



Stefan Heller, PhD, MS

Edward C. and Amy H. Sewall Professor in the School of Medicine and
Professor of Otolaryngology - Head & Neck Surgery (OHNS)
Otolaryngology (Head and Neck Surgery)

Bio

ACADEMIC APPOINTMENTS

- Professor, Otolaryngology (Head and Neck Surgery)
- Member, Bio-X
- Member, Institute for Stem Cell Biology and Regenerative Medicine
- Member, Maternal & Child Health Research Institute (MCHRI)
- Member, Stanford Cancer Institute
- Member, Wu Tsai Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- Departmental Senator, Medical School Faculty Senate, (2008-2011)
- Director of Research, Otolaryngology - Stanford, (2005-2014)
- Provost's Advisory Committee on Postdoctoral Affairs, Stanford, (2009-2017)
- Associate Chair, Research, Otolaryngology - Stanford, (2014-2020)

HONORS AND AWARDS

- Juergen Tonndorf Award, Deafness Research Foundation (2001)
- Basil O'Connor Starter Scholar Research Award, March of Dimes (2001-2003)
- Franklin M. Rizer Lectureship, The American Neurotology Society (2004)
- Burt Evans Young Investigator Award, National Organization for Hearing Research Foundation (2005)
- James Wiggins Associate Professor, Harvard Medical School (4/2005)
- Albert and Ellen Grass Faculty Grant Award, Marine Biological Laboratory, Woods Hole, MA (Summer 2004, Summer 2005)
- Frontiers of Science Scholar (US/Japan 2006), Kavli Foundation (2006)
- McKnight Neuroscience of Brain Disorders Award, McKnight Endowment Fund for Neuroscience (2005-2007)
- Edward C. and Amy H. Sewall Professor, Stanford School of Medicine (7/ 2010)
- Member, Collegium Oto-Rhino-Laryngologicum Amicitiae Sacrum (9/2011)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Board of Directors, Korsa Therapeutics (2024 - present)
- Board of Directors, Valora Therapeutics (2024 - present)
- Board of Scientific Counselors, NIDCD (2024 - present)

- Scientific Advisor (ad hoc), Lineage Cell Therapeutics (2022 - present)
- Long Range Planning Committee, Association for Research in Otolaryngology Midwinter Meeting (2021 - present)
- Board of Directors, Avelas Biosciences (2020 - present)
- Board of Directors, Nerio Therapeutics (2020 - 2024)
- NIDCD Council, ad hoc member, National Institute for Communication Disorders (2020 - 2021)
- Board of Directors, Fortis Therapeutics (2019 - present)
- Board of Directors, Adanate Therapeutics (2019 - 2021)
- Scientific Advisory Board, Institut de L'Audition, Institut Pasteur (2018 - present)
- Board of Directors, Janux Therapeutics (2018 - 2022)
- Auditory System Study Section (AUD), member, NIDCD/NIH (2014 - 2019)
- Award of Merit Committee, Association for Research in Otolaryngology Midwinter Meeting (2014 - 2018)
- Scientific Advisor, Pipeline Therapeutics (2012 - 2022)
- Communication Disorders Review Committee (CDRC study section), chair, NIDCD/NIH (2012 - 2013)
- Workshop on hair cell regeneration and future therapies, chair and co-organizer, NIDCD (2012 - 2012)
- Hearing Restoration Project, collaborative research group member, Hearing Health Foundation (2011 - present)
- Associate Editor, Hearing Research (2010 - 2017)
- Research Advisory Board, American Otological Society (2010 - 2015)
- Program Committee Member, Association for Research in Otolaryngology Midwinter Meeting (2010 - 2013)
- Associate Editor, JARO (2009 - 2012)
- Scientific Advisor, Otonomy (2009 - 2012)
- Council of Scientific Trustees, Deafness Research Foundation / Hearing Health Foundation (2008 - 2014)
- Communication Disorders Review Committee (CDRC study section), member, NIDCD/NIH (2008 - 2013)
- Stem Cell Policy Working Group, Harvard University (2004 - 2005)

PROFESSIONAL EDUCATION

- Postdoctoral Fellow, The Rockefeller University, New York, NY , Sensory Neuroscience (2000)
- Dr rer nat (Ph.D.), Johannes Gutenberg University, Mainz, Germany , Genetics (1994)
- Dipl Biol (M.S.), Johannes Gutenberg University, Mainz, Germany , Biological Sciences (1990)

COMMUNITY AND INTERNATIONAL WORK

- Biology of the Inner Ear Course, <http://www.mbl.edu/bie/>
- 9th Molecular Biology of Hearing & Deafness Conference, Stanford University

PATENTS

- Edge Albert, Heller Stefan. "United States Patent 9375452 Use of stem cells to generate inner ear cells", Massachusetts Eye & Ear Infirmary (Boston, MA), Jun 28, 2016
- Edge Albert, Heller Stefan. "United States Patent 9,265,933 Cochlear implants containing biological cells and uses thereof", Massachusetts Eye and Ear Infirmary (Boston, MA), Feb 23, 2016
- Heller Stefan, Ronaghi Mohammad, Oshima Kazuo. "United States Patent 9,157,064 Methods for generating inner ear cells in vitro", The Board of Trustees of the Leland Stanford Junior University (Stanford, CA), Oct 13, 2015
- Li Huawei, Edge Albert, Heller Stefan. "United States Patent 8,673,634 Method for the treatment of hearing loss", Massachusetts Eye & Ear Infirmary (Boston, MA), Mar 18, 2014
- Heller Stefan, Edge Albert. "United States Patent 8,617,810 Screening method for compounds that promote differentiation of inner ear progenitor cells", Massachusetts Eye & Ear Infirmary (Boston, MA), Dec 31, 2013

LINKS

- Heller Lab Website: <http://hellerlab-stanford.net>
- Google Scholar: <https://scholar.google.com/citations?user=Pkf3t7YAAAAAJ>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

We are interested in how the inner ear forms from an early anlage called the otic placode. Our goal is to describe the otic lineage from an early placodal progenitor until it splits into multiple cell types that make up the sensory epithelia, innervating ganglia, and accessory structures.

