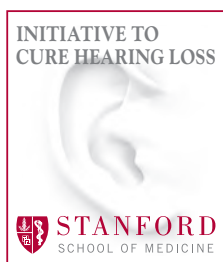




STANFORD INITIATIVE TO CURE HEARING LOSS

Imagine the world in silence. No Schubert concertos. No birdsongs. No whispered secrets among friends. No warning beeps from oncoming traffic. No gleeful laughter from children at play. Life without sound is like an outline of a drawing—the picture is there but it lacks the depth, richness, and dimension of a color portrait.



We are all part of the equation.

hearinglosscure.stanford.edu

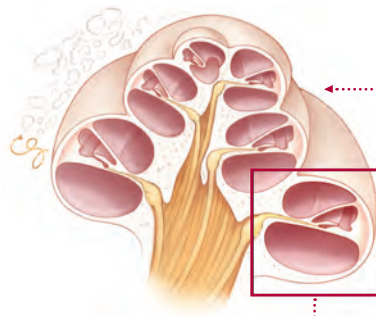
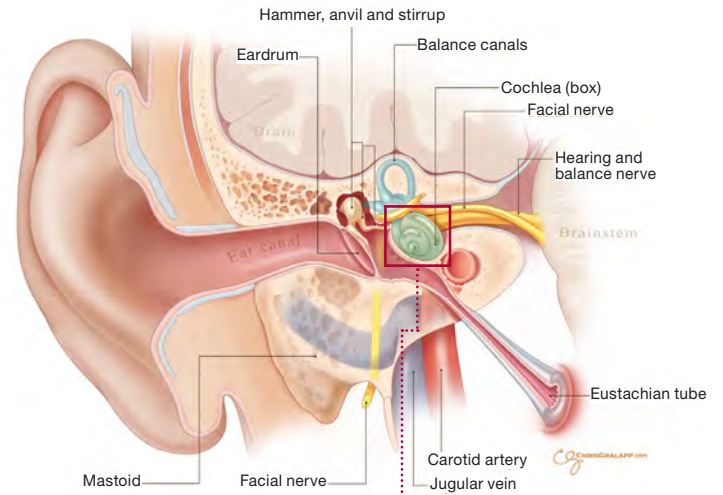
“Noise exposure and modern drugs such as chemotherapy or certain antibiotics are toxic to our hearing. These environmental exposures, in combination with the effects of aging and genetic disposition, cause a worldwide pandemic of hearing loss, which is what we are currently experiencing.”

~ Stefan Heller, PhD, Edward C. and Amy H. Sewall Professor III in the School of Medicine

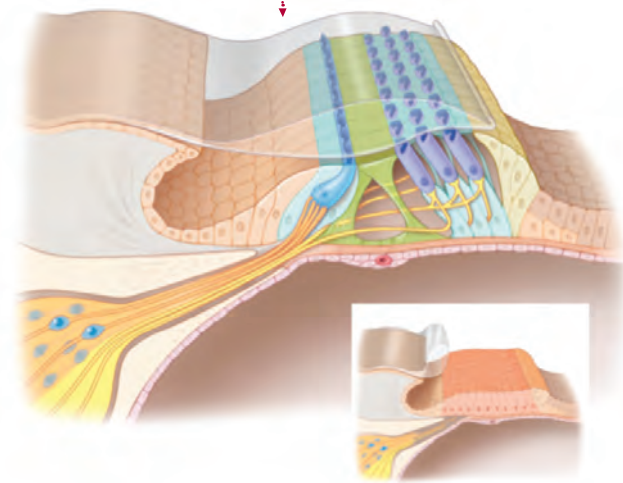
- Two out of every 1,000 babies in the United States are born deaf or hard-of-hearing. Close to a million children in America have hearing loss.
- Health experts estimate that one in three adults over the age of 65 has developed a handicapping hearing loss. The numbers continue to increase as the population grows older. Almost 50 percent of American seniors experience some form of hearing impairment.
- Noise pollution from military service, industrial activity, and MP3 players amounts to 19 percent of hearing loss.

Approximately 36 million American adults— 17 percent of the entire population—report some degree of hearing loss.

