CURRICULUM VITAE

Matthias A. Hediger

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Academic Age: **42** Nationality: **Swiss**
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2. Education and training

1983	Dr. sc. nat. ETH (Ph.D.)	Swiss Federal Institute of Technology, Switzerland
1977	Dipl. sc. nat. (Biochemistry)	Swiss Federal Institute of Technology, Switzerland

3. Employment

Professional Positions:

2019-	Group Leader & Head of Membrane Transport Discovery Lab, Department of Nephrology and Hypertension, University Hospital Bern Inselspital, Bern, Switzerland.
2005-2019	Professor Ordinarius, Institute of Biochemistry and Molecular Medicine, University of Bern, Switzerland.
1995-2005	Associate Professor of Medicine (Biological Chemistry and Molecular Pharmacology), Harvard Medical School, Boston, MA, USA.
1989-1995	Assistant Professor of Medicine, Harvard Medical School, Boston, MA, USA.
1986-1989	Assistant Research Physiologist, Dept. of Physiology, UCLA School of Medicine, Los Angeles, CA, USA.
1984-1986	Postgraduate Research Biochemist, Dept. of Biological Chemistry, UCLA School of Medicine, Los Angeles, CA, USA.
1982-1983	Postgraduate Research Biochemist, Dept. of Biochemistry, University of Connecticut Health Center, Farmington, CT, USA.

4. Institutional responsibilities:

2005-2017	Director, Institute of Biochemistry and Molecular Medicine, University of Bern, Switzerland.
2010-2014	Director, NCCR TransCure (the Swiss National Center of Competence in Research, TransCure), Medical Faculty, University of Bern, Switzerland.
1999-2005	Director, Membrane Biology Program, Brigham and Women's Hospital, Harvard Medical School, Boston, USA.

5. Research grants (PI: Hediger MA)

(Ongoing)

1. *New insights into the COVID-19 pandemic: Genetic polymorphisms, role of SLC6 amino acid transporters, renal aspects and therapeutic perspectives*. PI Matthias Hediger, Co-PI Bruno Vogt. Funding period: November 1, 2020 – October 31, 2022.
2. *The role of mitochondrial carriers in metabolic tuning and reprogramming by calcium flow across membrane contact sites*. Sinergia, Swiss National Science Foundation. PI Matthias Hediger, Co-PIs Martin Lochner and Edmund Kunji. Funding period: September 1, 2018 – August 31, 2022.
3. *Intestinal absorption of transition metals in human health and disease.* Swiss National Science Foundation. PI Matthias Hediger, February 1, 2019 – January 31, 2023.

4. *Optogenetic control of the ER calcium store release by a novel ER-localized photoactivated cation channel.* Spark «Rapid funding of unconventional ideas», Swiss National Science Foundation. PI Matthias Hediger, December 1, 2019 – January 31, 2021.

(Recently completed)

1. *The role of neutral amino acid transporters in colorectal cancer progression.* Swiss Cancer League, PI Matthias Hediger. Co-PI Inti Zlobec. May 1, 2017 – April 30, 2020.
2. *Compound screening on solute carrier SLC15A4 to targeting for lupus autoimmune disease*. CTI, PI Matthias Hediger. Funding period: June 1, 2018 – May 31, 2020.
3. *Store-operated calcium channels in health and disease*. Sinergia, Swiss National Science Foundation. PI Matthias Hediger, Co-PIs Martin Lochner and Nicolas Demaurex. Funding period: October 1, 2015 – November 30, 2018.

6. Supervision of junior researchers at graduate and postgraduate level

1. Ongoing supervision and training of bachelor and master students. Current Master Students are Sven Baumann, Gabriel Jonathan Klesse and Paola Bermudez Lekerika. Recently completed master theses by Jan Dernič, Marina Troxler, Mey Boukenna, Damian Nydegger, Stefanie Graeter, Andrea Amati and Nicolas Wenger.
2. Doctoral theses in biology: Current PhD student is Damian Nydegger (ongoing). Recent PhD theses were completed by Mey Boukenna (2019), Marie-Christine Franz (2015), Marc Bürzle (2012), Katrin A. Bolanz (January 2010).
3. Over the past 25 years, Matthias Hediger has supervised and trained more than 40 post-doctoral researchers.

7. Teaching activities

Membrane biochemistry (ongoing yearly master lecture series), lectures to veterinary medicine (VetSuisse) and medical students (until 2018); organizer of the endocrinology lecture series for 2nd year medical students (until 2018).

