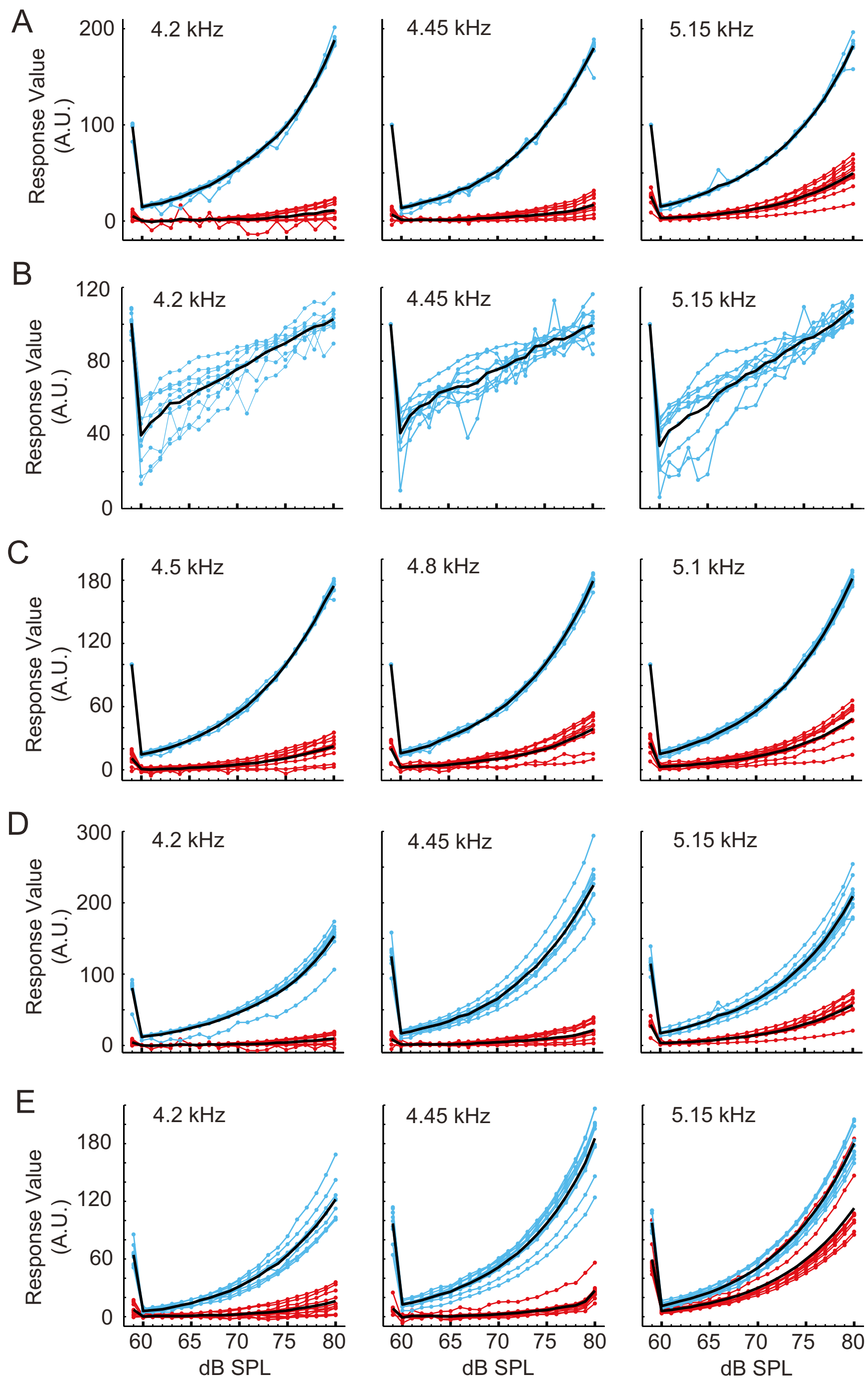

Fig. S1. Normalised intensity tuning curves. (A) 90 deg phase-shifted sound stimuli, conical speakers, laser vibrometer measurements. (B) 90 deg phase-shifted sound stimuli, conical speakers, electrophysiology of auditory afferents. (C) 22.5 deg phase shifts, conical speakers, laser vibrometer measurements. (D) Directional tuning, conical speakers, laser vibrometry. (E) Directional tuning, free-field speakers, laser vibrometry. Responses to ipsilateral stimuli are plotted in blue, and responses to contralateral stimuli are plotted in red. All intensity tuning curves were normalised using their initial 75 dB SPL pulses (a.u.). N=10 in all cases.