- The ability to communicate—to hear, process sound, and respond—makes life more engaging and stimulating.
- Untreated hearing loss can discourage social interaction which often leads to depression, anxiety, and disconnect from the rest of the world.
- People with hearing loss express greater dissatisfaction with their friendships, family life, health, and financial situation, and many become withdrawn and isolated.
- Depression is common in older adults who have trouble hearing.



The human cochlea (right) has 2-1/4 turns. The Organ of Corti (box) is the location of the sound sensing hair cells.



Normal Organ of Corti with one row of inner and three rows of outer hair cells.

Inset: Organ of Corti in deafness lacks hair cells, but the hearing nerve remains.

Now, imagine the world as it could be...

“Stanford University has the unique ability to cure a major disability in our lifetime. We sit on the cusp of a time, in which we believe that we can categorically cure a large percentage of inner ear hearing loss, whether it is in children or adults.”

*~ Robert K. Jackler, MD, Edward C. and Amy H. Sewall
Professor of Otolaryngology – Head & Neck Surgery*



Discovery and Delivery Through Collaboration

Stanford University Medical Center has a long tradition of leadership in discovery, innovation, and creative research. Its world-class hospitals dedicated to adult and pediatric care and its close proximity to allied programs throughout the university—including biology, physics, engineering, and computer science—allows investigators to interact and collaborate, offering the potential for “out-of-the-box” solutions that will lead to new therapies, technologies, and innovations.

Since there is no way to be certain which of various strategies will ultimately prove successful, the Stanford Initiative to Cure Hearing Loss (SICHL) pursues several lines of investigation until one or a few approaches emerge as the the most effective solution. It is essential to pursue many different avenues of research, because discoveries in one discipline may relate to a seemingly unrelated investigation.

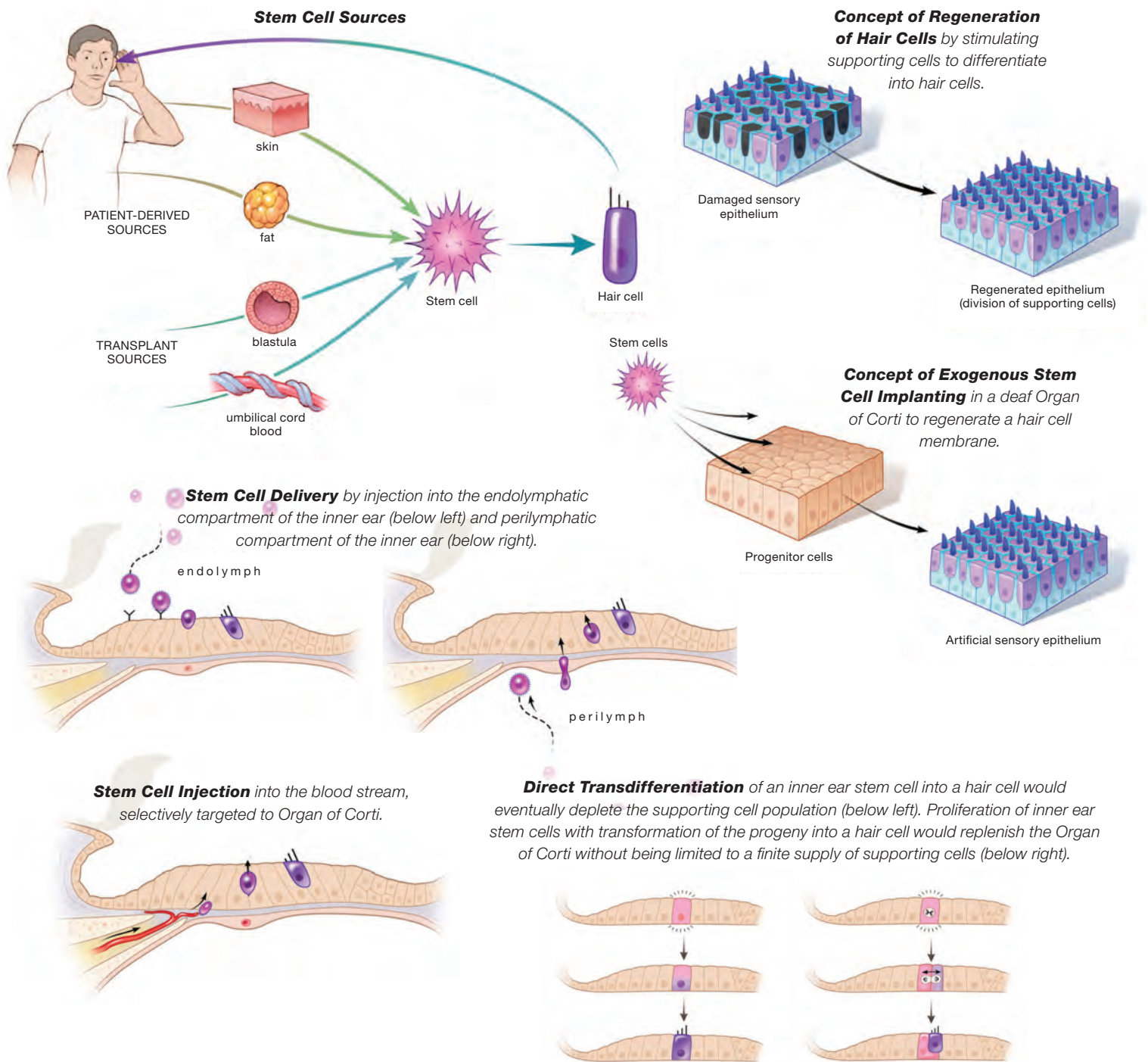
SICHL is building a new paradigm of progress through partnerships and collaboration, coupled with breakthrough science and brilliant problem-solving. It will reinforce the back-and-forth dynamic of translational medicine with one concentrated focus: to find a way to cure—and prevent—hearing loss.