In parallel, we apply the knowledge we gained from guiding embryonic and induced pluripotent stem cells along the otic lineage to find ways to cure hearing loss. This involves the identification of mechanisms of sensory hair cell regeneration in animals such as chickens that recover from hearing loss, screening for potential regenerative targets that can be activated with drugs and exploring reprogramming and cell transplantation strategies.

We support inclusive, diverse, and equitable conduct of research. We resist attempts to dictate uniformity and embrace all forms of diversity. Members of the lab are encouraged to be different and to feel good about it.

Teaching

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Ishwar Hosamani, Xiangyu Ma, Ayse Maraslioglu Sperber, Hui Zhang

Doctoral Dissertation Advisor (AC)

Austin Huang, Lyn Miranda Portillo, Jiayi Wu

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Bioengineering (Phd Program)
- Biology (School of Humanities and Sciences) (Phd Program)
- Biomedical Data Science (Phd Program)
- Chemical and Systems Biology (Phd Program)
- Developmental Biology (Phd Program)
- Human Genetics and Genetic Counseling (Masters Program)
- Medicine (Masters Program)
- Molecular and Cellular Physiology (Phd Program)
- Neurosciences (Phd Program)
- Neurotology (Fellowship Program)
- Pediatric Otolaryngology (Fellowship Program)
- Stem Cell Biology and Regenerative Medicine (Phd Program)

Publications

PUBLICATIONS

- **Dual mechanisms of supporting cell regeneration in the neonatal mouse cochlea.** *iScience*
Abitbol, J. M., Matern, M. S., Billings, S. E., Yao, J., Choi, S. W., Wang, T., Heller, S., Cheng, A. G.
2026; 29 (3): 115113
- **Transcriptomic comparison of avian auditory and vestibular sensory epithelia.** *iScience*
Sato, M. P., Hosamani, I. V., Heller, S., Kubota, M.
2025; 28 (11): 113780
- **Protocol for vibratome sectioning, immunofluorescence, and S-phase labeling of inner ear organoids.** *STAR protocols*
Wu, J., Heller, S., Matern, M. S.
2025; 6 (3): 104032
- **Analysis of miRNAs from Inner Ear Organoid-Derived Extracellular Vesicles.** *Journal of the Association for Research in Otolaryngology : JARO*
Lee, S., Kubota, M., Park, E., Heller, S., Im, G. J., Chang, J.
2025
- **Anatomical and Molecular Insights into Avian Inner Ear Sensory Hair Cell Regeneration.** *Developmental biology*
Miranda Portillo, L. S., Huang, A. P., Hosamani, I. V., Sanchez, C. N., Heller, S., Benkafadar, N.
2025
- **Crosstalk Signaling Between the Epithelial and Non-Epithelial Compartments of the Mouse Inner Ear.** *Journal of the Association for Research in Otolaryngology : JARO*
David, A. P., Biswas, S., Soltis, M. P., Eltawil, Y., Zhou, R., Easow, S. A., Cheng, A. G., Heller, S., Jan, T. A.
2025
- **A developmental atlas of mouse vestibular-like inner ear organoids.** *iScience*
Matern, M. S., Heller, S.
2025; 28 (2): 111817
- **Hyperosmotic sisomicin infusion: a mouse model for hearing loss.** *Scientific reports*
Maraslioglu-Sperber, A., Blanc, F., Heller, S., Benkafadar, N.
2024; 14 (1): 15903
- **Protocol for in vivo elimination of avian auditory hair cells, multiplexed mRNA detection, immunohistochemistry, and S-phase labeling.** *STAR protocols*
Sato, M. P., Huang, A. P., Heller, S., Benkafadar, N.
2024; 5 (2): 103118
- **Single-cell transcriptomic atlas reveals increased regeneration in diseased human inner ear balance organs.** *Nature communications*
Wang, T., Ling, A. H., Billings, S. E., Hosseini, D. K., Vaisbuch, Y., Kim, G. S., Atkinson, P. J., Sayyid, Z. N., Aaron, K. A., Wagh, D., Pham, N., Scheibinger, M., Zhou, et al
2024; 15 (1): 4833
- **Murine cochlear damage models in the context of hair cell regeneration research.** *Hearing research*
Maraslioglu-Sperber, A., Blanc, F., Heller, S.
2024; 447: 109021
- **Hair cell regeneration, reinnervation, and restoration of hearing thresholds in the avian hearing organ.** *Cell reports*
Sato, M. P., Benkafadar, N., Heller, S.
2024; 43 (3): 113822
- **An essential signaling cascade for avian auditory hair cell regeneration** *Developmental Cell*
Benkafadar, N., Sato, M. P., Ling, A. H., Janesick, A., Scheibinger, M., Jan, T. A., Heller, S.
2024; 59 (2): 280-291
- **Transcriptional dynamics of delaminating neuroblasts in the mouse otic vesicle.** *Cell reports*

