

Additional File #5:

Auditory Evoked Potentials to compare Goldcup vs. Needle electrodes

When we directly compared goldcup and needle electrodes (similar to those used in the past to record sleep in elephant seals - (33,34)), we detected auditory cortical responses of similar amplitude and time course when comparing auditory evoked potentials of goldcup versus minimally invasive needle electrodes. However, in high-noise lab environments, the goldcup electrode signals were more susceptible to electrical noise artifacts (50-60Hz).

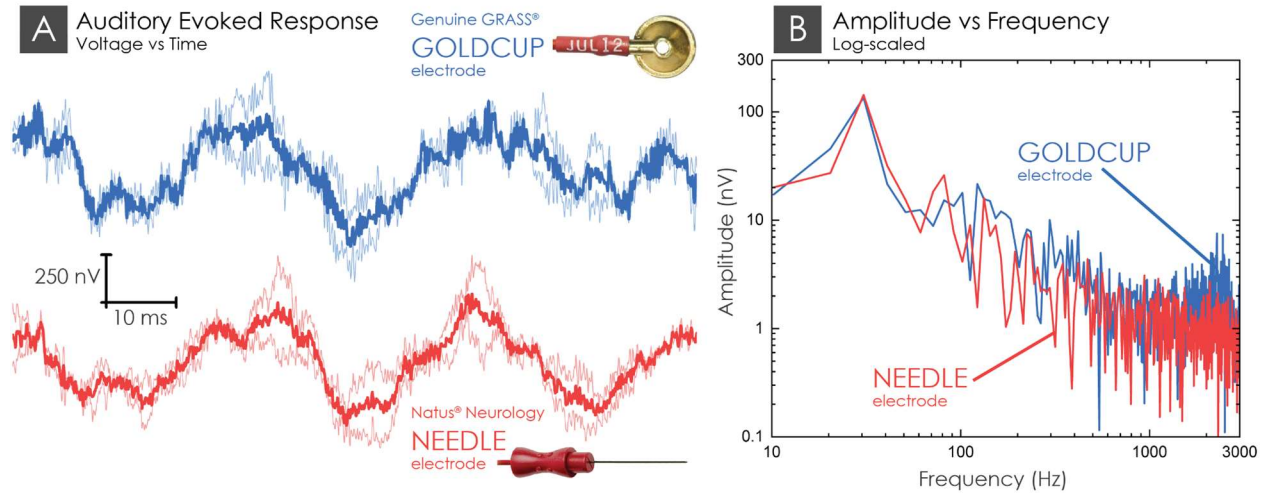


Figure S1. Signal amplitude comparison between goldcup and needle electrodes. (A) Averaged EEG (i.e., evoked responses) in the following stimulation with a 100 microsecond click in an elephant seal. Two types of electrodes were used to collect the EEG: goldcups placed on the skin surface (top blue trace) and needles placed subdermally (bottom red trace). The thin lines represent the average of 1024 individual stimulus presentations. The bold lines are the average of the two thin lines (i.e., an average based on 2048 presentations). The amplitudes and time courses of the responses are directly comparable between the two electrode types. (B) Amplitude versus frequency for each electrode type over all averaged recordings, demonstrating slightly higher high-frequency noise for goldcup electrodes compared to needle electrodes.