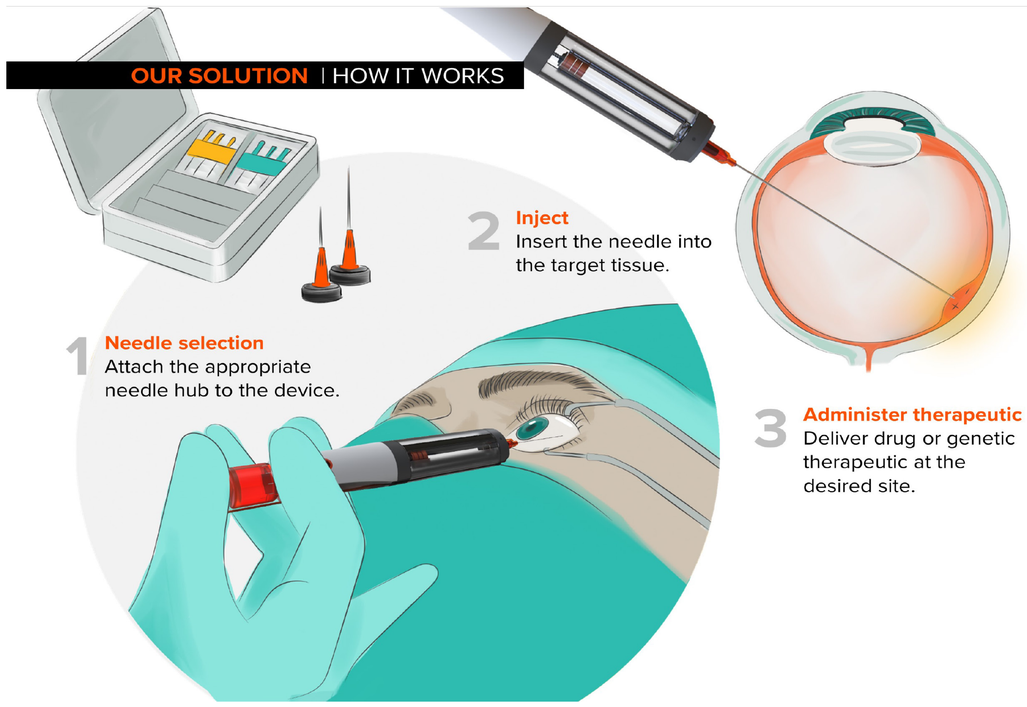
Precision DNA / RNA Electrotherapeutics Platform

BaDGE®
Bionic Array - Directed Gene Electrotransfer

OUR SOLUTION | HOW IT WORKS

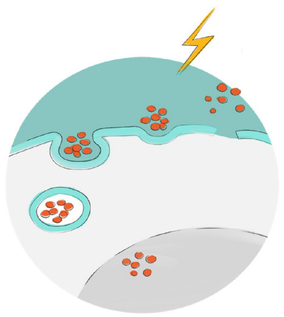


1 Needle selection
Attach the appropriate needle hub to the device.

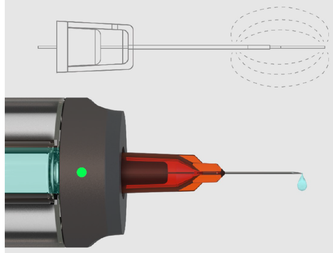
2 Inject
Insert the needle into the target tissue.

3 Administer therapeutic
Deliver drug or genetic therapeutic at the desired site.

4 Administer single discharge
Enable intracellular movement of molecules across the cell barrier.



Single Needle Technology
Proprietary design allows electrical discharge via a single needle, whilst still functioning as a delivery channel.



Focal Delivery
Reduced systemic impacts & precision intracellular delivery at site of discharge.

Platform Device
Supports pre-filled cartridges for a range of molecules and target applications.

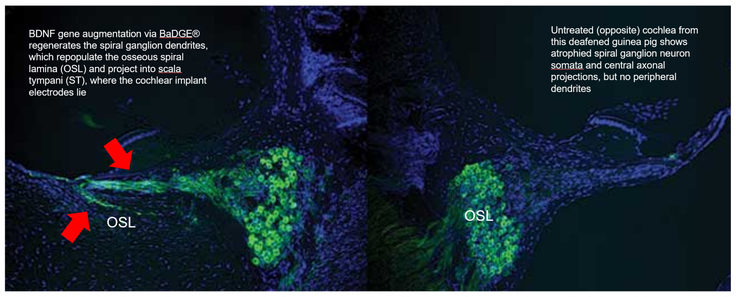
Low-Charge Electrotransfer
Allowing for painless delivery without cellular destruction and CNS safe.

