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Changes in Expression Profiles of Energy Metabolism and Cellular Calcium Balance Genes in the Mammalian Inner Ear During Development

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Changes in Expression Profiles of Energy Metabolism and Cellular Calcium Balance Genes in the Mammalian Inner Ear During Development

Audrey Freedman

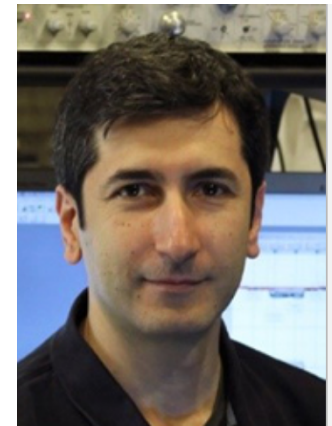
Mentor: Dr. Ruben Stepanyan Department of Otolaryngology

Outline

- Introduction
- Age-related Hearing loss (ARHL) background and mechanism
- Aim of Study and Methods
- Results
- Findings
- Future work and Conclusion

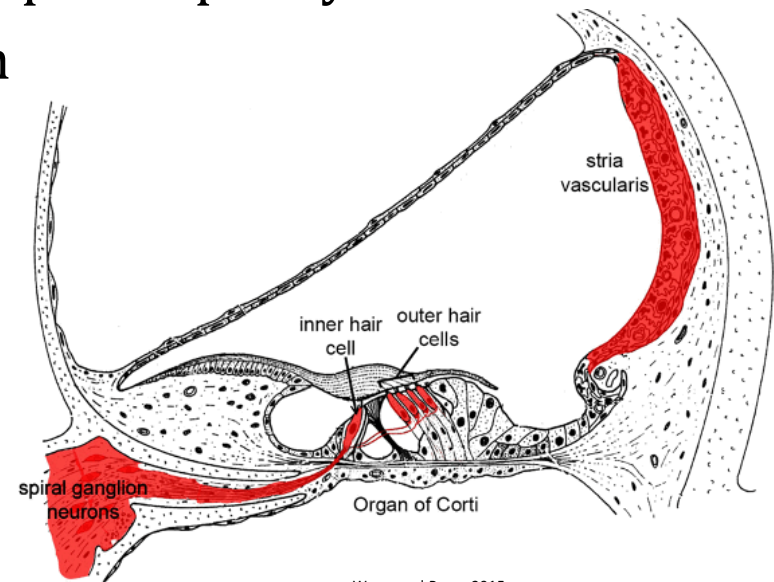
Introduction

- Major: Biology
- Future plans
- Interest in research



Age-Related Hearing Loss (ARHL)

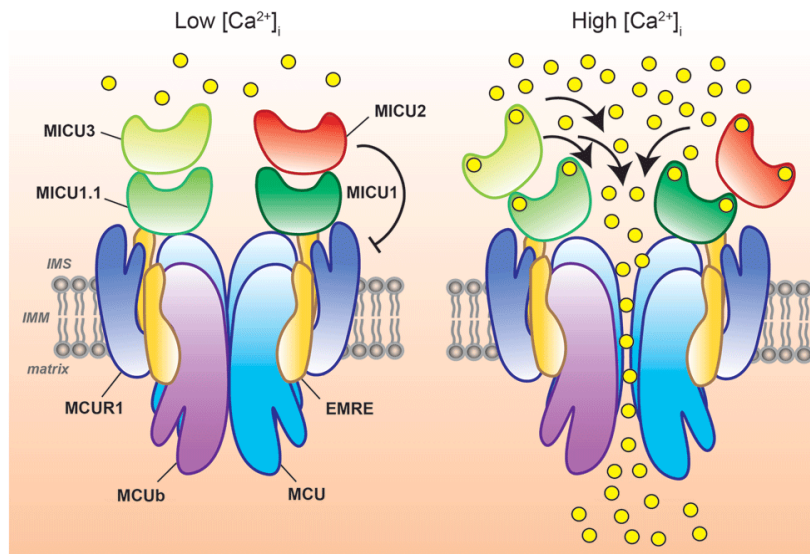
- 50-80% individuals over age of 80
- No cure (yet)
- Sensorineural tissues have limited repair capacity
- High in mitochondrial concentration



