

Non-monotonic kilohertz frequency neural block thresholds arise from amplitude- and frequency-dependent charge imbalance

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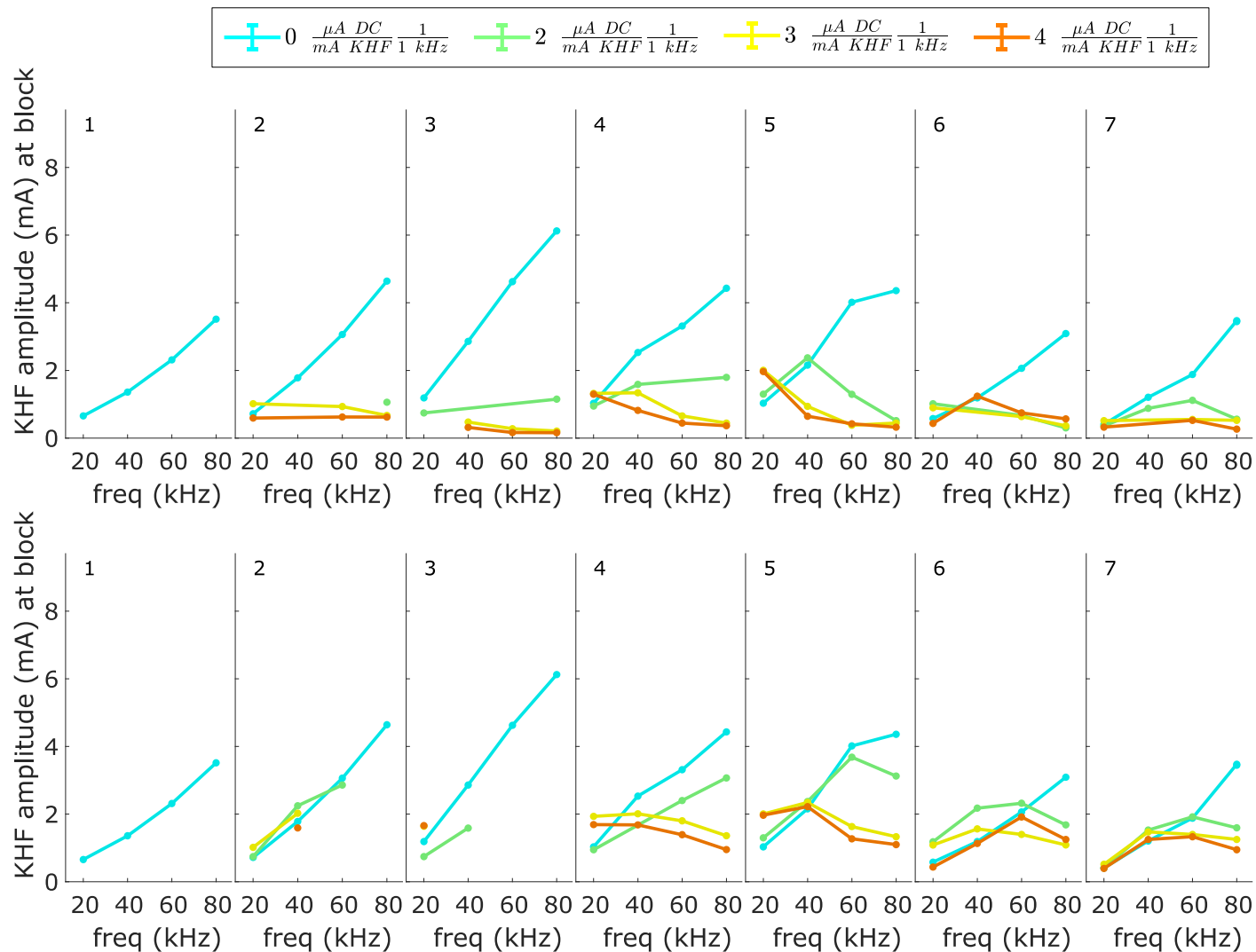
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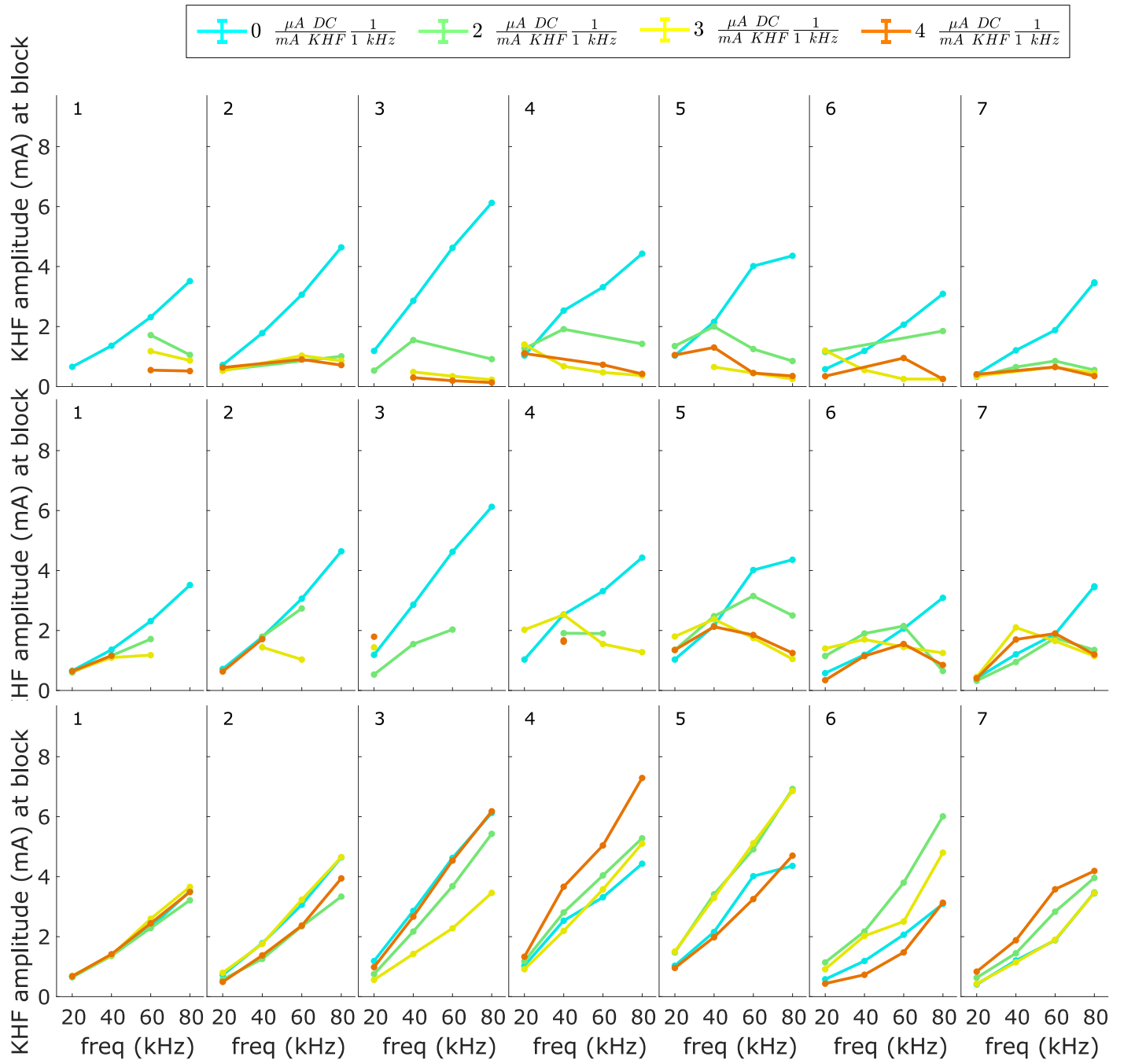
