| Publication | Summary |
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| **Auditory nerve responses to combined optogenetic and electrical stimulation in chronically deaf mice.** Ajay E. et al. J Neural Eng . (2023) Apr 11;20(2) https://pubmed.ncbi.nlm.nih.gov/36963106/ | 4-7 day old **mice** used to compare the temporal fidelity and precision of electrical, optogenetic, and hybrid stimulation through compound action potential and single-unit recordings of the auditory. Mice were deafened by perfusing 10–15 µL of 10% neomycin sulphate in 9% saline solution through the round window while aspirating gently from the drilled hole over 20–30 min. |
| **Effects of enhanced acoustic environment on residual hearing following chronic cochlear implantation and electrical stimulation in the partially deafened cat** Wise Atkinson Fallon (2022) Hearing Research **https://pubmed.ncbi.nlm.nih.gov/36306607/** | **16 neonatal** cats partially deafened, bilaterally implanted with electrode array, and received unilateral chronic electrical stimulation. Partial deafened by sodium edecrin. Recovered for 4 weeks and recordings taken. Implanted with electrode array. All were killed at the conclusion. |
| **Effects of chronic implantation and long-term stimulation of a cochlear implant in the partial hearing cat model** Fallon, JB et al (2022) Hearing Research Vol 426 https://doi.org/10.1016/j.heares.2022.108470 | 12 **cats** were used. 3-6 days after birth they were partially deafened using a chemical injection. At 6 weeks of age, and every month after, auditory brainstem responses to acoustic stimuli were recorded. At 2 months they were implanted with electrodes into the cochlea. All animals were killed at the end of the experiment |
| **Platinum dissolution and tissue response following long-term electrical stimulation at high charge densities.** Robert K Shepherd *et al* (2021) J. Neural Eng. 18 036021 DOI 10.1088/1741-2552/abe5ba | Six **cats** were deafened as neonates followed by cochlear implant surgery at 8 weeks of age and electrode arrays inserted. Electrochemical measurements were taken on 3 occasions over a 6-month period. Each animal was stimulated via a back-back stimulator that delivered the pulses. The purpose of the study was to examine safe levels of electrical stimulation. |
| **Electrochemical and biological performance of chronically stimulate conductdive hydrogel electrodes** Dalrymple Fallon et al J. Neural Eng. (2020) | Coated CH or uncoated smooth platinum (Pt) electrode arrays were implanted into the cochlea of **rats** and stimulated over a 5-week period with more than 57 million biphasic current pulses. |
| **Slim electrodes for improved targeting in deep brain stimulation** | Aimed to improve surgical outcomes by evaluating electrode leads with smaller diameter electrode and microelectrodes incorporated which can be used for assisting targeting. Arrays |

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| Villalobos, Fallon et al (2020) J. Neual Eng 17 https://iopscience.iop.org/article/10.1088/1741-2552/ab7a51 | were bilaterally implanted into the medial geniculate body (MGB) in nine anaesthetised **cats** for 24–40 h using stereotactic techniques. |
| **Chronic intracochlear electrical stimulation at high charge densities: Reducing platinum dissolution** Shepherd, Fallon et al (2020) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8695957/pdf/nihms-1763939.pdf | 24 Deafened **guinea pigs** were continuously stimulated for 28 days using biphasic current pulses at extreme charge densities |
| **Chronic intracochlear electrical stimulation at high charge densities results in platinum dissolution but not neural loss or functional changes in vivo** Shepherd et al, J Neural Eng (2019) Apr;16(2):026009. doi: 10.1088/1741-2552/aaf66b. Epub 2018 Dec 5. | 19 **guinea pigs** were systemically deafened and implanted with a cochlear electrode array containing eight Pt electrodes of 0.05, 0.075 or 0.2 $mm^2$ area. Animals were electrically stimulated continuously for 28 d using charge balanced current pulses at charge densities of 400, 267 or 100 $\mu C/cm^2$/phase. |
