A novel gene therapy approach enhances cochlear implant performance

Auditory neuron mechanosensitivity: Recreate the hearing ear

Translational Stroke Research: Neuroprotection

A novel gene therapy approach enhances cochlear implant performance

Auditory neuron mechanosensitivity: Recreate the hearing ear

Translational Stroke Research: Neuroprotection

Graphs: Auditory brainstem response measurements of hearing show improved sensitivity following BaDGE® neurotrophin gene augmentation.

Bionic array - Directed Gene Electrotransf er (BaDGE®) is a novel gene delivery device developed in our lab from cochlear implant technology. Cochlear implants are the only option to restore hearing in the profoundly deaf and we have used BaDGE® to achieve precise expression of neurotrophin genes next to cochlear implant electrodes, enabling directed regrowth of the auditory nerve fibres to improve the neural interface. Currently in clinical trial supported by collaborators and Industry Partner (Cochlear Ltd).


We develop gene therapies for fatal childhood leukodystrophies like Canavan disease and HBSL. We design and employ Adeno-associated virus vector mediated gene replacement or gene regulation approaches. For our preclinical testing we use CRISPR/Cas9 gene editing to generate accurate rodent models of these neurometabolic disorders.


Together with an Industry collaborator Nyra da Inc. we evaluate novel drugs aimed at reducing secondary brain injury in the days following stroke and trauma. Our models include light-guided photothrombotic infarcts, with readout via genetically encoded Ca²⁺ reporters and high field MRI.

We are a vibrant team of neuroscientists, cell & molecular biologists and engineers who are passionate about advancing global health through research and education of the next generation of research leaders.

Hearing loss is recognised as a primary addressable factor in cognitive decline. Our preclinical research has demonstrated that loss of ‘purinergic hearing adaptation’ is the predominant contributor towards noise induced hearing loss susceptibility. This program seeks to expand our knowledge in the genetics underlying purinergic hearing susceptibility signature in the human population.

For further information: Cederholm et al. Purinergic Sig. (2019); Housley et al. PNAS (2013)

We develop gene therapies for fatal childhood leukodystrophies like Canavan disease and HBSL. We design and employ Adeno-associated virus vector mediated gene replacement or gene regulation approaches. For our preclinical testing we use CRISPR/Cas9 gene editing to generate accurate rodent models of these neurometabolic disorders. For more information: von Jonquieres et al (2018) ACTA Neuropathologica and Frohlich et al. (2021) Front. Cell Neurosci.

We develop gene therapies for fatal childhood leukodystrophies like Canavan disease and HBSL. We design and employ Adeno-associated virus vector mediated gene replacement or gene regulation approaches. For our preclinical testing we use CRISPR/Cas9 gene editing to generate accurate rodent models of these neurometabolic disorders. For more information: von Jonquieres et al (2018) ACTA Neuropathologica and Frohlich et al. (2021) Front. Cell Neurosci.

Contact: Prof Gary Housley
email: g.housley@unsw.edu.au
phone: +61293851057

https://medicalsciences.med.unsw.edu.au/research/groups/translational-neuroscience-facility