- Matern, M. S., Durruthy-Durruthy, R., Birol, O., Darmanis, S., Scheibinger, M., Groves, A. K., Heller, S.
2023; 42 (6): 112545
- **Inner Ear Cells from Stem Cells: A Path Towards Inner Ear Cell Regeneration** *Hair Cell Regeneration*
Janesick, A., Hashino, E., Heller, S.
Springer.2023: 135-162
 - **Fbxo2CreERT2: A new model for targeting cells in the neonatal and mature inner ear.** *Hearing research*
McGovern, M. M., Hartman, B., Thawani, A., Maunsell, H., Zhang, H., Yousaf, R., Heller, S., Stone, J., Groves, A. K.
2022; 428: 108686
 - **Cell-type identity of the avian utricle.** *Cell reports*
Scheibinger, M., Janesick, A., Benkafadar, N., Ellwanger, D. C., Jan, T. A., Heller, S.
2022; 40 (13): 111432
 - **Avian auditory hair cell regeneration is accompanied by JAK/STAT-dependent expression of immune-related genes in supporting cells.** *Development (Cambridge, England)*
Janesick, A., Scheibinger, M., Benkafadar, N., Kirti, S., Heller, S.
2022
 - **Surgical Approach for Rapid and Minimally Traumatic Recovery of Human Inner Ear Tissues from Deceased Organ Donors.** *Otology & neurotology : official publication of the American Otological Society, American Neurotology Society [and] European Academy of Otology and Neurotology*
Vaisbuch, Y., Hosseini, D. K., Wagner, A., Hirt, B., Mueller, M., Ponnusamy, R., Heller, S., Cheng, A. G., Lowenheim, H., Aaron, K. A.
2022
 - **Selection Criteria Optimal for Recovery of Inner Ear Tissues from Deceased Organ Donors.** *Otology & neurotology : official publication of the American Otological Society, American Neurotology Society [and] European Academy of Otology and Neurotology*
Aaron, K. A., Hosseini, D. K., Vaisbuch, Y., Scheibinger, M., Grillet, N., Heller, S., Wang, T., Cheng, A. G.
2022
 - **Editorial: Inner ear biology: Development, physiopathology, repair and recovery.** *Frontiers in cell and developmental biology*
Alsina, B., Heller, S., Varela-Nieto, I.
2022; 10: 1049463
 - **Molecular Tools to Study Regeneration of the Avian Cochlea and Utricle** *Developmental, Physiological, and Functional Neurobiology of the Inner Ear*
Janesick, A., Scheibinger, M., Heller, S.
Springer Nature.2022: 77-97
 - **Immunohistochemistry and In Situ mRNA Detection Using Inner Ear Vibratome Sections** *Developmental, Physiological, and Functional Neurobiology of the Inner Ear*
Scheibinger, M., Janesick, A., Diaz, G. H., Heller, S.
Springer Nature.2022: 41-58
 - **Fluorescent in situ mRNA detection in the adult mouse cochlea.** *STAR protocols*
Diaz, G. H., Heller, S.
2021; 2 (3): 100711
 - **Spatiotemporal dynamics of inner ear sensory and non-sensory cells revealed by single-cell transcriptomics.** *Cell reports*
Jan, T. A., Eltawil, Y., Ling, A. H., Chen, L., Ellwanger, D. C., Heller, S., Cheng, A. G.
2021; 36 (2): 109358
 - **Greater epithelial ridge cells are the principal organoid-forming progenitors of the mouse cochlea.** *Cell reports*
Kubota, M. n., Scheibinger, M. n., Jan, T. A., Heller, S. n.
2021; 34 (3): 108646
 - **Murine cochlear cell sorting and cell-type-specific organoid culture.** *STAR protocols*
Kubota, M., Heller, S.
2021; 2 (3): 100645

- **Transcriptomic characterization of dying hair cells in the avian cochlea.** *Cell reports*
Benkafadar, N. n., Janesick, A. n., Scheibinger, M. n., Ling, A. H., Jan, T. A., Heller, S. n.
2021; 34 (12): 108902
- **Cell-type identity of the avian cochlea.** *Cell reports*
Janesick, A. n., Scheibinger, M. n., Benkafadar, N. n., Kirti, S. n., Ellwanger, D. C., Heller, S. n.
2021; 34 (12): 108900
- **Stem Cell Approaches and Small Molecules** *The Senses: A Comprehensive Reference*
Romano, D. R., Heller, S., Hashino, E.
Elsevier .2020; 2: 945–962
- **Hair-bearing human skin generated entirely from pluripotent stem cells.** *Nature*
Lee, J. n., Rabbani, C. C., Gao, H. n., Steinhart, M. R., Woodruff, B. M., Pflum, Z. E., Kim, A. n., Heller, S. n., Liu, Y. n., Shipchandler, T. Z., Koehler, K. R.
2020
- **Stem Cells and the Bird Cochlea-Where Is Everybody?** *COLD SPRING HARBOR PERSPECTIVES IN MEDICINE*
Janesick, A. S., Heller, S.
2019; 9 (4)
- **Progenitor Cells from the Adult Human Inner Ear.** *Anatomical record (Hoboken, N.J. : 2007)*
Senn, P. n., Mina, A. n., Volkenstein, S. n., Kranebitter, V. n., Oshima, K. n., Heller, S. n.
2019
- **Novel insights into inner ear development and regeneration for targeted hearing loss therapies.** *Hearing research*
Roccio, M. n., Senn, P. n., Heller, S. n.
2019: 107859
- **Single-cell proteomics reveals changes in expression during hair-cell development.** *eLife*
Zhu, Y. n., Scheibinger, M. n., Ellwanger, D. C., Krey, J. F., Choi, D. n., Kelly, R. T., Heller, S. n., Barr-Gillespie, P. G.
2019; 8
- **Fbxo2(VHC) mouse and embryonic stem cell reporter lines delineate in vitro-generated inner ear sensory epithelia cells and enable otic lineage selection and Cre-recombination** *DEVELOPMENTAL BIOLOGY*
Hartman, B. H., Boescke, R., Ellwanger, D. C., Keymeulen, S., Scheibinger, M., Heller, S.
2018; 443 (1): 64–77
- **Single Cell Transcriptomics Reveal Abnormalities in Neurosensory Patterning of the Chd7 Mutant Mouse Ear.** *Frontiers in genetics*
Durruthy-Durruthy, R., Sperry, E. D., Bowen, M. E., Attardi, L. D., Heller, S., Martin, D. M.
2018; 9: 473
- **Molecular characterization and prospective isolation of human fetal cochlear hair cell progenitors** *NATURE COMMUNICATIONS*
Roccio, M., Perny, M., Ealy, M., Widmer, H., Heller, S., Senn, P.
2018; 9: 4027
- **Aminoglycoside Damage and Hair Cell Regeneration in the Chicken Utricle (vol 19, pg 17, 2018)** *JARO-JOURNAL OF THE ASSOCIATION FOR RESEARCH IN OTOLARYNGOLOGY*
Scheibinger, M., Ellwanger, D. C., Corrales, C., Stone, J. S., Heller, S.
2018; 19 (1): 31
- **Hair Follicle Development in Mouse Pluripotent Stem Cell-Derived Skin Organoids.** *Cell reports*
Lee, J. n., Böske, R. n., Tang, P. C., Hartman, B. H., Heller, S. n., Koehler, K. R.
2018; 22 (1): 242–54
- **Transcriptional Dynamics of Hair-Bundle Morphogenesis Revealed with CellTrails.** *Cell reports*
Ellwanger, D. C., Scheibinger, M. n., Dumont, R. A., Barr-Gillespie, P. G., Heller, S. n.
2018; 23 (10): 2901–14.e14
- **Activity-Dependent Phosphorylation by CaMKII δ Alters the Ca $^{2+}$ Affinity of the Multi-C2-Domain Protein Otoferlin.** *Frontiers in synaptic neuroscience*