- **Safety:** naked plasmid DNA is not biologically active outside of cells; very limited expression in tissues in the absence of electrotransfer; lowered immunogenicity (no immune responses to viral vector elements).
- **Target Specificity:** BaDGE® provides optimal control of which tissue regions achieve take-up of the plasmid DNA into cells, so expression is limited to the region of interest.
- **Versatility:** plasmid DNA does not have the packaging (size) limits inherent in viral vector-based gene therapy; large (complex) gene expression cassettes, including DNA expression regulatory switches, can be used.
- **Speed, Efficiency, Duration:** Onset of expression within hours, duration of many months
- **Lower Regulatory Compliance:** transfer of naked DNA to human somatic cells is not subject to regulatory oversight by the office of the Gene Technology Regulator (Australia).

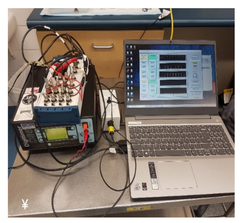
VALIDATION | SCIENTIFIC FEASIBILITY

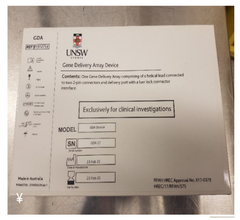
Hearing-BaDGE® - cochlear nerve regeneration

via proprietary neurotrophin - encoding DNA therapeutic (GMP)
(sponsored by Passe & Williams Foundation; Cochlear Ltd)

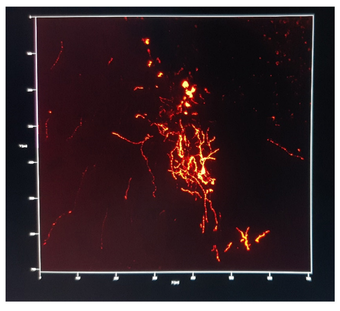


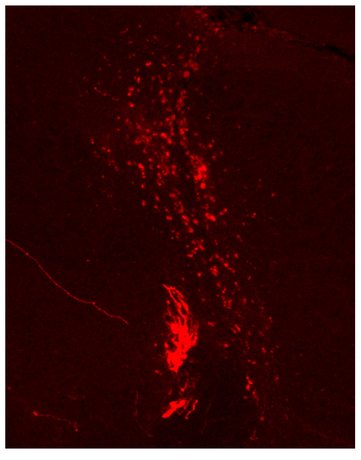
NERVE REGENERATION: Experimentally deafened mammals suffer loss of sensory hair cells followed by atrophy of the cochlear nerve. But a new therapy being tested in guinea pigs may spur the regeneration of the nerve (left, green projections), by placing an implant in the cochlea that can mediate the uptake of a gene therapy construct encoding brain-derived neurotrophic factor (BDNF).
IMAGE BY JEREMY PINYON AND GARY HOUSLEY UNSW AUSTRALIA Adapted from ***The Scientist Magazine*** - 'Hearing Help' by Kate Randell, 1st Sept. 2015.

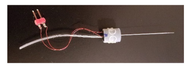




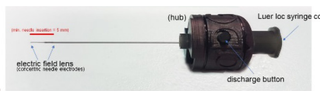
Brain-BaDGE® - neurosuppression to control epilepsy & Parkinsons' Disease (sponsored by NHMRC & Boehringer-Ingelheim)

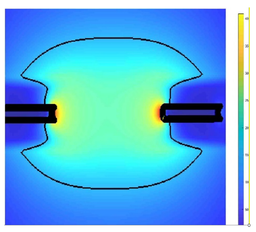






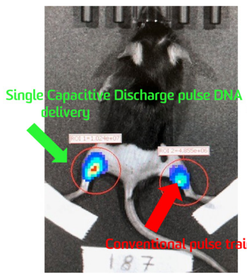
In vivo Proof of concept for Brain-BaDGE® gene electrotransfer . Confocal imaging – 6 days after DNA electrotransfer to the striatum brain region. Images show clusters of neurons expressing mScarlet DNA reporter plasmid. BaDGE® SCD controller and electrotransfer probe.

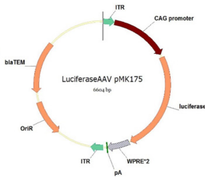


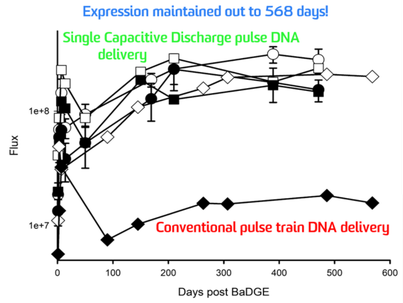


Muscle-BaDGE® - vaccines, immunotherapy & muscle reinnervation

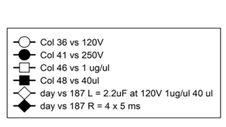
(sponsored by Touchlight Genetics UK)