| **Creating virtual electrodes with 2D current steering** Spencer, Fallon, Shivdasani (2018) J Neural Eng 15(3) DOI: 10.1088/1741-2552/aab1b8 | 7 normally sighted adult anaesthetised **cats** were implanted with a 42-channel electrode array in the suprachoroidal space and multi-unit neural activity was recorded from the visual cortex. |
| **Electrophysiological channel interactions using focused multipolar stimulation for cochlear implants,** Shefin S George *et al* (2015) *J. Neural Eng.* **12** 066005**DOI** 10.1088/1741-2560/12/6/066005 | To explore interactions in the inferior colliculus (IC) produced by simultaneous stimulation of two Cochlear implant channels by recording multi-unit neural activity in the IC of anaesthetized **cats**. |
| **Evaluation of focused multipolar stimulation for cochlear implants in acutely deafened cats.** Shefin S George *et al* (2014) *J. Neural Eng.* **11** 065003**DOI** 10.1088/1741-2560/11/6/065003 | 6 adult **cats** were acutely deafened and implanted with an intracochlear electrode array before multi-unit responses were recorded across the cochleotopic gradient of the contralateral IC. |
| **Evaluation of focused multipolar stimulation for cochlear implants in long-term deafened cats** | Four cochlear implant stimulation methods were tested on 6 **kittens** that had chemically induced chronic deafness starting the day after birth and continuing for 20 days until they were profoundly deaf. After being deaf for 10-12 months, the experiment took place over 2-3 |

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| Shefin S George *et al* (2015) *J. Neural Eng.* **12** 036003**DOI** 10.1088/1741-2560/12/3/036003 | days. Cochlear implants were surgically inserted. The cats were then placed in a restrictive metal frame for head positioning. Invasive brain surgery was performed to expose the auditory processing region. Different currents were applied to stimulate electrodes in the implants, assessing clarity and effectiveness. Brain activity was monitored. |
| **Evaluation of focused multipolar stimulation for cochlear implants: a preclinical safety study.** Robert K Shepherd *et al* (2017) *J. Neural Eng.* **14** 046020**DOI** 10.1088/1741-2552/aa7586 | Six **cats**, deafened two months prior, were implanted with electrode arrays in both ears and received continuous one-sided stimulation for up to 182 days. After completing the stimulation, the cochleae were histologically examined, and the electrode arrays were checked for platinum corrosion. |
| **Effects of deafness and cochlear implant use on temporal response characteristics in cat primary auditory cortex.** Fallon, JB et al Hear Res. (2014) Sep;315:1-9. doi: 10.1016/j.heares.2014.06.001. Epub 2014 Jun 14. PMID: 24933111. | Using 17 **cats** the primary aim of the research was to investigate whether **deafness** of moderate duration (less than 14 months), known to effect cochleotopy, results in degradation of temporal resolution, and whether any such effects are offset by cochlear implant use that provides chronic intra-cochlear electrical stimulation related to the acoustic environment. |
| **Spatial Restriction of Neural Activation Using Focused Multipolar Stimulation With a Retinal Prosthesis** Spencer et al (2018) DOI: 10.1167/iovs.16-19325 | To re-assess the effectiveness of electrical field shaping techniques previously conducted in normally-sighted animals by testing in cats who had undergone chemically induced photoreceptor degeneration. 4 **cats a**naesthetised to allow injection of adenosine triphosphate into the vitreal cavity of one eye each, the other eye acting as a 'control'. Craniotomies were done on each side of the skull. Electrodes inserted into the brain. The retinas were stimulated and the responses in the brain at various currents and MP and FMP responses recorded. |
| **In vivo feasibility of epiretinal stimulation using ultrananocrystalline diamond electrodes.** Shivdasani, M. N., et al (2020) Journal of Neural Engineering. doi:10.1088/1741-2552/aba560 | A prototype implant containing up to twenty-five electrodes was implanted into 16 anaesthetised **cats** and attached to the retina. Multiunit responses to retinal stimulation using charge-balanced biphasic current pulses were recorded acutely in the visual cortex using a multichannel planar array. |