Wong and Ryan, 2015

Mechanism Behind Hearing

- Transduction channels
- Calcium is an intracellular regulatory signaling molecule



<https://f1000research.com/articles/7-1858>

Aim of Study & Methods

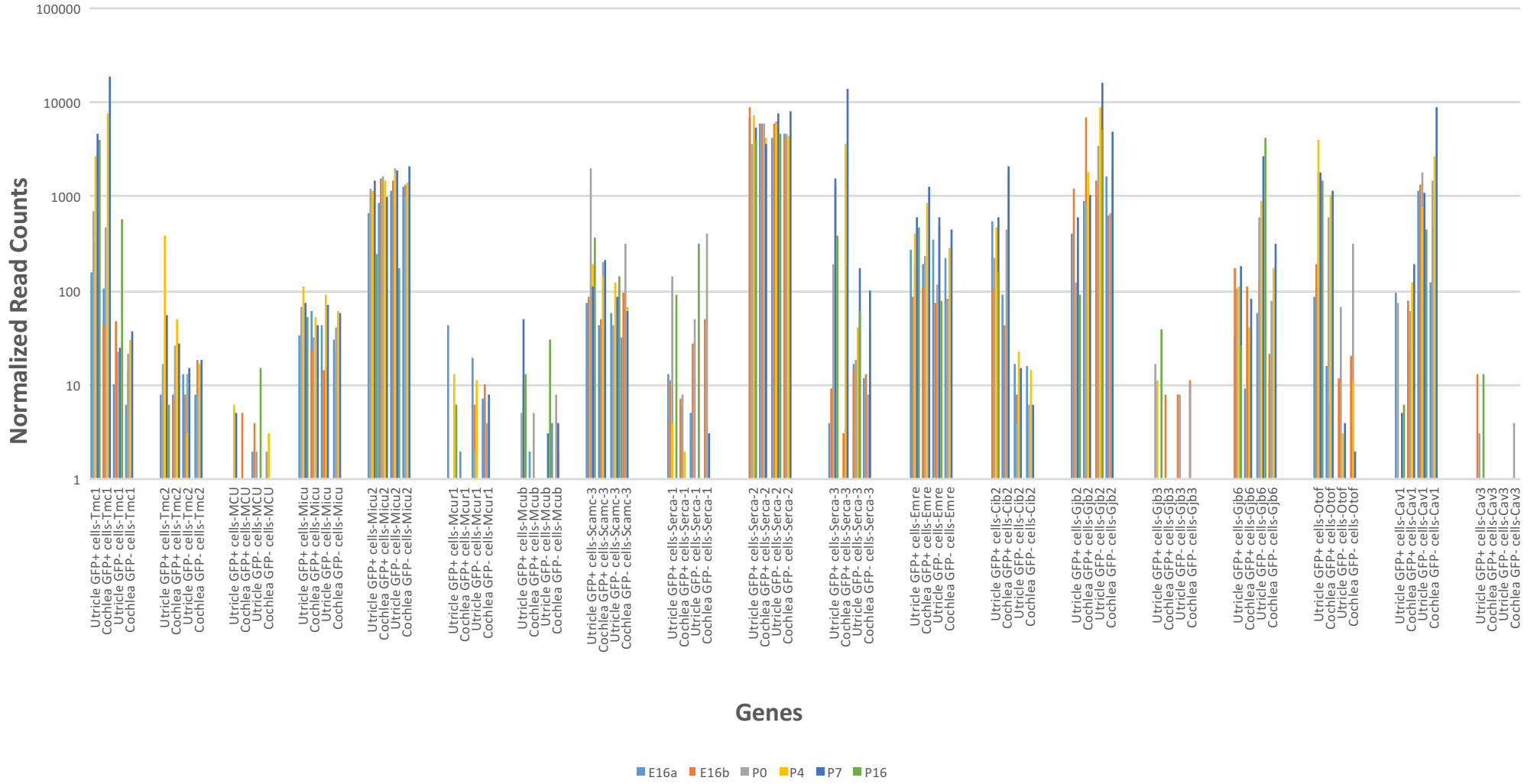
- Examine the changes in expression of energy metabolism genes in the inner ear cells in mouse model
- Databases – comparing genes high in mitochondrial concentration