- Meese, S., Cepeda, A. P., Gahlen, F., Adams, C. M., Ficner, R., Ricci, A. J., Heller, S., Reisinger, E., Herget, M.
2017; 9: 13
- **Small Molecules for Early Endosome-Specific Patch Clamping.** *Cell chemical biology*
Chen, C. C., Butz, E. S., Chao, Y. K., Grishchuk, Y. n., Becker, L. n., Heller, S. n., Slaugenhaupt, S. A., Biel, M. n., Wahl-Schott, C. n., Grimm, C. n.
2017; 24 (7): 907–16.e4
 - **Identification of novel MYO18A interaction partners required for myoblast adhesion and muscle integrity.** *Scientific reports*
Cao, J., Cheng, X., Li, S., Heller, S., Xu, Z., Shi, D.
2016; 6: 36768-?
 - **Single-cell analysis delineates a trajectory toward the human early otic lineage** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Ealy, M., Ellwanger, D. C., Kosaric, N., Stapper, A. P., Heller, S.
2016; 113 (30): 8508-8513
 - **Modulation of Wnt Signaling Enhances Inner Ear Organoid Development in 3D Culture.** *PloS one*
Dejonge, R. E., Liu, X., Deig, C. R., Heller, S., Koehler, K. R., Hashino, E.
2016; 11 (9)
 - **Applications for single cell trajectory analysis in inner ear development and regeneration** *CELL AND TISSUE RESEARCH*
Durruthy-Durruthy, R., Heller, S.
2015; 361 (1): 49-57
 - **Quantitative High-Resolution Cellular Map of the Organ of Corti** *CELL REPORTS*
Waldhaus, J., Durruthy-Durruthy, R., Heller, S.
2015; 11 (9): 1385-1399
 - **Changes in the regulation of the Notch signaling pathway are temporally correlated with regenerative failure in the mouse cochlea** *FRONTIERS IN CELLULAR NEUROSCIENCE*
Maass, J. C., Gu, R., Basch, M. L., Waldhaus, J., Lopez, E. M., Xia, A., Oghalai, J. S., Heller, S., Groves, A. K.
2015; 9
 - **3D computational reconstruction of tissues with hollow spherical morphologies using single-cell gene expression data.** *Nature protocols*
Durruthy-Durruthy, R., Gottlieb, A., Heller, S.
2015; 10 (3): 459-474
 - **Identification and characterization of mouse otic sensory lineage genes.** *Frontiers in cellular neuroscience*
Hartman, B. H., Durruthy-Durruthy, R., Laske, R. D., Losorelli, S., Heller, S.
2015; 9: 79-?
 - **Cisplatin Exposure Damages Resident Stem Cells of the Mammalian Inner Ear** *DEVELOPMENTAL DYNAMICS*
Slattery, E. L., Oshima, K., Heller, S., Warchol, M. E.
2014; 243 (10): 1328-1337
 - **α -Tubulin K40 acetylation is required for contact inhibition of proliferation and cell-substrate adhesion.** *Molecular biology of the cell*
Aguilar, A., Becker, L., Tedeschi, T., Heller, S., Iomini, C., Nachury, M. V.
2014; 25 (12): 1854-1866
 - **Inner ear hair cell-like cells from human embryonic stem cells.** *Stem cells and development*
Ronaghi, M., Nasr, M., Ealy, M., Durruthy-Durruthy, R., Waldhaus, J., Diaz, G. H., Joubert, L., Oshima, K., Heller, S.
2014; 23 (11): 1275-1284
 - **Reconstruction of the Mouse Otocyst and Early Neuroblast Lineage at Single-Cell Resolution** *CELL*
Durruthy-Durruthy, R., Gottlieb, A., Hartman, B. H., Waldhaus, J., Laske, R. D., Altman, R., Heller, S.
2014; 157 (4): 964-978
 - **Transient, afferent input-dependent, postnatal niche for neural progenitor cells in the cochlear nucleus.** *Proceedings of the National Academy of Sciences of the United States of America*
Volkenstein, S., Oshima, K., Sinkkonen, S. T., Corrales, C. E., Most, S. P., Chai, R., Jan, T. A., Cheng, A. G., Heller, S.
2013; 110 (35): 14456-14461

