



## December 2020 Newsletter

Renew your membership to our local chapter for only \$15 a year! 3 ways to renew: send your renewal with your name, address, phone number, and e-mail to: East Bay Chapter, HLAA, P.O. Box 12484, Oakland, CA 94604-

2484. See back page to sign up and support National HLAA.

December 12, 2020, Meeting by Zoom! Zoom in and see your friends from HLAA-EBC. Schedule: 9:30 a.m. Meet and Greet; 10 a.m. Introduction to the Steering Committee; 10:20 a.m. Open Discussion



The Hearing Loss Association of America- East Bay invites you to our annual December get together. Register for this free event here: [www.hearinglosseb.org](http://www.hearinglosseb.org)

After you register, you'll be sent the link to join the meeting.

**Hear From the Experts: And that would be you!**

We will enjoy each other's company while sharing our holiday experiences. We hope to hear from our members and participants as we discuss:

- How do you cope in a noisy environment?
- What new devices have you discovered that help?
- Do you have a favorite holiday story to share?

Please join us for this end-of-year open discussion where you can share your trials and triumphs with those who will certainly understand!

HLAA-EB will post to the California State Association webpage and our website.

Check out our website: <http://www.hearinglosseb.org/> Contact us: [info@hearinglosseb.org](mailto:info@hearinglosseb.org)

## MEETING NOTES: *Emerging Medical Therapies for Hearing Loss – Research Update*

At our Nov. 14<sup>th</sup>, 2020 meeting, our guest speaker was Dr. Stefan Heller, Ph.D., the Edward C. & Amy H. Sewall Professor in the School of Medicine at Stanford University. In 1995, he obtained his Ph.D. in Genetics from the Johannes Gutenberg University in Germany, after which time he moved to the United States, where he held a post-doctoral position at the Rockefeller University in New York. He was also a professor at Harvard Medical School for several years. When Dr. Heller was offered a position at Stanford School of Medicine in 2005, he was delighted to join their faculty where he has served as Director of Research and then Vice Chair of Research in the Research Division of the Dept. of Otolaryngology – Head & Neck Surgery. In addition, he is the primary faculty member at the Stanford Institute for Stem Cell Biology & Regenerative Medicine, where he has continued to pursue his research interests in biology and genetics as they apply to investigating inner ear problems and treatments for hearing loss.



In particular, Dr. Heller's research is focused on regenerative medicine in the inner ear. He employs molecular and single-cell transcriptomic methods, and he has continued to work on developing stem cell-based drug screening assays and medical therapies for hearing loss. Since 2015, his lab has been investigating how chickens have recovered from hearing loss. In addition, Dr. Heller disclosed that he has formerly served as a scientific advisor for Otonomy, and he is currently a scientific advisor for Pipeline Therapeutics. He has also been a board member for several other biotech companies, including Janux Therapeutics, Avelas Biosciences, Adanate, Fortis, Synco., Inc., and Nerio Therapeutics.

### ***Stem Cells & Their Importance in Developing Emerging Therapies:***

Relying on a series of colorful PowerPoint slides from his lab work, Dr. Heller demonstrated where we find stem cells in our body and what they do for us. He explained that there are somatic stem cells in all of mammals' tissues, and they are typically self-generating. As an example, skin is a great organ to research because it has a lot of regenerating stem cells which can be studied in developing treatments for serious diseases or medical conditions. Therefore, researchers are trying to utilize what they have learned about the cell regeneration system in other bodily organs such as skin, so it might be applied in their research to discover therapies that would help in generating new hair cells to replace dying hair cells in the inner ear of people experiencing some level of hearing loss or even deafness.

In fact, for decades, researchers have been studying and seeking a remedy to this major problem of how to get new hair cells in the inner ear of humans to be generated once the hair cells have died. When an individual's hair cells in the inner ear are damaged or die (in spite of the cause for the damage), the individual will normally experience permanent hearing loss or deafness. Although there are already hearing aids, cochlear implants, and a range of assistive listening devices available for persons coping with hearing loss, Dr. Heller and other researchers are pursuing a different route by seeking a drug therapy that might assist in the hair cell regeneration process in the inner ear and thereby restore one's lost hearing ability.