8. Memberships in panels, boards, etc., and individual scientific reviewing activities

2003-2005	Vice Chair, Steering Committee, Epithelial Transport Group, Am. Physiol. Society
1995-	Specialist Advisor, HUGO Gene Nomenclature Committee (http://www.genenames.org)
1995	Partners Research Task Force of Massachusetts General Hospital and Brigham and Women's Hospital, Harvard Medical School to support new joint studies
1989-	Ongoing peer review (Science, Nature, Cell, PNAS, Nature Commun, eLife, etc.)

9. Active memberships in scientific societies, fellowships in renowned academies

Ongoing	American Physiological Society (APS), International BioIron Society (IBS), Life Sciences Switzerland (LS2), Biochemische Vereinigung Bern (BVB), American Association for the Advancement of Science (AAAS)

10. Organization of conferences (past 10 years)

2019	Organizer BioMedical Transporters Conference, Lucerne, Swiss Museum of Transport "Membrane transporters and channels: From basic research to drug" August 4-8
2017	Organizer BioMedical Transporters Conference, Lausanne, Olympic Museum, "SLC Transporters and Ion Channels in Drug Discovery and Preclinical Development" August 6-10
2015	Organizer BioMedical Transporters Conference, Lugano, Palazzo dei Congressi "Membrane Transporters – from Basic Science to Drug Discovery" August 9-13
2013	Organizer BioMedical Transporters Conference, St. Moritz, Hotel Laudinella "Transporters and Channels in Drug Discovery and Preclinical Development", August 11-15

2011 Organizer BioMedical Transporters Conference, Grindelwald Congress Center "Membrane Transporters in Drug Discovery", August 7-11

2009 Organizer and Chair, USGEB Meeting 2009: Membranes in Motion, January 29-30, Interlaken, Switzerland http://www.bioparadigms.org/biomedical09/USEGB%202009/index.html

11. Prizes, awards, fellowships

2018 Special Award, MDO/JSSX International Joint Meeting, Kanazawa, Japan.

2009 Japanese Society for the Study of Xenobiotics Award (Kyoto, Japan)

2003 Rank Prize Funds, Surrey, UK *Award in recognition of work on the identification, molecular characterization and control of cellular nutrient transporters*

1998 Recipient of an award to support interdisciplinary and interdepartmental research at Brigham and Women's Hospital

1996 Visiting Professor, University College London

1989 Annual Award for Excellence in Renal Research in recognition of research of the human Na^+/glucose cotransporters. American Physiological Society

12. Career breaks – None

Research focus and scientific achievements – Matthias A. Hediger

Research efforts arising from the laboratory of Matthias Hediger are focusing on the study of clinically important membrane proteins using biophysical, biochemical, computational biological and pharmaceutical approaches. Over the past years, the work if his group has revealed the mechanistic foundations for many different medically important membrane proteins such as glucose, amino acid, vitamin and metal ion transporters as well as calcium channels. Most recent efforts have been devoted to the development of pharmaceutical modulators of medically important membrane proteins.

Establishment of NCCR TransCure

The National Centre of Competence in Research (NCCR) "*TransCure*" has been initiated and directed by Matthias Hediger starting in year 2010, with the main goal to accelerate the transformation of knowledge from basic research within the transporter/channel field into use. The leading house of this network is the University of Bern (https://www.nccr-transcure.ch/about-us/), and it is currently ran by Hugues Abriel. Our network is composed of a dozen multidisciplinary scientific laboratories affiliated at Universities in Basel, Bern, Lausanne and Zurich. This team of Swiss academic experts are focused on cellular membrane transporter/channel research and emerging applications for the treatment of human diseases. Using TransCure's approach "*from transport physiology to the identification of therapeutic targets*" researchers are working collaboratively, combining a unique interdisciplinary skill-set that encompasses three major disciplines, referred to as "TransCure Trias": Physiology/Medicine, Structural Biology and Medicinal Chemistry. The NCCR TransCure projects greatly accelerate the development of therapeutic strategies to improve human health.