- **Tympanic border cells are Wnt-responsive and can act as progenitors for postnatal mouse cochlear cells** *DEVELOPMENT*
Jan, T. A., Chai, R., Sayyid, Z. N., van Amerongen, R., Xia, A., Wang, T., Sinkkonen, S. T., Zeng, Y. A., Levin, J. R., Heller, S., Nusse, R., Cheng, A. G.
2013; 140 (6): 1196-1206
- **Special issue on inner ear development and regeneration** *HEARING RESEARCH*
Heller, S.
2013; 297: 1-2
- **A Novel Ion Channel Formed by Interaction of TRPML3 with TRPV5** *PLOS ONE*
Guo, Z., Grimm, C., Becker, L., Ricci, A. J., Heller, S.
2013; 8 (2)
- **FCHSD1 and FCHSD2 Are Expressed in Hair Cell Stereocilia and Cuticular Plate and Regulate Actin Polymerization In Vitro** *PLOS ONE*
Cao, H., Yin, X., Cao, Y., Jin, Y., Wang, S., Kong, Y., Chen, Y., Gao, J., Heller, S., Xu, Z.
2013; 8 (2)
- **A simple method for purification of vestibular hair cells and non-sensory cells, and application for proteomic analysis.** *PloS one*
Herget, M., Scheibinger, M., Guo, Z., Jan, T. A., Adams, C. M., Cheng, A. G., Heller, S.
2013; 8 (6)
- **Regenerative Medicine for the Special Senses: Restoring the Inputs** *JOURNAL OF NEUROSCIENCE*
Birmingham-McDonogh, O., Corwin, J. T., Hauswirth, W. W., Heller, S., Reed, R., Reh, T. A.
2012; 32 (41): 14053-14057
- **Constitutive Activity of TRPML2 and TRPML3 Channels versus Activation by Low Extracellular Sodium and Small Molecules** *JOURNAL OF BIOLOGICAL CHEMISTRY*
Grimm, C., Joers, S., Guo, Z., Obukhov, A. G., Heller, S.
2012; 287 (27): 22701-22708
- **Oriented collagen as a potential cochlear implant electrode surface coating to achieve directed neurite outgrowth** *EUROPEAN ARCHIVES OF OTO-RHINO-LARYNGOLOGY*
Volkenstein, S., Kirkwood, J. E., Lai, E., Dazert, S., Fuller, G. G., Heller, S.
2012; 269 (4): 1111-1116
- **Concise Review: Inner Ear Stem Cells-An Oxymoron, but Why?** *STEM CELLS*
Ronaghi, M., Nasr, M., Heller, S.
2012; 30 (1): 69-74
- **Serial Analysis of Gene Expression in the Chicken Otocyst** *JARO-JOURNAL OF THE ASSOCIATION FOR RESEARCH IN OTOLARYNGOLOGY*
Sinkkonen, S. T., Starlinger, V., Galaiya, D. J., Laske, R. D., Myllykangas, S., Oshima, K., Heller, S.
2011; 12 (6): 697-710
- **Gpr126 is essential for peripheral nerve development and myelination in mammals** *DEVELOPMENT*
Monk, K. R., Oshima, K., Joers, S., Heller, S., Talbot, W. S.
2011; 138 (13): 2673-2680
- **Intrinsic regenerative potential of murine cochlear supporting cells** *SCIENTIFIC REPORTS*
Sinkkonen, S. T., Chai, R., Jan, T. A., Hartman, B. H., Laske, R. D., Gahlen, F., Sinkkonen, W., Cheng, A. G., Oshima, K., Heller, S.
2011; 1
- **Genetic Inactivation of Trpm13 Does Not Lead to Hearing and Vestibular Impairment in Mice** *PLOS ONE*
Joers, S., Grimm, C., Becker, L., Heller, S.
2010; 5 (12)
- **Characterization of stem cells derived from the neonatal auditory sensory epithelium** *HNO*
Diensthuber, M., Heller, S.
2010; 58 (11): 1056-?