During their research, researchers often use mice to investigate and test out whether they can generate new hair cells in the adult mammalian inner ear organs so they can then apply their findings to humans. Referring to his detailed slides, Dr. Heller explained how early researchers have tried to generate new hair cells in the primary organs in the inner ear, with factual research results described by Dr. Heller as follows:

- Very limited mitotic regeneration.
- Process of new hair cell generation is slow and incomplete.
- Functional relevance is unclear, but probably only low level regeneration in mice and humans.

Researchers who have continued to search for an assay to generate new hair cells in the inner ear are testing out a number of processes, including those applied in a neural/brain stem cell sphere assay (qualitative or quantitative analysis of a drug application), mixing stem cells from two mice before applying them to the inner ear organs, or making new hair cells in a cell culture dish.

More than a decade ago, researchers discovered as a result of the sphere test that cells with stem cell features exist in the new-born mouse cochlea and can grow new cells, but newborns lost this feature after the

second post-natal week. Acknowledging that it can often take years to translate theory into successful application, Dr. Heller said it seems that researchers may have recently made some progress (at least theoretically) in determining how to apply the cell generation process found in newborns to adults: Identify the specific genes present in the newborn's stem cells with this generation feature; use these genes to purify the cells; and grow new hair cells into massive colonies in the cochlea.

### ***Why Is Stem Cell-Based Research on Hearing Loss Therapies So Slow?***

Confirming that stem cell-based research on medical treatments for hearing loss seems to be progressing quite slowly, Dr. Heller identified several "roadblocks" to research on inner ear hearing loss therapies as compared to research on treatments for other medical conditions such as skin diseases:

#### Inner Ear

- Biopsy requires removal of the whole inner ear
- Only a few thousand cells accessible
- No cell lines; no ear cancer
- Perhaps 5 or so laboratories worldwide
- Small, but just emerging biotech field
- Very small commercial interest

#### Skin

- \* Punch biopsy is easy even in humans
- \* Billions of cells accessible
- \* Many cell lines; skin cancer is frequent
- \* Countless laboratories worldwide
- \* Massive biotech field & pharma interest
- \* Massive commercial interest

### ***Emerging Research with Chickens on Treatments for Hearing Loss:***

Recently, Dr. Heller has been looking into research with chickens and hair cell regeneration, a topic about which he has been interested for several years. Referring to his slides, he described how his lab has been running controlled experiments where they have injected an antibiotic (aminoglycoside), namely sisomicin, into the cochlea of deaf chickens to see if that procedure would regenerate the hair cells in the avian cochlea. Dr. Heller discussed these experiments, stating that so far the results seem to show some good potential for hair cell regeneration in the cochlea of deaf chickens over a relatively short time. Dr. Heller noted that this research might eventually lead to a drug that may work in hair cell regeneration in the mammalian cochlea, which does not naturally regenerate dying hair cells. However, he did caution us to keep in mind that there are some differences between the mammalian cochlea and avian cochlea that could affect the success of this hearing loss treatment in humans.

### ***Biotech Industry – Biology & Pharma:***

There are many biotech companies out there working diligently to discover therapeutics or even cures for a range of serious diseases or medical conditions. Several of these bio-companies are focusing on a pharma/drug-related solution (rather than an engineering solution) to hearing loss and deafness problems. Identifying a few of these biotech companies, Dr. Heller explained how the companies are pursuing several different routes in their research. For example:

- Gene therapy
- Drug delivery
- Sudden hearing loss -- steroids
- Otoprotection – noise
- Otoprotection – antibiotics/chemotherapy
- \* Anti-aging
- \* Restoration of lost synapses
- \* Hair cell regeneration
- \* Diagnostic tools
- \* Any drugs that make the inner ear work better

### ***Expectations for the Future of Medical Therapies for Hearing Loss:***

- ❖ Some spectacular results with gene therapy may be good PR, but not necessarily a great benefit for the general population.
- ❖ Medical treatments might delay the need for hearing aids (HA's) in some patients (e.g., synaptic restoration).
- ❖ Better hearing in noisy environments (e.g., parties, conferences, etc.) may become available.