Therapies

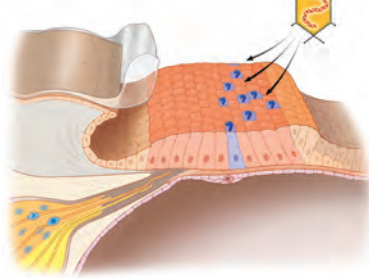
SICHL is capitalizing on Stanford's network of collaboration to consolidate and advance promising hearing loss research investigations in four key areas: Stem Cell Therapy, Gene Therapy, Molecular Therapy, Targeted Neural Stimulation.

STEM CELL THERAPY – SICHL researchers are developing biological methods to repair the damaged cochlea, by regenerating inner ear hair cells from patient's own skin or blood cells that have been genetically reprogrammed to revert back to stem cells. Therapies such as these have the potential to restore natural hearing without need for any type of prosthesis.

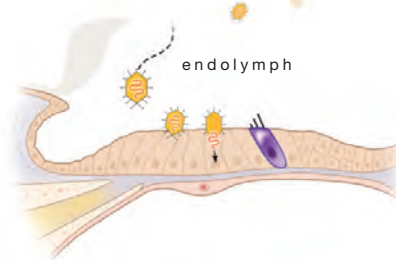


GENE THERAPY – An important strategy for restoring hair cells in genetic hearing loss is re-writing of the flawed genetic code via gene therapy. Replacement genes may be inserted using new-generation harmless virus vectors (as illustrated below).

Concept of Gene Therapy to stimulate inner ear cells to differentiate into hair cells.

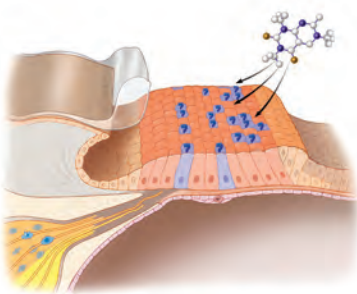


Using a Virus Vector to insert transformative genetic material into inner ear cells.