Current projects and recent achievements:

1. **New insights into the COVID-19 pandemic: Genetic polymorphisms, role of SLC6 amino acid transporters, renal aspects and therapeutic perspectives**: This project aims to decipher biological and pharmaceutical aspects of the SARS-CoV-2 virus pandemic. Using a combination of biochemical assays such as microscale thermophoresis (MST) to determine SARS-CoV-2 receptor binding domain (RBD) binding affinity to the ACE2 virus receptor and the SARS-CoV-2 pseudovirus entry assay to reveal viral load, we will clarify the roles of specific allelic variants of viral host genes in conferring COVID-19 severity. In addition, we will screen for blockers of viral susceptibility as hit/lead compounds for the development of novel treatment strategies.
2. **Calcium channel TRPV6 in health and disease**: As part of the initial activities of the NCCR TransCure network, we have been working with the group of Jean-Louis Reymond to generate specific TRPV6 inhibitors.

Our effort has led to the generation of a series of novel inhibitors with great specificity and IC_{50} values in the nanomolar range (Angew Chem Int Ed Engl. 2015, 54:14748-52**;** RSC Med Chem 2020, 11, 1032–1040**).** In our recent collaboration with Alexander Sobolevsky (University of Columbia) and Christoph Romanin (University of Linz), we combined structural data with mutagenesis and functional/computational analyses to clarify the binding site of these compounds within the open pore of TRPV6. Our study shows that binding converts the channel into a nonconducting state, thereby mimicking the action of calmodulin, which causes inactivation of TRPV6 channels under physiological conditions. This mechanism of inhibition explains the high selectivity and potency of these channel inhibitors and opens up unexplored avenues for the design of future-generation biomimetic drugs (Sci Adv. 2020 Nov 27; 6). Furthermore, in collaboration with Jean-Louis Reymond and Christoph Romanin, we developed a novel photoswitchable inhibitor of TRPV6 that is expected to serve as a versatile tool compound to deepen our understanding of TRPV6 (ACS Med Chem Lett. 2019; 10:1341-1345). In addition, we published a paper on capsaicin derivatives and their effects on TRPV1 and TRPV6 channel function (Bioorg Med Chem. 2019; 27:2893-2904). In addition, a review entitled "*TRPV5 and TRPV6 Calcium-Selective Channels*" was published as a book chapter in "*Calcium Entry Channels in Non-Excitable Cells*" (Kozak JA, Putney JW Jr., editors, CRC Press/Taylor & Francis; 2018; Chapter 13).

3. **Structure, function and pharmacology of Orai/STIM calcium channels:** In year 2015, our laboratory got awarded the Sinergia Swiss National Science Foundation (SNSF) interdisciplinary research grant, entitled "*Store-operated calcium channels in health and disease*" (October 1, 2015 – November 30, 2018), together with Nicolas Demaurex (University of Geneva) and Martin Lochner (University of Bern). The first study on this topic we published in collaboration with Nicolas Demaurex, showing that ORAI1 channel gating and selectivity is differentially altered by natural mutations in the first or third transmembrane domain (J Physiol. 2019 597:561-582). Thereafter, as a collaboration with Christoph Romanin, we reported the unveiling of a novel STIM1-Orai1 gating interface that is essential for CRAC channel activation (Cell Calcium. 2019; 79: 57-67). In collaboration with Martin Lochner, we characterized novel 2-aminoethyl diphenylborinate (2-APB) derivatives with respect to inhibition of store-operated calcium entry (SOCE) (Int J Mol Sci. 2020 Aug 5; 21(16):5604). In another recent study, we described a novel role for Ca^{2+}-calmodulin in SCDI of Orai1 (Cell Physiol Biochem 2020; 54:252-270). In addition, we completed our collaboration with Ivan Bogeski (University of Göttingen) and Rainer Schindl (University of Graz), showing that STIM2 cytosolic cysteine residues are targeted by reactive oxygen species to modulate SOCE (Cell Rep. 2020; 33(3):108292). Related to this work, we published a review entitled "Redox modulation of STIM-ORAI signaling" (Cell Calcium. 2016; 60:142-52).
4. **Mitochondrial carriers and regulation by calcium signaling**: In year 2018, we got awarded a new SNSF Sinergia grant (September 1, 2018 – August 31, 2022), which focusses on the role of mitochondrial carriers in metabolic tuning and reprogramming by calcium flow across membrane contact sites, a collaborative effort together with Edmund Kunji (University of Cambridge) and Martin Lochner. A review entitled "*Sequence Features of Mitochondrial Transporter Protein Families*" has recently been published (Biomolecules. 2020 28; 10(12):E1611).
5. **Structure, function and therapeutic implications of the SLC11A2/DMT1 iron transporter:** After the molecular discovery of the divalent metal ion transporter by our group (Nature. 1997, 388:482-8), Raimund Dutzler, as part of the NCCR TransCure iron project, reported the 3D structure of DMT1/SLC11A2 from Staphylococcus capitis (ScaDMT), unveiling it as a LeuT-fold transporter. As a follow-up, we employed molecular dynamics simulations and site-directed mutagenesis and discovered a novel H^+ transfer mechanism in DMT1. Our molecular dynamics simulations provided first insight into how H^+-translocation through E193 is allosterically linked to intracellular gating, revealing a novel H^+-coupling mechanism that is distinct from that of other H^+-transporters (Sci Rep. 2017 ;7:6194). The mechanistic base of the inhibition of DMT1 has recently been elucidated for bis-isothiourea substituted compounds in collaboration with the groups of Raimund Dutzler (University of Zurich) and Jean-Louis Reymond (University of Bern) (eLife 2019; 8: e51913).