- **A helix-breaking mutation in the epithelial Ca²⁺ channel TRPV5 leads to reduced Ca²⁺-dependent inactivation** *CELL CALCIUM*
Lee, K. P., Nair, A. V., Grimm, C., van Zeeland, F., Heller, S., Bindels, R. J., Hoenderop, J. G.
2010; 48 (5): 275-287
- **PIST regulates the intracellular trafficking and plasma membrane expression of Cadherin 23** *BMC CELL BIOLOGY*
Xu, Z., Oshima, K., Heller, S.
2010; 11
- **Curing hearing loss: Patient expectations, health care practitioners, and basic science** *19th Annual ASHA/NIH/NIDCD Research Symposium on Neural Regeneration and Communication Processes*
Oshima, K., Suchert, S., Blevins, N. H., Heller, S.
ELSEVIER SCIENCE INC.2010: 311-18
- **Mechanosensitive Hair Cell-like Cells from Embryonic and Induced Pluripotent Stem Cells** *CELL*
Oshima, K., Shin, K., Diensthuber, M., Peng, A. W., Ricci, A. J., Heller, S.
2010; 141 (4): 704-716
- **Small Molecule Activators of TRPML3** *CHEMISTRY & BIOLOGY*
Grimm, C., Jors, S., Saldanha, S. A., Obukhov, A. G., Pan, B., Oshima, K., Cuajungco, M. P., Chase, P., Hodder, P., Heller, S.
2010; 17 (2): 135-148
- **Twinfilin 2 Regulates Actin Filament Lengths in Cochlear Stereocilia** *JOURNAL OF NEUROSCIENCE*
Peng, A. W., Belyantseva, I. A., Hsu, P. D., Friedman, T. B., Heller, S.
2009; 29 (48): 15083-15088
- **The tissue-specific expression of TRPML2 (MCOLN-2) gene is influenced by the presence of TRPML1** *PFLUGERS ARCHIV-EUROPEAN JOURNAL OF PHYSIOLOGY*
Samie, M. A., Grimm, C., Evans, J. A., Curcio-Morelli, C., Heller, S., Slaugenhaupt, S. A., Cuajungco, M. P.
2009; 459 (1): 79-91
- **Differentiation of neurons from neural precursors generated in floating spheres from embryonic stem cells** *BMC NEUROSCIENCE*
Li, H., Liu, H., Corrales, C. E., Risner, J. R., Forrester, J., Holt, J. R., Heller, S., Edge, A. S.
2009; 10
- **Quo vadis, hair cell regeneration?** *NATURE NEUROSCIENCE*
Brigande, J. V., Heller, S.
2009; 12 (6): 679-685
- **Stem/Progenitor Cells Derived from the Cochlear Sensory Epithelium Give Rise to Spheres with Distinct Morphologies and Features** *JARO-JOURNAL OF THE ASSOCIATION FOR RESEARCH IN OTOLARYNGOLOGY*
Diensthuber, M., Oshima, K., Heller, S.
2009; 10 (2): 173-190
- **Life and Death of Sensory Hair Cells Expressing Constitutively Active TRPML3** *JOURNAL OF BIOLOGICAL CHEMISTRY*
Grimm, C., Joers, S., Heller, S.
2009; 284 (20): 13823-13831
- **Rethinking How Hearing Happens** *NEURON*
Xu, Z., Ricci, A. J., Heller, S.
2009; 62 (3): 305-307
- **Isolation of sphere-forming stem cells from the mouse inner ear.** *Methods in molecular biology (Clifton, N.J.)*
Oshima, K., Senn, P., Heller, S.
2009; 493: 141-162
- **Diverse Expression Patterns of LIM-Homeodomain Transcription Factors (LIM-HDs) in Mammalian Inner Ear Development** *DEVELOPMENTAL DYNAMICS*
Huang, M., Sage, C., Li, H., Xiang, M., Heller, S., Chen, Z.
2008; 237 (11): 3305-3312

- **MAGI-1, A Candidate Stereociliary Scaffolding Protein, Associates with the Tip-Link Component Cadherin 23** *JOURNAL OF NEUROSCIENCE*
Xu, Z., Peng, A. W., Oshima, K., Heller, S.
2008; 28 (44): 11269-11276
- **Transient receptor potential vanilloid 4 deficiency suppresses unloading-induced bone loss** *JOURNAL OF CELLULAR PHYSIOLOGY*
Mizoguchi, F., Mizuno, A., Hayata, T., Nakashima, K., Heller, S., Ushida, T., Sokabe, M., Miyasaka, N., Suzuki, M., Ezurai, Y., Noda, M.
2008; 216 (1): 47-53
- **Stimulus-specific modulation of the cation channel TRPV4 by PACSIN 3** *JOURNAL OF BIOLOGICAL CHEMISTRY*
D'hoedt, D., Owsianik, G., Prenen, J., Cuajungco, M. P., Grimm, C., Heller, S., Voets, T., Nilius, B.
2008; 283 (10): 6272-6280
- **Stem-cell-based approaches for treating inner ear diseases** *HNO*
Senn, P., Heller, S.
2008; 56 (1): 21-26
- **Emerging Strategies for Restoring the Cochlea** *Auditory Trauma, Protection, and Repair*
Heller, S., Raphael, Y.
2008: 321–338
- **A helix-breaking mutation in TRPML3 leads to constitutive activity underlying deafness in the varitint-waddler mouse** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Grimm, C., Cuajungco, M. P., van Aken, A. F., Schnee, M., Jors, S., Kros, C. J., Ricci, A. J., Heller, S.
2007; 104 (49): 19583-19588
- **Dual role of the TRPV4 channel as a sensor of flow and osmolality in renal epithelial cells** *AMERICAN JOURNAL OF PHYSIOLOGY-RENAL PHYSIOLOGY*
Wu, L., Gao, X., Brown, R. C., Heller, S., O'Neil, R. G.
2007; 293 (5): F1699-F1713
- **LIF promotes neurogenesis and maintains neural precursors in cell populations derived from spiral ganglion stem cells** *BMC DEVELOPMENTAL BIOLOGY*
Oshima, K., Teo, D. T., Senn, P., Starlinger, V., Heller, S.
2007; 7
- **TRP channels as candidates for hearing and balance abnormalities in vertebrates** *BIOCHIMICA ET BIOPHYSICA ACTA-MOLECULAR BASIS OF DISEASE*
Cuajungco, M. P., Grimm, C., Heller, S.
2007; 1772 (8): 1022-1027
- **Robust postmortem survival of murine vestibular and cochlear stem cells** *JARO-JOURNAL OF THE ASSOCIATION FOR RESEARCH IN OTOLARYNGOLOGY*
Senn, P., Oshima, K., Teo, D., Grimm, C., Heller, S.
2007; 8 (2): 194-204
- **The potential role of endogenous stem cells in regeneration of the inner ear** *Inner Ear Biology Workshop Symposium on Terminal Differentiation - A Challenge in Regeneration*
Martinez-Monedero, R., Oshima, K., Heller, S., Edge, A. S.
ELSEVIER SCIENCE BV.2007: 48–52
- **Differential distribution of stem cells in the auditory and vestibular organs of the inner ear** *JARO-JOURNAL OF THE ASSOCIATION FOR RESEARCH IN OTOLARYNGOLOGY*
Oshima, K., Grimm, C. M., Corrales, C. E., Senn, P., Moneder, R. M., Geleoc, G. S., Edge, A., Holt, J. R., Heller, S.
2007; 8 (1): 18-31
- **Bone marrow mesenchymal stem cells are progenitors in vitro for inner ear hair cells** *MOLECULAR AND CELLULAR NEUROSCIENCE*
Jeon, S., Oshima, K., Heller, S., Edge, A. S.
2007; 34 (1): 59-68