- ❖ No immediate “magical cure” is likely, but any therapies to help individuals hear better so will probably improve their lives.
- ❖ Looking at the evolution of treatments for eye disorders might provide realistic insights into how inner ear therapies will become available (we are about 20 years behind vision treatments for retinal disorders).
- ❖ Finally, Dr. Stefan Heller reminded us that the timeline for solving hearing loss problems is unclear because the reasons for hearing loss are so multi-factorial. Nevertheless, “. . . with the dawn of personalized medicine, and the newer ways for diagnosis ranging from audiological ways of detecting difficulties in a noisy environment to genetic testing, will allow emerging therapies to be tailored precisely toward different aspects of hearing loss.”

**For More Information & Questions:** Email: [hellers@stanford.org](mailto:hellers@stanford.org) Phone: (650) 776-2839

~ Kathy Fairbanks

**HLAA – EBC is looking for volunteers! Specifically, we need a Publicity Chair but other volunteers are needed as well. Please contact Dale Davis, our chapter leader, to discuss the possibilities! Contact: [dadedavis94605@gmail.com](mailto:dadedavis94605@gmail.com). Leave your number so she can call you.**

### JOKE CORNER

**Santa**

What does Santa Claus say when he loses his hearing?

Huh? Huh? Huh?

### Telephone Line

A boy asked his father why the birds on a telephone line were kind of jumpy while other birds on a different line were sitting quietly. After a moment of thinking, his father replied that that particular line was a TTY line, causing the birds to jump.

**HEARING AID BATTERIES!** Only 17 cents apiece at Costco.

HLAA members can join the hearOclub to have batteries delivered to your home! Use the coupon code **HLAAmember** online at [hearclub.com](http://hearclub.com) or by calling 833.LISTEN-2 (833.547.8362).

**DONATE USED HEARING AIDS and/or HEARING EQUIPMENT!** Bag them up and when we meet in person again, see Dale Davis at a meeting or [ddavis94605@gmail.com](mailto:ddavis94605@gmail.com).

#### **East Bay Leadership Team**

The chapter is run by a Steering Committee, Leader Dale Davis, [ddavis94605@gmail.com](mailto:ddavis94605@gmail.com) who also oversees the Membership Database.

Outreach, Walk4Hearing Chair, National Chapter Coordinator/Liaison: Susan Jeffries Fitzgerald, [susanlj29@gmail.com](mailto:susanlj29@gmail.com)

Treasurer: Len Bridges, [lenbridges3993-hlaa@outlook.com](mailto:lenbridges3993-hlaa@outlook.com)

Programs: George and Susan Fitzgerald, [revcgf@gmail.com](mailto:revcgf@gmail.com)

Technology and AfterWords Small Group: George Chin, Sr., 352-1569, [georgechinsr@gmail.com](mailto:georgechinsr@gmail.com)

Membership: Connie Gee, [cbgee2014@yahoo.com](mailto:cbgee2014@yahoo.com); Derek Daniels, [d.c.daniels262@gmail.com](mailto:d.c.daniels262@gmail.com); and Marlene Muir, [muircmc@comcast.net](mailto:muircmc@comcast.net)

Newsletter Editors: Nancy Asmundson, [nasmundson@comcast.net](mailto:nasmundson@comcast.net) ; Kathy Fairbanks, [mkathyfairbanks@att.net](mailto:mkathyfairbanks@att.net)

Publicity: George Chin, Sr., [georgechinsr@gmail.com](mailto:georgechinsr@gmail.com)

Refreshments: Marie Rhein, Coordinator

Technical/Audio Loop: Peter G. Townsend, [peterg.townsend@gmail.com](mailto:peterg.townsend@gmail.com), Steven Ulrich

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Go to this URL to join today: <https://www.hearingloss.org/make-an-impact/become-a-memberrenew/>