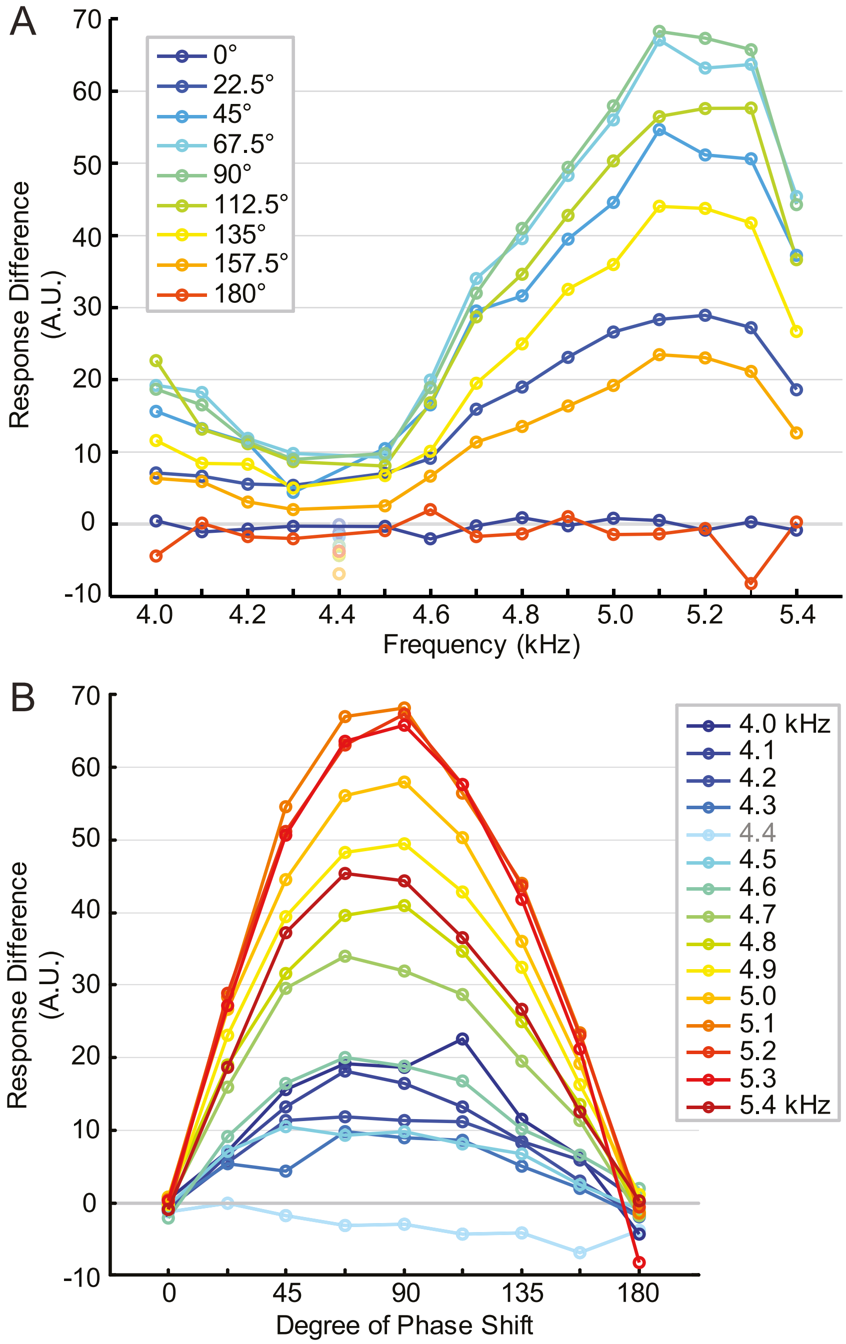

Fig. S2. Differences between the normalised velocities of tympanic membrane oscillations measured in response to the ipsilateral and contralateral speakers leading in phase across a range of phase shifts (0–180 deg) at carrier frequencies between 4.0 and 5.4 kHz. (A) For each degree of phase shift, the difference values averaged across all individuals (n=10) are presented as a function of the carrier frequency. (B) The same data as in A, but for each carrier frequency the difference value is plotted as a function of the degree of phase shift. Original velocity signals were normalised at each carrier frequency with the initial 75 dB SPL pulses from the respective ipsilateral tuning curve.