- **Engraftment and differentiation of embryonic stem cell-derived neural progenitor cells in the cochlear nerve trunk: Growth of processes into the organ of corti** *JOURNAL OF NEUROBIOLOGY*
Corrales, C. E., Pan, L., Li, H., Liberman, M. C., Heller, S., Edge, A. S.
2006; 66 (13): 1489-1500
- **PACSINs bind to the TRPV4 cation channel - PACSIN 3 modulates the subcellular localization of TRPV4** *JOURNAL OF BIOLOGICAL CHEMISTRY*
Cuajungco, M. P., Grimm, C., Oshima, K., D'hoedt, D., Nilius, B., Mensenkamp, A. R., Bindels, R. J., Plomann, M., Heller, S.
2006; 281 (27): 18753-18762
- **Reinnervation of hair cells by auditory neurons after selective removal of spiral ganglion neurons** *JOURNAL OF NEUROBIOLOGY*
Martinez-Monedero, R., Corrales, C. E., Cuajungco, M. P., Heller, S., Edge, A. S.
2006; 66 (4): 319-331
- **Sonic hedgehog promotes mouse inner ear progenitor cell proliferation and hair cell generation in vitro** *NEUROREPORT*
Zhao, Y. L., Wang, Y. C., Wang, Z. M., Liu, H., SHEN, Y. Z., Li, W., Heller, S., Li, H. W.
2006; 17 (2): 121-124
- **Generation of inner ear cell types from embryonic stem cells.** *Methods in molecular biology (Clifton, N.J.)*
Rivolta, M. N., Li, H., Heller, S.
2006; 330: 71-92
- **The mechanosensitive nature of TRPV channels** *PFLUGERS ARCHIV-EUROPEAN JOURNAL OF PHYSIOLOGY*
O'Neil, R. G., Heller, S.
2005; 451 (1): 193-203
- **BMP4 signaling is involved in the generation of inner ear sensory epithelia** *BMC DEVELOPMENTAL BIOLOGY*
Li, H. W., Corrales, C. E., Wang, Z. M., Zhao, Y. L., Wang, Y. C., Liu, H., Heller, S.
2005; 5
- **Sound from silence** *NATURE MEDICINE*
Oshima, K., Heller, S.
2005; 11 (3): 249-250
- **Identification of chicken transmembrane channel-like (TMC) genes: Expression analysis in the cochlea** *NEUROSCIENCE*
Mutai, H., Mann, S., Heller, S.
2005; 132 (4): 1115-1122
- **Islet-1 expression in the developing chicken inner ear** *JOURNAL OF COMPARATIVE NEUROLOGY*
Li, H. W., Liu, H., Sage, C., Huang, M. Q., Chen, Z. Y., Heller, S.
2004; 477 (1): 1-10
- **Stem cells as therapy for hearing loss** *TRENDS IN MOLECULAR MEDICINE*
Li, H. W., Corrales, C. E., Edge, A., Heller, S.
2004; 10 (7): 309-315
- **Correlation of Pax-2 expression with cell proliferation in the developing chicken inner ear** *JOURNAL OF NEUROBIOLOGY*
Li, H. W., Liu, H., Corrales, C. E., Mutai, H., Heller, S.
2004; 60 (1): 61-70
- **Absence of the RGS9 center dot G beta 5 GTPase-activating complex in photoreceptors of the R9AP knockout mouse** *JOURNAL OF BIOLOGICAL CHEMISTRY*
Keresztes, G., Martemyanov, K. A., Krispel, C. M., Mutai, H., Yoo, P. J., Maison, S. F., Burns, M. E., Arshavsky, V. Y., Heller, S.
2004; 279 (3): 1581-1584
- **Correlation of expression of the actin filament-bundling protein espin with stereociliary bundle formation in the developing inner ear** *JOURNAL OF COMPARATIVE NEUROLOGY*
Li, H. W., Liu, H., Balt, S., Mann, S., Corrales, C. E., Heller, S.
2004; 468 (1): 125-134