6. **SLC39/ZIP metal ion transporters and in pathologies:** A combination of *in silico* and *in vitro* techniques involving structural modeling, mutagenesis and functional characterization was employed to unravel the structural elements of pH sensitivity and substrate binding in the human zinc transporter SLC39A2 (ZIP2). This work provides the first structural evidence for the previously observed pH and voltage modulation of ZIP2-mediated metal transport (J Biol Chem. 2019; 294:8046-8063). An inhibitor against the SLC39A8/ZIP8 zinc transporter has recently been generated and is being tested using an *in vitro* osteoarthritis cellular system, looking for beneficial disease treatment effects.
7. **Role of amino acid transporters in colorectal cancer progression:** Our recent data reveal that oncogenic mutations boost amino acid delivery into colorectal cancer cells via Hippo-mediated upregulation of specific amino acid transporters (manuscript in review).
8. **Peptide/histidine transporter SLC15A4:** Investigation of the biology of the orphan endosomal peptide/histidine transporter SLC15A4 has led to the development of therapeutic hit compounds that target this transporter. These are currently being evaluated with respect to application to the treatment of autoimmune diseases such as systemic lupus erythematosus (SLE) and inflammatory bowel disease (IBD).
9. **Glial glutamate transporters (SLC1A2/GLT1):** Our recent collaboration with Rodan, Lance, Children's Hospital, Harvard Medical School, revealed novel glutamate transporter mutations that cause epilepsy via a dominant negative mechanism. We found that these mutations are localized in the trimerization domain of the glutamate transporter trimers (**Ann Neurol. 2019; 85:921-926**).

Conference organization

Matthias Hediger has established two different international conference series to promote the transporter/ion channel field in the biomedical and pharmaceutical areas:

1) International Gordon Research Conference Series on transporters and channels
2) International BioMedical Transporter Conference Series (held biennially) on the pharmaceutical aspects of transporters and channels. The focus is on transporter and ion channel-based drug discovery strategies, pharmacokinetics, drug delivery and drug elimination (http://www.bioparadigms.org/conferences_main.html).

SLC mini-review series and BioParadigms website

There are currently 65 human transporter gene families belonging to the SLC (solute carrier) series and these families include 432 genes. Matthias Hediger serves as Special Advisor on SLCs to the HUGO Gene Nomenclature Committee (HGNC). The SLC tables are presented on the BioParadigms website (http://www.bioparadigms.org/slc/intro.htm).

Research output, past 5 years – Matthias A. Hediger

Link to website showing complete list of publications:

https://www.ncbi.nlm.nih.gov/pubmed/?term=Hediger%20MA

***) Co-Corresponding author**

1) Publications in international peer-reviewed scientific journals

***) Co-Corresponding author**

1. Bhardwaj R, Lindinger S, Neuberger A, Nadezhdin KD, Singh AK, Cunha MR, Derler I, Gyimesi G, Reymond JL, **Hediger MA***), Romanin C, Sobolevsky AI. Inactivation-mimicking block of the epithelial calcium channel TRPV6. *Sci Adv.* 2020 Nov 27;**6**(48)
2. Gyimesi G, **Hediger MA**. Sequence Features of Mitochondrial Transporter Protein Families. *Biomolecules*. 2020 Nov 28;**10**(12):E1611
3. Gibhardt CS, Cappello S, Bhardwaj R, Schober R, Kirsch SA, Bonilla Del Rio Z, Gahbauer S, Bochicchio A, Sumanska M, Ickes C, Stejerean-Todoran I, Mitkovski M, Alansary D, Zhang X,

Revazian A, Fahrner M, Lunz V, Frischauf I, Luo T, Ezerina D, Messens J, Belousov VV, Hoth M, Böckmann RA, **Hediger MA**, Schindl R, Bogeski I. Oxidative Stress-Induced STIM2 Cysteine Modifications Suppress Store-Operated Calcium Entry. *Cell Rep.* 2020 Oct 20;**33**(3):108292.

