current impairs agonist-dependent Ca^{2+} entry and vasorelaxation in TRP4 (CCE1)^{-/-} mice. **Nat Cell Biol** 3: 121-7, 2001.
110. Wei L, **Freichel M**, Jaspers M, Cuppens H, Cassiman JJ, Droogmans G, Flockerzi V, Nilius B: Functional interaction between TRP4 and CFTR in mouse aorta endothelial cells. **BMC Physiology** 1: 3, 2001.
111. Quitterer U, Hoffmann M, **Freichel M**, Lohse MJ: Paradoxical block of parathormone secretion is mediated by increased activity of G protein α subunits. **J Biol Chem** 276: 6763-9, 2001.
112. Wissenbach U, Bödding M, **Freichel M**, Flockerzi V: Trp12, a novel Trp related protein from kidney. **FEBS Lett** 485: 127-34, 2000.
113. Freise D, Held B, Wissenbach U, Pfeifer A, Trost C, Himmerkus N, Schweig U, **Freichel M**, Biel M, Hofmann F, Hoth M, Flockerzi V: Absence of the gamma subunit of the skeletal muscle dihydropyridine receptor increases L-type Ca^{2+} currents and alters channel inactivation properties. **J Biol Chem** 275: 14476-81, 2000.
114. Zimmer S, Trost C, Wissenbach U, Philipp S, **Freichel M**, Flockerzi V, Cavalié A: Modulation of recombinant transient-receptor-potential-like (TRPL) channels by cytosolic Ca^{2+} . **Pflügers Arch** 440: 409-17, 2000.
115. Suh SH, Vennekens R, Manolopoulos VG, **Freichel M**, Schweig U, Prenen J, Flockerzi V, Droogmans G, Nilius B: Characterisation of explanted endothelial cells from mouse aorta: electrophysiology and Ca^{2+} signaling. **Pflügers Arch** 438: 612-20, 1999.

-
116. Philipp S, Hambrecht J, Brqaslavski L, Schroth G, **Freichel M**, Murakami M, Cavalié A, Flockerzi V: A novel capacitative calcium entry channel expressed in excitable cells. **EMBO J** 17: 4274-82, 1998.
117. **Freichel M**, Wissenbach U, Philipp S, Flockerzi V: Alternative splicing and tissue specific expression of the 5' truncated bCCE1 variant bCCE1 Δ ₅₁₄. **FEBS Lett** 422: 354-8, 1998.
118. Philipp S, Cavalié A, **Freichel M**, Wissenbach U, Zimmer S, Trost C, Marquart A, Manabu M, Flockerzi V: A mammalian capacitative calcium entry channel homologous to Drosophila TRP and TRPL. **EMBO J** 15: 6166-71, 1996.
119. **Freichel M**, Zink-Lorenz A, Holloschi A, Hafner M, Flockerzi V, Raue F: Expression of a calcium-sensing receptor in a human medullary thyroid carcinoma cell line and its contribution to calcitonin secretion. **Endocrinology** 137: 3842-8, 1996.
120. Biel M, Altenhofen W, Hullin R, Ludwig J, **Freichel M**, Flockerzi V, Dascal N, Kaupp UB, Hofmann F: Primary structure and functional expression of a cyclic nucleotide gated channel from rabbit aorta. **FEBS Lett** 329: 134-8, 1993.
121. Hullin R, Singer-Lahat D, **Freichel M**, Biel M, Dascal N, Hofmann F, Flockerzi V: Calcium channel β subunit heterogeneity: functional expression of cloned cDNA from heart, aorta and brain. **EMBO J** 11: 885-90, 1992.

Reviews, book chapters and online courses:

1. Brings S, Fleming T, **Freichel M**, Muckenthaler MU, Herzig S, Nawroth PP: Dicarbonyls and advanced glycation end-products in the development of diabetic complications and targets for intervention. **Int J Mol Sci** 18: pii: E984, 2017.
2. **Freichel M**, Berlin M, Schürger A, Mathar I, Bacmeister L, Medert R, Frede W, Marx A, Segin S, Londoño JEC. TRP channels in the heart. In: Emir TLR, ed. Neurobiology of TRP channels. 2nd ed, Boca Raton (FL): CRC Press/Taylor & Francis, Chapter 9, PMID: 29356479, 2017.
3. Mathar I, Jacobs G, Kecskés M, Menigoz A, Phillipaert K, Vennekens R: Mammalian transient receptor potential (TRP) cation channels. **Handb Exp Pharmacol** 222: 462-481, 2014.

-
4. **Freichel M**, Tsvilovskyy V, Camacho Londoño JE: TRPC4- and TRPC4-containing channels. **Handb Exp Pharmacol** 222: 85-128, 2014.
 5. **Freichel M**: TRP channels with diverse permeability profiles: regulation of blood pressure and fertility. In: Simpson, A. (ed.): Calcium signaling I: Regulation, mechanisms, effectors, role in disease and recent advances. The Biomedical & Life Sciences Collection, Henry Stewart Talks Ltd, London (online at <http://hstalks.com/?t=BL0293598-Freichel>), 2014.
 6. **Freichel M**, Almering J, Tsvilovskyy V: The role of TRP proteins in mast cells. **Front Immunol** 3: 150, 2012.
 7. **Freichel M**, Kriebs U, Vogt D, Mannebach S, Weißgerber P: Strategies and protocols to generate mouse models with targeted mutations to analyze TRP channel functions. In: Zhu MX (ed.). TRP channels. CRC Press, Boca Raton (FL), chapter 8, 2011.
 8. **Freichel M**, Flockerzi V: Biological functions of TRPs unravelled by spontaneous mutations and transgenic animals. **Biochem Soc Trans** 35: 120-3, 2007.
 9. **Freichel M**, Vennekens R, Olausson J, Stolz S, Philipp S, Weißgerber P: Flockerzi V. Functional role of TRPC proteins in native systems: implications from knockout and knock-down studies. **J Physiol** 567: 59-66, 2005.
 10. Flockerzi V, Jung C, Aberle T, Meissner M, **Freichel M**, Philipp SE, Nastainczyk W, Maurer P, Zimmermann R: Specific detection and semi-quantitative analysis of TRPC4 protein expression by antibodies. **Pflugers Arch** 451: 81-6, 2005.
 11. **Freichel M**, Vennekens R, Olausson J, Hoffmann M, Müller C, Stolz S, Scheunemann J, Weißgerber P, Flockerzi V: Functional role of TRPC proteins *in vivo*: lessons from TRPC-deficient mouse models. **Biochem Biophys Res Commun** 322: 1352-8, 2004.
 12. **Freichel M**, Philipp P, Cavalié A, Flockerzi V: TRPC4 and TRPC4 deficient mice. **Novartis Found Symp** 258: 189-99; discussion 199-203, 263-6, 2004.

-
13. **Freichel M**, Schweig U, Stauffenberger S, Freise D, Schorb W, Flockerzi V: Store operated cation channels (SOCs) in the heart and cells of the cardiovascular system. **Cell Physiol Biochem** 9: 270-83, 1999.

 14. Freise D, Himmerkus N, Schroth G, Trost C, Weißgerber P, **Freichel M**, Flockerzi V: Mutations of calcium channel β subunit genes in mice. **Biol Chem** 380: 897-902, 1999.