- **The DEP domain determines subcellular targeting of the GTPase activating protein RGS9 in vivo** *JOURNAL OF NEUROSCIENCE*
Martemyanov, K. A., Lishko, P. V., Calero, N., Keresztes, G., Sokolov, M., Strissel, K. J., Leskov, I. B., Hopp, J. A., Kolesnikov, A. V., Chen, C. K., Lem, J., Heller, S., Burns, et al
2003; 23 (32): 10175-10181
- **Generation of hair cells by stepwise differentiation of embryonic stem cells** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Li, H. W., Roblin, G., Liu, H., Heller, S.
2003; 100 (23): 13495-13500
- **Expression patterns of the RGS9-1 anchoring protein R9AP in the chicken and mouse suggest multiple roles in the nervous system** *MOLECULAR AND CELLULAR NEUROSCIENCE*
Keresztes, G., Mutai, H., Hibino, H., Hudspeth, A. J., Heller, S.
2003; 24 (3): 687-695
- **Expression of Frizzled genes in the developing chick eye** *GENE EXPRESSION PATTERNS*
Fuhrmann, S., Stark, M. R., Heller, S.
2003; 3 (5): 659-662
- **Pluripotent stem cells from the adult mouse inner ear** *NATURE MEDICINE*
Li, H. W., Liu, H., Heller, S.
2003; 9 (10): 1293-1299
- **TMC and EVER genes belong to a larger novel family, the TMC gene family encoding transmembrane proteins** *BMC GENOMICS*
Keresztes, G., Mutai, H., Heller, S.
2003; 4
- **Vertebrate and invertebrate TRPV-like mechanoreceptors** *CELL CALCIUM*
Mutai, H., Heller, S.
2003; 33 (5-6): 471-478
- **Parvalbumin 3 is an abundant Ca²⁺ buffer in hair cells** *JARO-JOURNAL OF THE ASSOCIATION FOR RESEARCH IN OTOLARYNGOLOGY*
Heller, S., Bell, A. M., Denis, C. S., Choe, Y., Hudspeth, A. J.
2002; 3 (4): 488-498
- **Molecular screens for inner ear genes** *JOURNAL OF NEUROBIOLOGY*
Heller, S.
2002; 53 (2): 265-275
- **Application of physiological genomics to the study of hearing disorders** *JOURNAL OF PHYSIOLOGY-LONDON*
Heller, S.
2002; 543 (1): 3-12
- **A unified nomenclature for the superfamily of TRP cation channels** *MOLECULAR CELL*
Montell, C., Birnbaumer, L., Flockerzi, V., Bindels, R. J., Brudorf, E. A., Caterina, M. J., Clapham, D. E., Harteneck, C., Heller, S., Julius, D., Kojima, I., Mori, Y., Penner, et al
2002; 9 (2): 229-231
- **Vanilloid receptor-related osmotically activated channel (VR-OAC), a candidate vertebrate osmoreceptor** *CELL*
Liedtke, W., Choe, Y., Marti-Renom, M. A., Bell, A. M., Denis, C. S., Sali, A., Hudspeth, A. J., Friedman, J. M., Heller, S.
2000; 103 (3): 525-535
- **A novel conserved cochlear gene, OTOR: Identification, expression analysis, and chromosomal mapping** *GENOMICS*
Robertson, N. G., Heller, S., Lin, J. S., Resendes, B. L., Weremowicz, S., Denis, C. S., Bell, A. M., Hudspeth, A. J., Morton, C. C.
2000; 66 (3): 242-248
- **The specification of sympathetic neurotransmitter phenotype depends on gp130 cytokine receptor signaling** *DEVELOPMENT*
Geissen, M., Heller, S., Pennica, D., Ernsberger, U., Rohrer, H.
1998; 125 (23): 4791-4802

- **A transient role for ciliary neurotrophic factor in chick photoreceptor development** *JOURNAL OF NEUROBIOLOGY*
Fuhrmann, S., Heller, S., Rohrer, H., Hofmann, H. D.
1998; 37 (4): 672-683
- **Mutations in a novel cochlear gene cause DFNA9, a human nonsyndromic deafness with vestibular dysfunction** *NATURE GENETICS*
Robertson, N. G., Lu, L., Heller, S., Merchant, S. N., Eavey, R. D., McKenna, M., Nadol, J. B., Miyamoto, R. T., Linthicum, F. H., Neto, J. F., Hudspeth, A. J., Seidman, C. E., Morton, et al
1998; 20 (3): 299-303
- **Differential regulation of ciliary neurotrophic factor receptor-alpha expression in all major neuronal cell classes during development of the chick retina** *JOURNAL OF COMPARATIVE NEUROLOGY*
Fuhrmann, S., Kirsch, M., Heller, S., Rohrer, H., Hofmann, H. D.
1998; 400 (2): 244-254
- **Molecular markers for cell types of the inner ear and candidate genes for hearing disorders** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Heller, S., Sheane, C. A., Javed, Z., Hudspeth, A. J.
1998; 95 (19): 11400-11405
- **Two deaf mice, two deaf mice ...** *NATURE MEDICINE*
Heller, S., Hudspeth, A. J.
1998; 4 (5): 560-561
- **Onset of CNTFR alpha expression and signal transduction during neurogenesis in chick sensory dorsal root ganglia** *DEVELOPMENTAL BIOLOGY*
VONHOLST, A., Heller, S., Junghans, D., Geissen, M., Ernsberger, U., Rohrer, H.
1997; 191 (1): 1-13
- **Distribution of Ca²⁺-activated K⁺ channel isoforms along the tonotopic gradient of the chicken's cochlea** *NEURON*
Rosenblatt, K. P., Sun, Z. P., Heller, S., Hudspeth, A. J.
1997; 19 (5): 1061-1075
- **Extrinsic signals in the developing nervous system: The role of neurokinins during neurogenesis** *PERSPECTIVES ON DEVELOPMENTAL NEUROBIOLOGY*
Heller, S., Ernsberger, U., Rohrer, H.
1996; 4 (1): 19-34
- **ANALYSIS OF FUNCTION AND EXPRESSION OF THE CHICK GPA RECEPTOR (GPAR-ALPHA) SUGGESTS MULTIPLE ROLES IN NEURONAL DEVELOPMENT** *DEVELOPMENT*
Heller, S., Finn, T. P., Huber, J., Nishi, R., Geissen, M., Puschel, A. W., Rohrer, H.
1995; 121 (8): 2681-2693
- **GPA AND CNTF PRODUCE SIMILAR EFFECTS IN SYMPATHETIC NEURONS BUT DIFFER IN RECEPTOR-BINDING** *NEUROREPORT*
Heller, S., Huber, J., Finn, T. P., Nishi, R., Rohrer, H.
1993; 5 (3): 357-360
- **Bioluminescence-based detection of genetically engineered microorganisms in nonsterile river water.** *Microbial releases : viruses, bacteria, fungi*
Heller, S., Bühler, S., Kilz, S., MIESCHENDAHL, M.
1992; 1 (1): 35-39