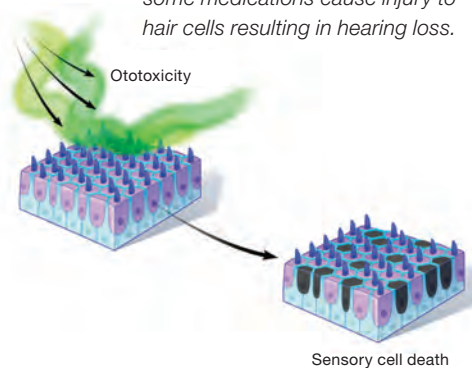


MOLECULAR THERAPY – Novel drugs are being developed that could be used to either prevent the cochlea from losing hair cells or that could lead to initiation of a self-repair program within the cochlea. Our researchers are also investigating specific targets in the inner ear that could be directly applicable for drug intervention.

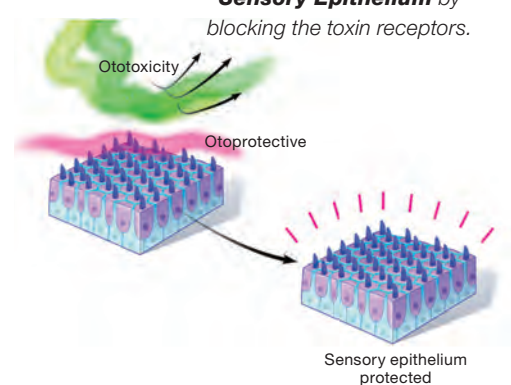
Concept of Molecular Therapy using molecular modulators to transform inner ear cells into hair cells.



Ototoxicity is a process whereby some medications cause injury to hair cells resulting in hearing loss.

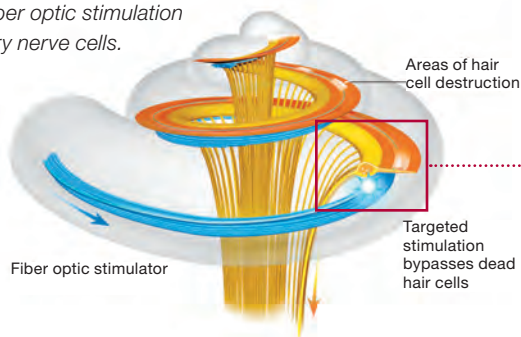


Concept of Protecting the Sensory Epithelium by blocking the toxin receptors.

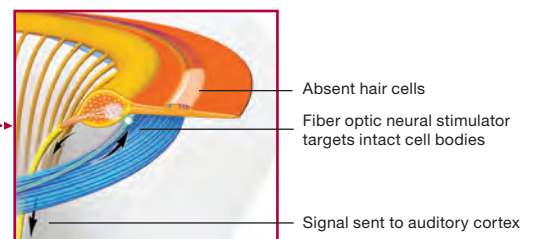


TARGETED NEURAL STIMULATION – SICHL researchers are also studying ways to bypass the hair cells and directly stimulate auditory nerve cells by using focused laser energy to restore hearing. A team of Stanford otolaryngologists and bioengineers is developing non-invasive optical imaging and stimulation techniques for this purpose.

Concept of Targeted Neural Stimulation using fiber optic stimulation of intact auditory nerve cells.



Detail close up of targeted neural stimulation. (box area, left)





Stanford biomedical researchers continue to make rapid progress in understanding the genetic, molecular, and cellular processes behind deafness and are applying new insights in stem cell proliferation, regenerative medicine, bioengineering, nanotechnology, and other specialties.

Our integrated approach will bring breakthrough strategies for the repair and restoration of hearing—addressing the personal, social and economic toll paid by those who have been forced to live in a world of silence.

Our goal is to cure major forms of inner ear hearing loss in the foreseeable future.

Opportunities to invest

SICHL's success will be determined in large part by its ability to attract and retain the best and the brightest researchers and to ensure a collaborative environment that includes adequate space and other resources essential to this effort. In addition, SICHL will continue to support the ancillary services that create an environment of comprehensive care for children and adults suffering from hearing loss.