4. Anderegg MA, Albano G, Hanke D, Deisl C, Uehlinger DE, Brandt S, Bhardwaj R, **Hediger MA**, Fuster DG. The sodium/proton exchanger NHA2 regulates blood pressure through a WNK4-NCC dependent pathway in the kidney. *Kidney Int.* 2020 Sep 18:S0085-2538(20)31066-8.
5. Schild A, Bhardwaj R, Wenger N, Tscherrig D, Kandasamy P, Dernič J, Baur R, Peinelt C, **Hediger MA*)**, Lochner M. Synthesis and Pharmacological Characterization of 2-Aminoethyl Diphenylborinate (2-APB) Derivatives for Inhibition of Store-Operated Calcium Entry (SOCE) in MDA-MB-231 Breast Cancer Cells. *Int J Mol Sci.* 2020 Aug 5;**21**(16):5604.
6. Cunha, MR, Bhardwaj R, Carrel AL, Lindinger S, Romanin C, Parise-Filho R, **Hediger MA*)** and Reymond J-L. Natural product inspired optimization of a selective TRPV6 calcium channel inhibitor. *RSC Med Chem* 2020, **11**, 1032–1040.
7. Gyimesi G, Pujol-Giménez J, Kanai Y and **Hediger MA**. Sodium-coupled glucose transport, the SLC5 family and therapeutically relevant inhibitors: From molecular discovery to clinical application. *Pflugers Arch* 2020, Sep;**472**(9):1177-1206.
8. Poirier M, Pujol-Giménez J, Bühlmann S, Embaby A, Manatchal C, **Hediger MA*)** and Reymond J-L. Pyrazolyl-pyrimidones inhibit the function of human solute carrier protein SLC11A2 (hDMT1) by metal chelation. *RSC Med Chem* 2020, **11**, 1023–1031.
9. Bhardwaj R, Augustynek BS, Ercan-Herbst E, Kandasamy P, Seedorf M, Peinelt C, **Hediger MA**. Ca^{2+}/Calmodulin Binding to STIM1 Hydrophobic Residues Facilitates Slow Ca^{2+}-Dependent Inactivation of the Orai1 Channel. *Cell Physiol Biochem*. 2020; **54**:252-270.
10. Manatschal1 C, Pujol-Giménez, J, Poirier M, Reymond JL, **Hediger MA**, Dutzler R. Mechanistic basis of the inhibition of SLC11/NRAMP-mediated metal 1 ion transport by aromatic bis-isothiourea substituted compounds. *eLife.* 2019, Elife. 2019 Dec 5;8:e51913.
11. Cunha MR, Bhardwaj R, Lindinger S, Butorac C, Romanin C, **Hediger MA*)**, Reymond JL. Photoswitchable Inhibitor of the Calcium Channel TRPV6. *ACS Med Chem Lett*. 2019;**10**:341-1345.
12. Lüscher BP, Surbek DV, Clémençon B, Huang X, Albrecht C, Marini C, **Hediger MA**, Baumann MU. Different Pharmacological Properties of GLUT9a and GLUT9b: Potential Implications in Preeclampsia. *Cell Physiol Biochem.* 2019;**53**:508-517.
13. Pereira GJV, Tavares MT, Azevedo RA, Martins BB, Cunha MR, Bhardwaj R, Cury Y, Zambelli VO, Barbosa EG, **Hediger MA**, Parise-Filho R. Capsaicin-like analogue induced selective apoptosis in A2058 melanoma cells: Design, synthesis and molecular modeling. *Bioorg Med Chem.* 2019;**27**:2893-2904.
14. Stergachis AB, Pujol-Giménez J, Gyimesi G, Fuster D, Albano G, Troxler M, Picker J, Rosenberg PA, Bergin A, Peters J, El Achkar CM, Harini C, Manzi S, Rotenberg A, **Hediger MA*)**, Rodan LH. Recurrent SLC1A2 variants cause epilepsy via a dominant negative mechanism. *Ann Neurol.* 2019;**85**:921-926.
15. Gyimesi G, Albano G, Fuster DG, **Hediger MA*)** and Pujol-Giménez J. Unraveling the structural elements of pH sensitivity and substrate binding in the human zinc transporter SLC39A2 (ZIP2). *J Biol Chem.* 2019;**294**:8046-8063.
16. Butorac C, Muik M, Derler I, Stadlbauer M, Lunz V, Krizova A, Lindinger S, Schober R, Frischauf I, Bhardwaj R, **Hediger MA**, Groschner K, Romanin C. A novel STIM1-Orai1 gating interface essential for CRAC channel activation. *Cell Calcium.* 2019;**79**:57-67.
17. Bulla M, Gyimesi G, Kim JH, Bhardwaj R, **Hediger MA**, Frieden M, Demaurex N. ORAI1 channel gating and selectivity is differentially altered by natural mutations in the first or third transmembrane domain. *J Physiol* 2019;**597**:561-582.