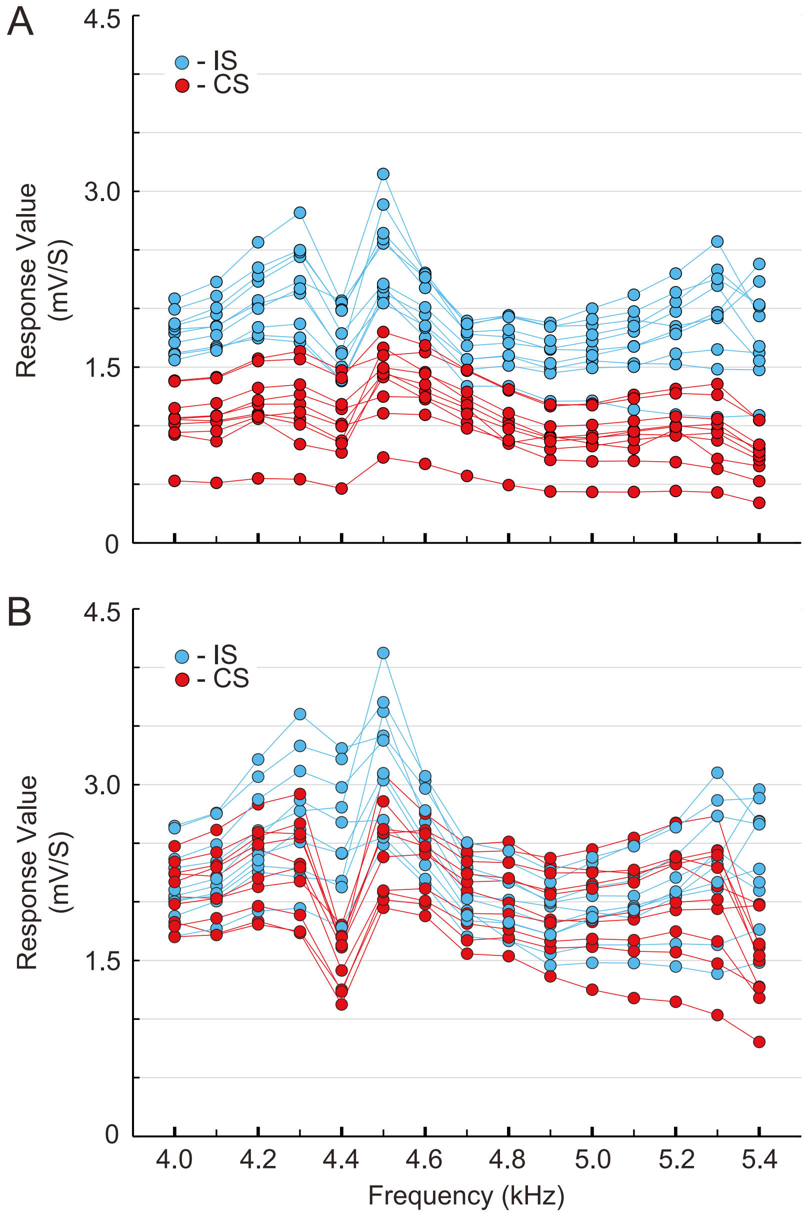

Fig. S3. Average microphone responses to (A) the frequency-dependent directional tuning sound stimuli and (B) the 90 deg phase-shifted sound stimuli presented from the conical speakers during laser vibrometer experiments (n=10). The ipsilateral (IS, blue) and contralateral (CS, red) speakers are independently active in (A), i.e. no phase shift, and simultaneously active with a phase shift in (B). Note the drop of the response at 4.4 kHz.