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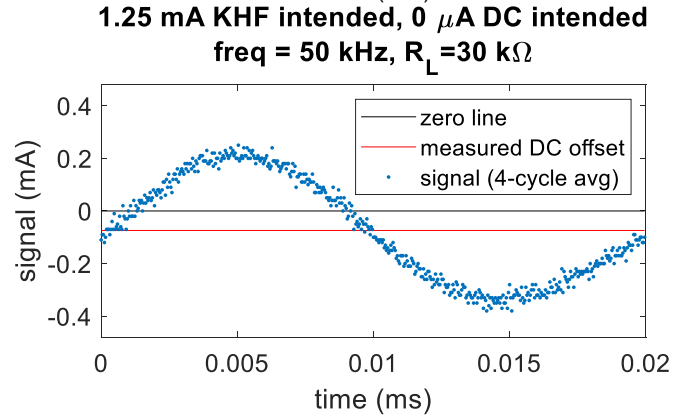
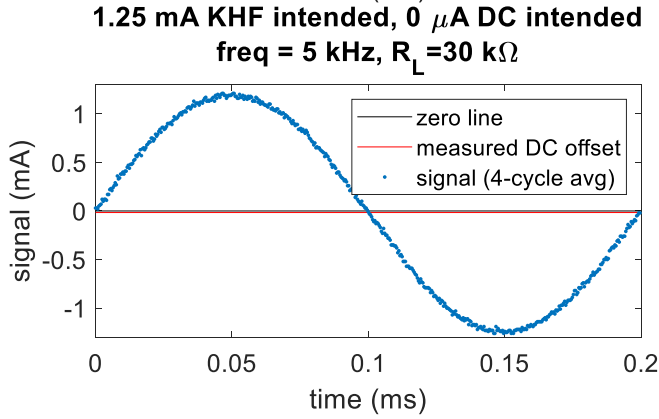
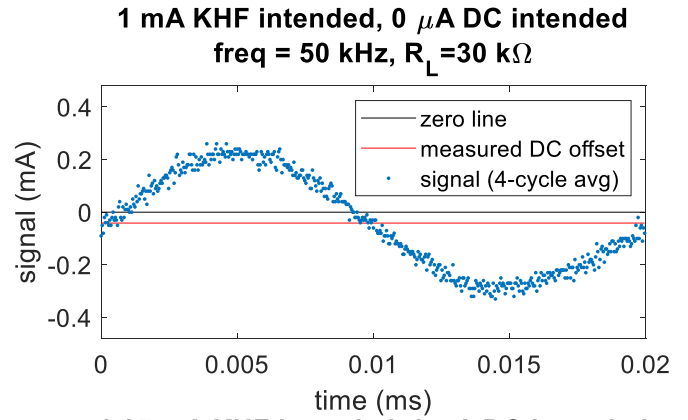
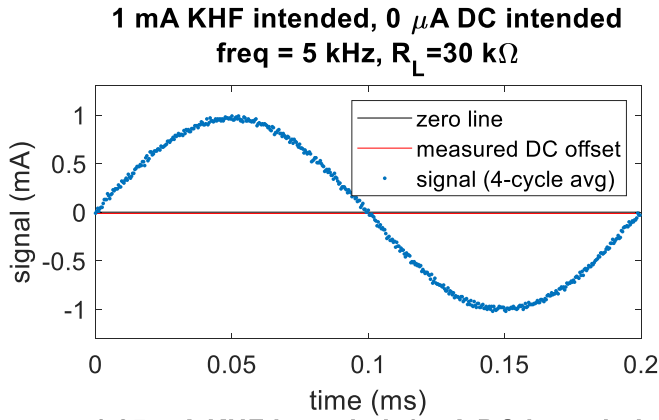
Supplemental Figures