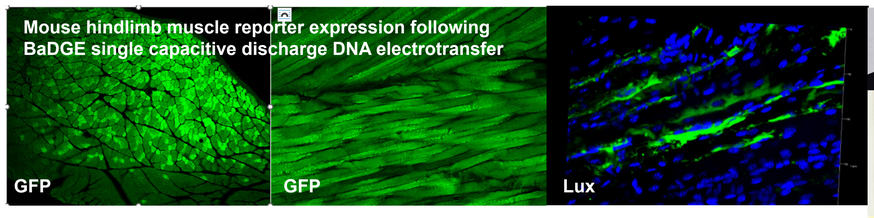




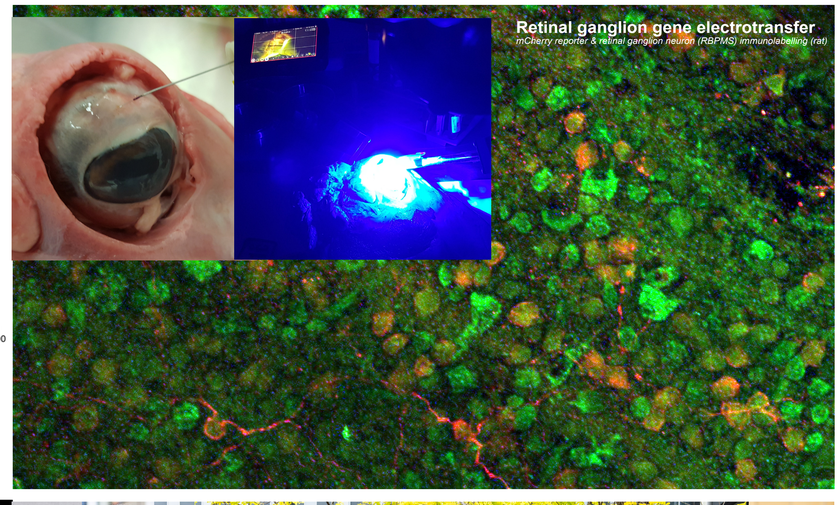


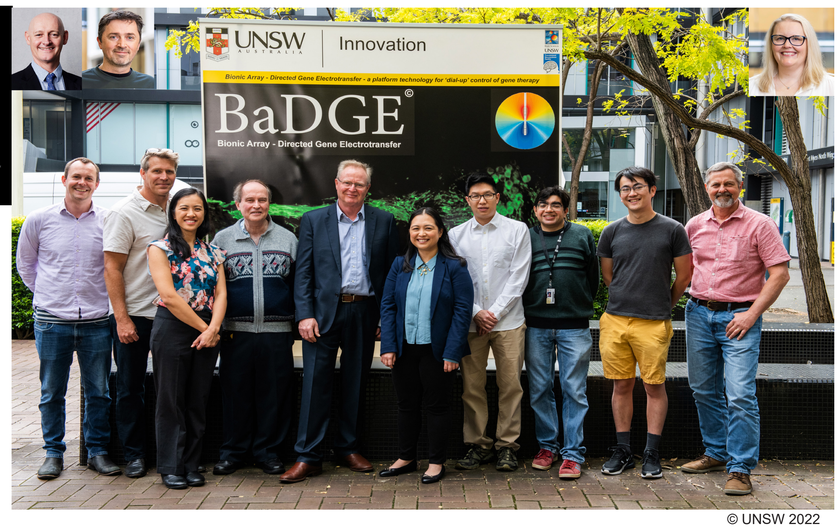
In vivo Proof of concept for Muscle-BaDGE® single capacitive discharge *(SCD) gene electrotransfer . Spectrum CT bioluminescence imaging – mouse (ref. ms187, 250519) at 24 hours post DNA electrotransfer of a luciferase encoding plasmid DNA (LuciferaseAAV pMK175.CAGpluciferase.WPRE), under isoflurane anaesthesia within 30 min of i.p. injection of luciferin substrate to elicit photo emission arising from expression of recombinant luciferase by the hindlimb muscles. SCD - left hindlimb, conventional monophasic pulse train (right hindlimb). DNA (1 µg / µl).





Vision-BaDGE® - a platform for non-viral-based eye therapeutics





UNSW SYDNEY
Translational Neuroscience Facility

Faculty of Medicine & Health, School of Biomedical Sciences; Faculty of Engineering, Graduate School of Biomedical Engineering; Tyree Foundation Institute of Health Engineering. Contact: g.housley@unsw.edu.au

- ***Patented electric-field focusing for 'dial-up' control of instantaneous focal DNA/RNA electrotransfer***
- ***Patented single-pulse delivery***
- ***> $5M undiluted research funding & Pharma engagement***
- ***Peer-reviewed publications***
- ***National and international media coverage***
- ***Clinical pathway validated***