18. Franz MC, Pujol-Gimenez J, Montalbetti N, Fernandez-Tenorio M, DeGrado TR, Niggli E, Romero MF, **Hediger MA**. Reassessment of the transport mechanism of the human zinc transporter SLC39A2. *Biochemistry* 2018;**57**:3976-3986.
19. Kandasamy P, Gyimesi G, Kanai Y, **Hediger MA**. Amino acid transporters revisited: New views in health and disease *Trends Biochem Sci.* 2018;**43**:752-789
20. Clémençon B, Lüscher BP, **Hediger MA**. Establishment of a novel microscale thermosphoresis ligand-binding assay for characterization of SLC solute carriers using oligopeptide transporter PepT1 (SLC15 family) as a model system. *J Pharmacol Toxicol Methods* 2018;**92**:67-76.
21. Pujol-Giménez J, **Hediger MA**[*)]**,** Gyimesi G. A novel proton transfer mechanism in the SLC11 family of divalent metal ion transporters. *Sci Rep.* 2017;**7**:6194.
22. Dalghi MG, Ferreira-Gomes M, Montalbetti N, Simonin A, Strehler EE, **Hediger MA**, Rossi JP. Cortical cytoskeleton dynamics regulates plasma membrane calcium ATPase isoform-2 (PMCA2) activity. *Biochim Biophys Acta.* 2017;**1864**:1413-1424.
23. Lüscher BP, Marini C, Jorger-Messerli M, Huang X, **Hediger MA**, Albrecht C, Baumann MU, Surbek DV. Placental glucose transporter (GLUT)-1 is down-regulated in preeclampsia. *Placenta* 2017;**55**:94-99
24. Bhardwaj R, **Hediger MA**, Demaurex N. Redox modulation of STIM-ORAI signaling. *Cell Calcium.* 2016;**60**:142-52.
25. Clémençon B, Fine M, **Hediger MA**. Conservation of the oligomeric state of native VDAC1 in detergent micelles. *Biochimie.* 2016;**127**:163-72.
26. Leuenberger M, Ritler A, Simonin A, **Hediger MA**, Lochner M. Concise Asymmetric Synthesis and Pharmacological Characterization of All Stereoisomers of Glutamate Transporter Inhibitor TFB-TBOA and Synthesis of EAAT Photoaffinity Probes. *ACS Chem Neurosci.* 2016;**7**:534-9.
27. Dhayat N, Simonin A, Anderegg M, Pathare G, Lüscher BP, Deisl C, Albano G, Mordasini D, **Hediger MA**, Surbek DV, Vogt B, Sass JO, Kloeckener-Gruissem B, Fuster DG. Mutation in the Monocarboxylate Transporter 12 Gene Affects Guanidinoacetate Excretion but Does Not Cause Glucosuria. *J Am Soc Nephrol.* 2016;**27**:1426-36.
28. Simonin A, Montalbetti N, Gyimesi G, Pujol-Giménez J, **Hediger MA**. The Hydroxyl Side Chain of a Highly Conserved Serine Residue Is Required for Cation Selectivity and Substrate Transport in the Glial Glutamate Transporter GLT-1/SLC1A2. *J Biol Chem.* 2015;**290**:30464-74.
29. Simonin C, Awale M, Brand M, van Deursen R, Schwartz J, Fine M, Kovacs G, Häfliger P, Gyimesi G, Sithampari A, Charles RP, **Hediger MA**, Reymond JL. Optimization of TRPV6 Calcium Channel Inhibitors Using a 3D Ligand-Based Virtual Screening Method. *Angew Chem Int Ed Engl.* 2015;**54**:14748-52.
30. César-Razquin A, Snijder B, Frappier-Brinton T, Isserlin R, Gyimesi G, Bai X, Reithmeier RA, Hepworth D, **Hediger MA**[*)], Edwards AM, Superti-Furga G. A Call for Systematic Research on Solute Carriers. *Cell.* 2015;**162**:478-87.
31. Damseh N, Simonin A, Jalas C, Picoraro JA, Shaag A, Cho MT, Yaacov B, Juusola J, Al-Ashhab M, Bale S, Telegrafi A, Retterer K, Pappas JG, Cappell J, Yeboa KA, Abu-Libdeh B, **Hediger MA**, Chung WK, Elpeleg O, Edvardson S. Mutations in SLC1A4, encoding the brain serine transporter, associated with developmental delay, microcephaly and hypomyelination. *J Med Genet.* 2015;**52**:541-7.
32. Montalbetti N, Simonin A, Simonin C, Awale M, Reymond JL, **Hediger MA**. Discovery and characterization of a novel non-competitive inhibitor of the divalent metal transporter DMT1/SLC11A2 *Biochem Pharmacol.* 2015;**96**:216-24.
33. Clémençon B, Fine M, Schneider P, **Hediger MA.** Rapid method to express and purify human membrane protein using the Xenopus oocyte system for functional and low-resolution structural analysis. *Methods Enzymol.* 2015;**556**:241-65.