Supplemental Figure 1: Individual data across all seven nerves in symmetric waveforms for cathodal (top) and anodal (bottom) DC offsets.



Supplemental Figure 2: Individual data across all seven nerves in asymmetric waveforms for longer cathodal phase charge-imbalanced (top), longer anodal phase charge-imbalanced (middle), and charge-balanced asymmetric.



Supplemental Figure 3: Oscilloscope recordings (Tektronix tbs1032b) of kilohertz signals generated using the stimulator and load size reported in (Joseph and Butera 2009) (A-M Systems 2200, 30 k Ω resistive load) at two different amplitudes (1 mA & 1.25 mA) and two different frequencies (5 kHz & 50 kHz). DC offsets at 5 kHz were small ($\sim 13 \mu\text{A}$ DC per actual mA of KHF at 1 mA & 1.25 mA intended KHF), but DC offsets at 50 kHz were large (~ 164 and $\sim 274 \mu\text{A}$ DC per actual mA of KHF at 1 mA & 1.25 mA intended KHF). The change in DC offsets per intended mA KHF from 5 kHz to 50 kHz was comparable to the DC offsets we showed to be necessary for non-monotonic thresholds (~ 3.3 and $\sim 5.8 \mu\text{A}$ DC per actual mA KHF per kHz). The stimulator was calibrated by adjusting DC offset screw to output $< 2 \mu\text{A}$ when the input was 0 V. Plots show average of four recorded cycles. DC offset was estimated from area under the curve of the average of the four recorded cycles using trapz in MATLAB R2018a.