Identify areas of opportunity that future research may explore to improve GBA-mapping.

Methods PubMed and EMBASE were searched for publications, 2000–2022. Inclusion criteria: SEEG-GBA studies mapping the following brain functions: language, memory, vision, audition, motor and sensory. Task-selection, signal-analysis methodology, and comparison against the 'gold-standard' were reviewed.

Results Language: 3 studies identified, two compared GBA mapping to DCS. In these, GBA mapping was highly specific but lowly sensitive for language localisation. Memory: 3 studies identified. Since there is no gold-standard for memory mapping, the clinical relevance of GBA memory mapping remains unknown. However, GBA was seen in brain regions thought to support memory from the existing PET, fMRI, DCS and WADA experience. Motor: one study identified; in this, GBA was highly congruent with DCS motor maps. No SEEG experience exists for mapping visual and sensory cortices. Task-selection and signal-analysis methods were heterogeneous across studies.

Conclusion SEEG-GBA mapping experience is limited, but promising for mapping language and motor networks. Memory mapping is shown to be possible but clinical relevance is stifled by the lack of a gold-standard. Standardised testing pipeline to map these and other un-investigated brain networks is needed.

20 CHANGES IN MRNA EXPRESSION IN THE TEMPORAL LOBE OF PATIENTS WITH DRUG RESISTANT EPILEPSY: A FOCUS ON NEUROINFLAMMATION

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Objectives To assess various neuroinflammatory gene expressions in temporal lobe samples from patients with drug-resistant temporal lobe epilepsy (DRTLE).

Methods We used a BioMark Fluidigm custom made microarray chip to analyse a panel of 38 selected genes and 10 housekeeping genes. RNA was isolated from frozen temporal brain samples from 20 DRTLE patients and 12 non-epilepsy post-mortem controls. 1uG of RNA was converted to cDNA. 100ng of cDNA was used for qPCR performed in collaboration with the Monash Health Translation Precinct, Australia. Unpaired t-test and Mann-Whitney tests were used for comparisons of parametric and non-parametric data, respectively. Significance was set at $p<0.05$.

Results Several genes related to inflammasome and proinflammatory pathways were upregulated in DRTLE compared to controls: *NLRP3*, *CASP1*, *TNF*, *IL1B*, *IL18*; as were several chemokines (*CCL2*, *CCL3*, *CXCL9*). Genes encoding monocyte/macrophage/microglia markers (*CD14*, *CD68*) were also elevated in patients, however *P2X7R* was not. While the general leukocyte marker CD45 was elevated in patients, lymphocyte related markers and cytokines such as *BAFF* (B-cell-activating factor) and *IL17B* (Th17 response) were decreased. Th2/Th1 pathway related genes *(IL4*, *IL2*, *IL5*, *IL13*, *IL15* and *IFNG*, *CXCL10*, *IL12*) were similar between cohorts. Interestingly, *IL6* levels were similar between the two cohorts, and 'anti-inflammatory' genes *IL1RN*, *TGFB1*, *IL10* were upregulated in patients. Astrocytosis marker GFAP was not differentially expressed between cohorts.

Conclusions Brain tissue from DRTLE patients harbours elevations in various markers of neuroinflammation – in particular those of inflammasome and innate immunity pathways. This highlights a possible role of innate immunity in DRTLE pathogenesis.

21 OUTCOMES OF MAGNETIC RESONANCE IMAGE GUIDED FOCUSED ULTRASOUND THALAMOTOMY IN TREMOR SYNDROMES

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Objectives To compare the outcomes between tremor subtypes following a unilateral Magnetic Resonance Image guided Focused Ultrasound (MRgFUS) thalamotomy.

Method Sixty-six patients underwent a unilateral MRgFUS thalamotomy for tremor between November 2018 and May 2020 at St Vincent's Hospital Sydney. All patients were included in the prospective study 'Capturing outcomes in MRgFUS intervention for tremor'. Each patient's tremor syndrome was classified prior to treatment. Pre-defined clinical assessments from baseline to 36 months; included: Hand Tremor Score (HTS), Clinical Rating Scale for Tremor (CREST) and Quality of Life in Essential Tremor Questionnaire (QUEST).

Results There were 32 patients with Essential Tremor (ET), 25 with Dystonic Tremor (DT) and 9 with Parkinson's Disease Tremor (PDT). The HTS improved at 1-month by 70% in ET (19.0 ± 6.3 to 5.3 ± 4.6, $p<0.001$), 78% in DT (20.8 ± 7.3 to 4.7 ± 4.2, $p<0.001$) and 59% in PDT (14.8 ± 15.3 to 6.0 ± 5.4, $p<0.001$). However, at 24-months, this benefit was lost within the PDT cohort. In contrast, there was a 78% (19.0 ± 6.3 to 4.2 ± 2.2, $p<0.0001$) and 65% (20.8 ± 7.3 to 7.2 ± 5.4, $p<0.0001$) improvement in HTS in ET and DT patients respectively. Similar results were observed in the CRST and QUEST scales.

Conclusions These results support the use of unilateral MRgFUS thalamotomy for the treatment of DT, who appear to have a similar expected outcomes to patients diagnosed with ET. Patients with PDT should be warned about the risks of treatment failure and the ongoing use of this procedure in these patients should occur under a research framework until there is further evidence.