34. Clémençon B, Lüscher BP, Fine M, Baumann MU, Surbek DV, Bonny O, **Hediger MA**. Expression, purification, and structural insights for the human uric acid transporter, GLUT9 using the Xenopus laevis oocytes system. *PLoS ONE*. 2014;**9**:e108852.
35. Franz MC, Simonin A, Graeter S, **Hediger MA**, Kovacs G. Development of the first fluorescence screening assay for SLC39A2 zinc transporter. *J Biomol Screen.* 2014;**19**:909-16.
36. Montalbetti N, Simonin A, Dalghi MG, Kovács G, **Hediger MA**. Development and validation of a fast and homogeneous cell-based fluorescence screening assay for divalent metal transporter-1 (DMT1/SLC11A2) using the FLIPR tetra. *J Biomol Screen*. 2014;**19**:900-8.
37. Clémençon B, Fine M, Lüscher B, Baumann MU, Surbek DV, Abriel H, **Hediger MA**. Expression, purification, and projection structure by single particle electron microscopy of functional human TRPM4 heterologously expressed in Xenopus laevis oocytes. *Protein Expr Purif*. 2014;**95**:169-76.
38. Marini C, Lüscher BP, Jorger-Messerli M, Sager R, Huang X, Gertsch J, **Hediger MA**, Albrecht C, Baumann MU, Surbek DV. Placental Glucose Transporter (GLUT1) expression in pre-eclampsia. *Reprod Sci.* 2014;**21**:1A-70A.
39. Jain A, Schneider H, Aliyev E, Soydemir F, Baumann M, Surbek D, **Hediger MA**, Brownbill P, Albrecht C. Hypoxic treatment of human dual placental perfusion induces a pre-eclampsia-like inflammatory response. *Lab Invest.* 2014;**94**:873-80.
40. Montalbetti N, Dalghi MG, Albrecht C, Hediger MA. Nutrient transport in the mammary gland: calcium, trace minerals and water soluble vitamins. J Mammary Gland Biol Neoplasia. 2014;19:73-90.

2) Peer-reviewed books/monographs – N/A

3) Peer-reviewed conference papers

- Lüscher BP, Clémençon B, Marini C, Huang X, Sager R, Jeanneret C, Reymond J-L, Albrecht C, Hediger MA, Surbek DV, Baumann MC, Placental uric acid transport system: Glucose Transporter 9 (SLC2A9). Reprod Sci. 2014;21:1A-70A.

4) Contributions to books

- Peng, J-B, Suzuki Y, Gyimesi, G and **Hediger MA.** TRPV5 and TRPV6 calcium-selective channels. In: Juliusz Ashot Kozak, James W. Putney, Jr., editors. Calcium Entry Channels in Non-Excitable Cells. CRC Press/Taylor & Francis; 2018; Chapter 13; p241-274.

