

Stanford



Stefan Heller

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

CONTACT INFORMATION

• Administrative Contact

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Bio

ACADEMIC APPOINTMENTS

- Professor, Otolaryngology - Head & Neck Surgery Divisions
- 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)
- Vice Chair for Research, Otolaryngology - Stanford, (2014-2019)

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

- Long Range Planning Committee, Association for Research in Otolaryngology Midwinter Meeting (2021 - present)
- NIDCD Council, ad hoc member, National Institute for Communication Disorders (2020 - present)
- Hearing Restoration Project, collaborative research group member, Hearing Health Foundation (2011 - present)
- Scientific Advisor, Pipeline Therapeutics (2012 - present)
- Board of Directors, Avelas Biosciences (2020 - present)
- Board of Directors, Synco, Inc. (2020 - present)
- Board of Directors, Nerio Therapeutics (2020 - present)
- Board of Directors, Janux Therapeutics (2019 - present)
- Board of Directors, Adanate/PDI Therapeutics (2019 - present)
- Board of Directors, Fortis Therapeutics (2019 - present)
- Award of Merit Committee, Association for Research in Otolaryngology Midwinter Meeting (2014 - 2018)
- Program Committee Member, Association for Research in Otolaryngology Midwinter Meeting (2010 - 2013)
- Auditory System Study Section (AUD), member, NIDCD/NIH (2014 - 2019)
- 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)
- Communication Disorders Review Committee (CDRC study section), member, NIDCD/NIH (2008 - 2013)
- Associate Editor, Hearing Research (2010 - 2017)
- Research Advisory Board, American Otological Society (2010 - 2015)
- Associate Editor, JARO (2009 - 2012)
- Scientific Advisor, Otonomy (2009 - 2012)
- Council of Scientific Trustees, Deafness Research Foundation / Hearing Health Foundation (2008 - 2014)
- 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.edu>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

We are interested 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 up into multiple cell types making up the sensory epithelia, innervating ganglia, and accessory structures.

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

Teaching

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Nesrine Benkafadar, Amanda Janesick, Marie Kubota, Maggie Matern, Anna Shipman

Doctoral Dissertation Advisor (AC)

Giovanni Diaz

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Biology (School of Humanities and Sciences) (Phd Program)
- Biomedical Informatics (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

- **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
- **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
- **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., B#scke, R. n., Tang, P. C., Hartman, B. H., Heller, S. n., Koehler, K. R.
2018; 22 (1): 242–54
- **Single Cell Transcriptomics Reveal Abnormalities in Neurosensory Patterning of the Chd7 Mutant Mouse Ear.** *Frontiers in genetics*
Durruthy-Durruthy, R. n., Sperry, E. D., Bowen, M. E., Attardi, L. D., Heller, S. n., Martin, D. M.
2018; 9: 473
- **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# Alters the Ca²⁺ Affinity of the Multi-C2-Domain Protein Otoferlin.** *Frontiers in synaptic neuroscience*
Meese, S. n., Cepeda, A. P., Gahlen, F. n., Adams, C. M., Ficner, R. n., Ricci, A. J., Heller, S. n., Reisinger, E. n., Herget, M. n.
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 Trpml3 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*
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