Like-minded visionary donors can help realize the dreams of SICHL and the hundreds of millions worldwide who experience some form of hearing impairment. Charitable gifts to the Stanford Initiative to Cure Hearing Loss (SICHL) will lift SICHL towards its goal of preventing and curing hearing loss. We live in an unprecedented time of rapidly expanding medical knowledge in stem cell biology, genomics, and molecular therapy. Astounding advancements in basic science have made this possible and will continue to drive new achievements in care for adults and children with hearing loss.

How to Contribute – Gifts to Stanford's **SICHL** can be made in several ways:

ONLINE – Make a gift by using **Stanford's secure website for giving:**

Under "DIRECT YOUR GIFT" scroll down to "Other". It will direct you to a box on the next page where you can type in "Please designate my contribution to Stanford Hearing Loss Initiative."

BY MAIL OR FAX – Print and complete the online donation form and return it with your gift to:

Otolaryngology - Head & Neck Surgery
c/o Development Services
PO Box 20466
Stanford, CA 94309
650-725-2450 (fax)

CALL US – Contact **Medical Center Development** by calling **650-725-2504** to discuss a gift.

For further information on the Stanford Initiative to Cure Hearing Loss, please visit our website: medicalgiving.stanford.edu

Faculty

Stanford has assembled an interdisciplinary team of scientists, engineers, and physicians drawing upon expertise from many different domains for the shared purpose of curing hearing loss.

By sustaining a research culture that encourages translational medicine—a close inter-relationship between basic science investigators and the surgeons and physicians working directly with patients—Stanford continues to lay the groundwork for previously unimagined ways to treat and prevent disease.



Robert Jackler, MD

The Edward C. and Amy H. Sewall Professor and Chair of Otolaryngology (Head and Neck Surgery) and Professor of Neurosurgery and of Surgery



Mirna Mustapha, PhD

Assistant Professor of Otolaryngology (Head and Neck Surgery)



Stefan Heller, PhD

The Edward C. and Amy H. Sewall Professor III in the School of Medicine and Professor of Otolaryngology (Head and Neck Surgery) and of Molecular and Cellular Physiology



John S. Oghalai, MD

Associate Professor of Otolaryngology (Head and Neck Surgery) and of Pediatrics



Nikolas H. Blevins, MD

The Malcolmson Professor of Otolaryngology (Head and Neck Surgery) and Chief of the Division of Otology and Neurotology



Gerald R. Popelka, PhD

Professor (Consulting) of Otolaryngology (Head and Neck Surgery) and Chief of the Division of Audiology



Kay Chang, MD

Associate Professor of Otolaryngology (Head and Neck Surgery) and of Pediatrics



Sunil Puria, PhD

Associate Professor (Consulting) of Mechanical Engineering and Otolaryngology (Head and Neck Surgery)



Alan G. Cheng, MD

Assistant Professor of Otolaryngology (Head and Neck Surgery) and Pediatrics



Anthony Ricci, PhD

The Edward C. and Amy H. Sewall Professor II in the School of Medicine and Professor of Otolaryngology (Head and Neck Surgery) and of Molecular and Cellular Physiology

For further information on the Stanford Initiative to Cure Hearing Loss, please visit our website:

hearinglosscure.stanford.edu

or contact:

Kate Morris

Initiative Coordinator
kmmorris@ohns.stanford.edu

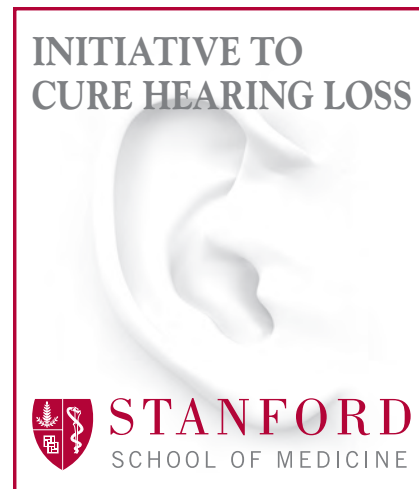
Robert K. Jackler, MD

Sewall Professor and Chair
Department of Otolaryngology – Head and Neck Surgery
650-725-6500
jackler@stanford.edu

Medical Center Development

650-725-2504
medicalgiving.stanford.edu/

or for the latest updates, join us via:



We are all part of the equation.

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