5) Patents and licenses

Methods of altering calcium transport (**TRPV6**)

- Patent number: 7078178 (USPTO)
  Abstract: Methods of altering transmembrane calcium transport by altering expression of a calcium-transport protein are described.
  Type: Grant
  Filed: April 22, 2003
  Date of Patent: July 18, 2006
  Inventors: Matthias A. Hediger, Edward M. Brown, Ji-Bin Peng
- **Methods for transporting vitamin C** (**SLC23 family**)
  Patent number: 7371536 (USPTO)
  Abstract: The invention provides methods for regulating the transport of vitamin C across membranes.
  Type: Grant

Filed: April 7, 2003
Date of Patent: May 13, 2008
Inventor: Matthias A. Hediger

6) Oral contributions to international conferences

2019 Plenary speaker: Fundamentals and importance of the SLC solute carrier superfamily and future perspectives. 60th Congress of the Italian Society of Biochemistry and Molecular Biology (SIB), Lecce, Italy.

2019 Opening remarks and overview of the diversity of human membrane transporters and ion channels: BioMedical Transporters 2019, Membrane transporters and channels: From basic research to drug development and clinical application. 11th international research conference, Lucerne, Switzerland.

2018 Plenary Speaker: Current vision and future direction of transporter research. International Meeting on 22nd MDO and 33rd JSSX "Societal impact of ADME/Tox research on safety & toxicity of drug products", October 1 to 5, 2018, Kanazawa, Japan.

2018 Invited Speaker: Future perspectives of transporter research. End of Phase II NCCR TransCure Symposium. University of Bern, Switzerland.

2017 Opening remarks: BioMedical Transporters 2017, SLC and ABC transporters and ion channels in drug discovery and preclinical development. 10th international research conference, Lausanne, Switzerland.

2016 Invited speaker: Solute Carrier Proteins: Unlocking the Gene-Family for Effective Therapies. Symposium of the New York Academy of Sciences, USA.

2015 Opening presentation: BioMedical Transporters 2015, Membrane transporters – From basic science to drug discovery. 9th international research conference, Lugano, Switzerland.

2014 Invited speaker: Fundamentals of the SLC series. SLC Workshop, Vienna, Organized by Giulio Superti Furga.

7. Outreach activities

- Exhibition by NCCR TransCure at a recent two day annual commercial Bernese spring fair, called BEA. Explaining children and young students how to use a pipette, how to look through a microscope and what the basic goals of NCCR TransCure are about. Presenting a video showing TransCure's automated screening technologies was presented.
- Press release, June 2018, Media Relations, University of Bern. Topic: The new Swiss SNF-funded Sinergia Project entitled "*The role of mitochondrial carriers in metabolic tuning and reprogramming by calcium flow across membrane contact sites*", awarded to Matthias Hediger (Coordinator), Martin Lochner and Inti Zlobec (University of Bern), Edmund Kunji (University of Cambridge, UK) and Nicolas Demaurex (University of Geneva).
- Various other press releases in connection with NCCR TransCure discoveries; latest public outreach available via Twitter: https://twitter.com/NCCR_TransCure

8. General contributions to science

- Founder of the National Center of Competence in Research, called NCCR TransCure (years 2010 to 2022)
- Founder of the International Post-Doctoral Fellowship Program "IFP TransCure", supported by the FP7 European Marie Curie Actions Grant (years 2012 to 2018).

9. Other contributions

The **BioParadigms SLC (Solute Carrier) gene tables** (https://www.bioparadigms.org/) provide a versatile scientific resource, showing the latest up-to-date information on all approved SLC families and their members, as well as relevant links to gene databases and reviews in the literature. The original version of the SLC tables was generated by the authors of the 2004 SLC reviews in Pflügers Archives. The newly revised tables have been generated by the authors of the 2013 reviews, which have been published in the Journal Molecular Aspects of Medicine. The details regarding these two review series are as follows:

- Guest Editor, special issue "The ABCs of membrane transporters in health and disease (SLC series); Molecular Aspects of Medicine, Volume 34, Issues 2-3, April/June 2013 *(total of 50 reviews on SLC solute carrier families).*
- Guest Editor, special issue "Membrane Transporters: Solute Carriers" *(total of 51 reviews on SLC solute carrier families).*
- Guest Edited by Prof Matthias A. Hediger & Dr David Hepworth (Pfizer); *Med. Chem. Comm.* (Royal Society of Chemistry), Volume 7, 2016. *This collection of articles is a celebration of all areas of research where the chemical sciences have impacted the study of the SLC solute carrier superfamily*.