SHIELD

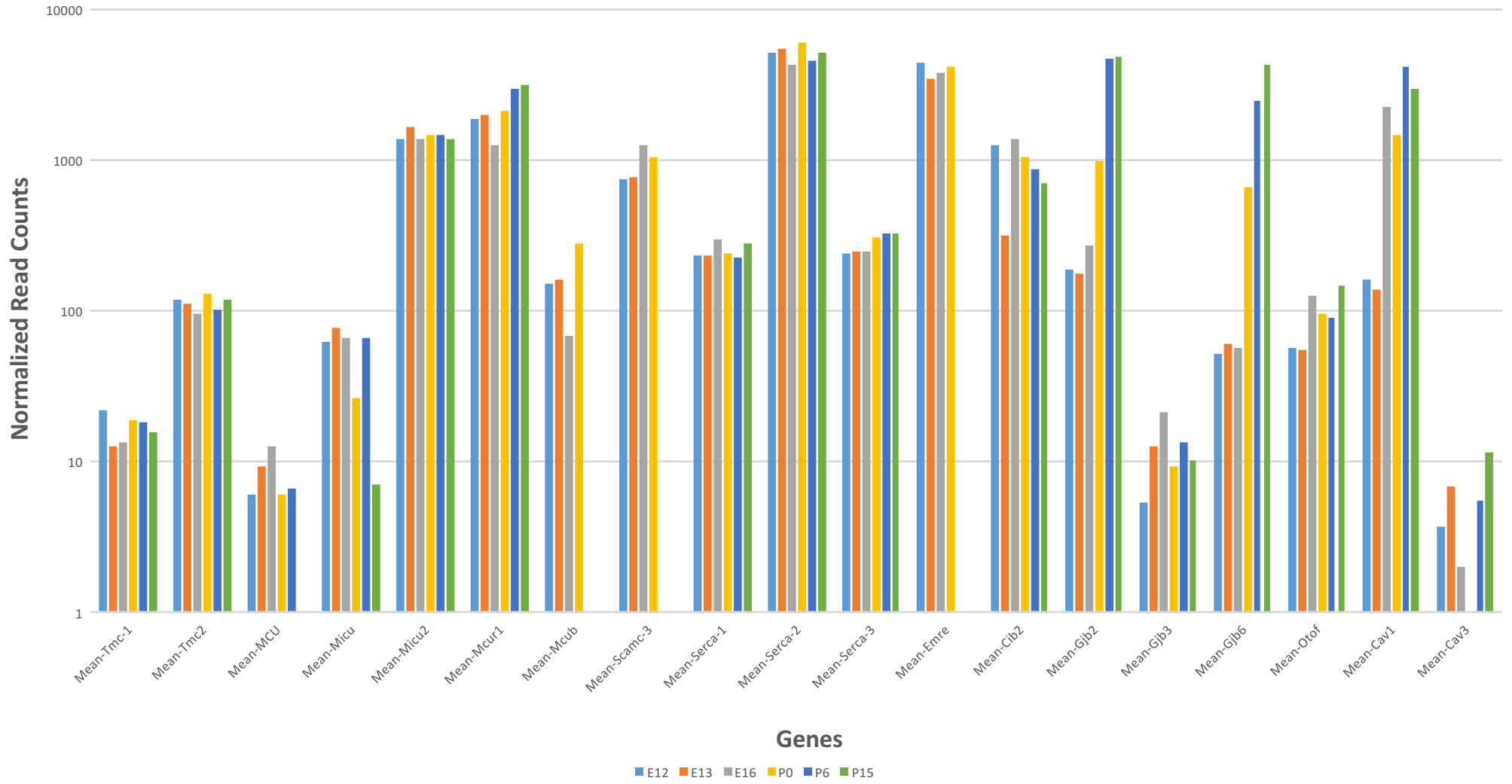
SHARED HARVARD INNER-EAR LABORATORY DATABASE

<https://shield.hms.harvard.edu>

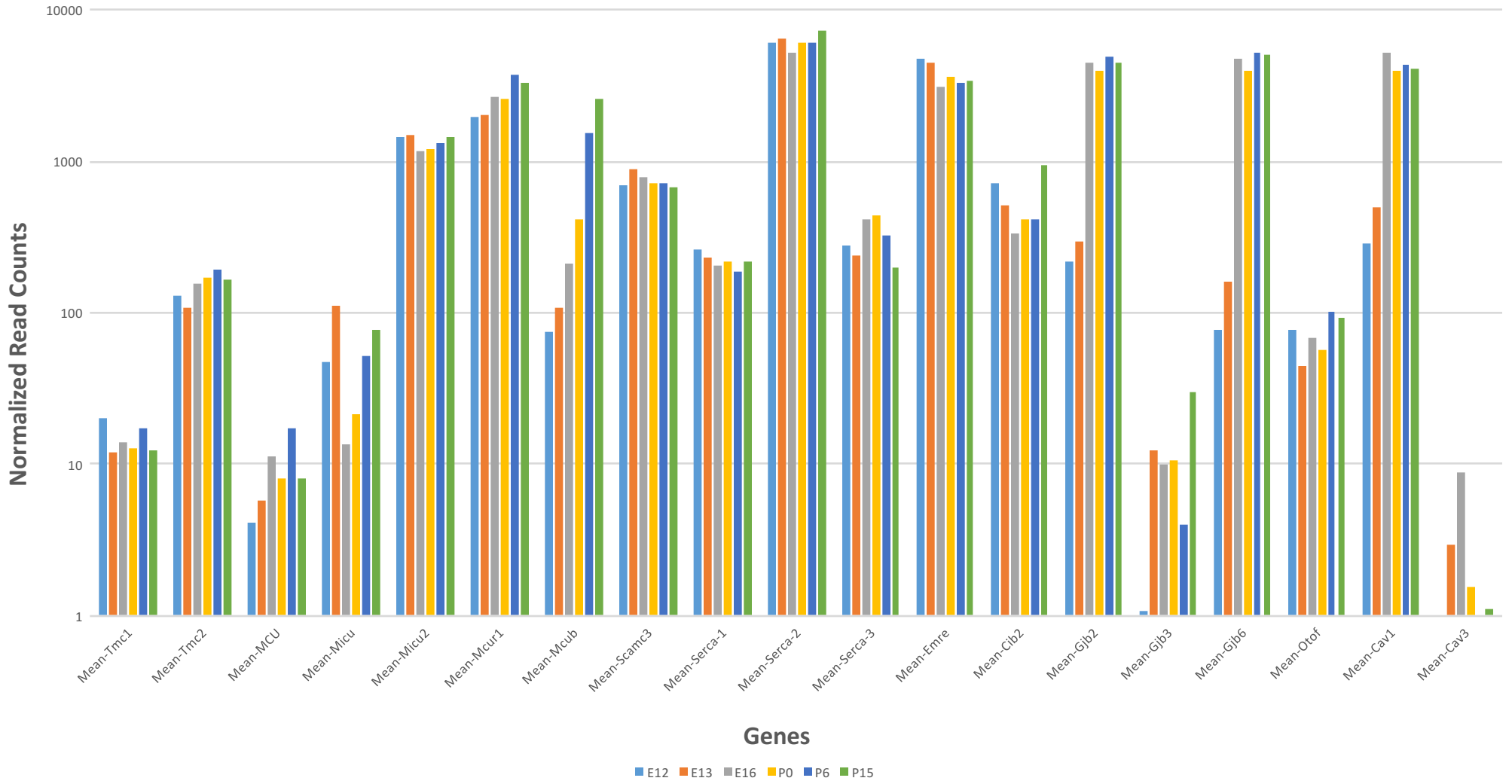
FACS-Sorted Hair Cells



Spiral Ganglion Neurons



Vestibular Ganglion Neurons



Findings

- FACS-Sorted Hair Cells
 - Tmc1
 - Micu-2
 - Serca-2
 - Gjb6
 - Otof
 - Cav1
- Spiral Ganglion Neurons
 - Micu2
 - Mcur1
 - Scamc-3 (early stages)
 - Serca-2
 - Emre (early stages)
 - Cib2
 - Gjb2 (later stages)
 - Gjb6 (later stages)
 - Cav1 (later stages)
- Vestibular Ganglion Neurons
 - Micu-2
 - Mcur1
 - Mcub (later stages)
 - Serca-2
 - Emre
 - Gjb2 (later stages)
 - Gjb6 (later stages)
 - Cav1

Future Work and Conclusion

- Future research
- Questions



<https://www.commondreams.org>