**Description of original data for Dewey (2022) “Cubic and quadratic distortion products in vibrations of the mouse cochlear apex”, JASA EL**

This repository contains all individual data presented in the main manuscript for the various two-tone stimulus paradigms, as well as code for generating plots of average displacement magnitudes. Responses to single tones are not included here as they have been previously characterized in a greater number of mice in Dewey et al. (2021) using the same optical coherence tomography system (these data are available at https://github.com/jso111/Dewey2021).

The present data are included in MATLAB .mat files and named according to the measurement location (‘ohc’, ‘bm’, or ‘tm’) and the measurement paradigm (‘fixed\_L2\_varied\_L1’, ‘L2\_equals\_L1’, ‘swept\_f2\_fixed\_f2f1ratio’, ‘swept\_f2\_fixed\_qdp’, and ‘swept\_f2\_fixed\_cdp’). Note that data from each location are not necessarily available for each paradigm or mouse. Additionally, due to the time-consuming nature of the measurements, there is no guarantee that available data from two locations (e.g., ‘bm’ vs. ‘tm’) are unaffected by drift in the precise measurement location. Such drifts likely affect phase comparisons more than amplitude comparisons. I do not recommend generating conclusions regarding the relative phases of DPs on the different structures.

For clarity, the paradigm names above are shown listed next to the corresponding figures in the main manuscript:

**Manuscript figure panels:** Fig. 2(e)-(f)

**Paradigm name:** ‘fixed\_L2\_varied\_L1’

**Parameters:** *f*2 = 9 kHz, *L*2 = 60 dB SPL, *L*1 = 20-85 dB SPL, *f*2/*f*1 varied from ~1.07-1.67 in 0.1 steps.

**Manuscript figure panels:** Fig. 3(a)-(f)

**Paradigm name:** ‘L2\_equals\_L1’

**Parameters:** *f*2 = 9 kHz, *L*2 = *L*1 = 20-85 dB SPL, *f*2/*f*1 varied from ~1.07-1.67 in 0.1 steps.

**Manuscript figure panels:** Fig. 4(a)-(c)

**Paradigm name:** ‘swept\_f2\_fixed\_f2f1ratio’

**Parameters:** *f*2 = ~2-40 kHz in 0.5 kHz steps, *f*2/*f*1 = 1.57, *L*2 = *L*1 = 50-70 dB SPL

**Manuscript figure panels:** Fig. 4(d)-(f)

**Paradigm name:** ‘swept\_f2\_fixed\_qdp’ and ‘swept\_f2\_fixed\_cdp’

**Parameters:** *f*2 = ~10-32 kHz in 0.5 kHz steps, *L*2 = 60 dB SPL, *f*1 set so that *f*2-*f*1 (‘qdp’ for quadratic distortion product) or 2*f*1-*f*2 (‘cdp’ for cubic distortion product) were ~9 kHz, and *L*1 = 30-80 dB SPL.

Opening the .mat file for a given measurement location and paradigm will load the ‘all’ data structure, which includes basic information about the paradigm:

**all.mouseIDs** mouse identification numbers

**all.f2s** *f*2 frequencies (Hz)

**all.f1s** *f*1 frequencies (Hz)

**all.f2f1ratios** *f*2/*f*1 ratios

**all.L2s** *L*2 (dB SPL)

**all.L1s** *L*1 (dB SPL)

Vibration data are stored in ‘all.vib’. Displacement magnitudes and phases for each response component are accessed as substructures in all.vib (‘f2’, ‘f1’, ‘dp1f2\_m1f1’ for *f*2-*f*1, and ‘dp2f1\_m1f2’ for 2*f*1-*f*2). For example, the following data matrices are available for *f*2-*f*1:

**all.vib.dp1f2\_m1f1.mag** displacement magnitudes (dB re 1 nm RMS)

**all.vib.dp1f2\_m1f1.magC** displacement magnitudes (dB re 1 nm RMS)

for responses meeting the noise floor criterion (the ‘C’ denotes

‘clean’ data)

**all.vib.dp1f2\_m1f1.phi** displacement phases (cycles)

**all.vib.dp1f2\_m1f1.phiC** displacement phases (cycles) for responses meeting the noise floor

criterion (the ‘C’ denotes ‘clean’ data)

All data matrices are organized as *frequency* x *level* x *mouse*.

All displacements are in dB re 1 nm RMS, and all phases are already corrected for the phases of the stimuli measured in the ear canal (see main manuscript for details).

**Supplementary figures and plotting code**

Included in this repository is a separate document showing average displacement magnitudes for all measurement paradigms. The supplementary figures are listed below along with the MATLAB code that was used to generate them. For simplicity, displacement phases are not included in the plots, as phase jumps in some of the individual data lead to average curves that may be misinterpreted. As described above, all individual phase data are available in the .mat files. Please note that averaging any phase data will require re-aligning the individual phases, possibly on a frequency-by-frequency basis due to aforementioned phase jumps.

**Supplementary Figure 1.** Average OHC region displacements for the fixed *L*2, varied *L*1 paradigm for all *f*2/*f*1 ratios. Created with: fig\_s1\_2\_fixed\_L2\_varied\_L1\_ave\_plot.m.

**Supplementary Figure 2.** Average BM displacements for the fixed *L*2, varied *L*1 paradigm for all *f*2/*f*1 ratios. Created with: fig\_s1\_2\_fixed\_L2\_varied\_L1\_ave\_plot.m.

**Supplementary Figure 3**. Average OHC region displacements for the equal-level paradigm for all *f*2/*f*1 ratios. Created with: fig\_s3\_5\_L2\_equals\_L1\_ave\_plot.m.

**Supplementary Figure 4.** Average BM displacements for the equal-level paradigm for all *f*2/*f*1 ratios. Created with: fig\_s3\_5\_L2\_equals\_L1\_ave\_plot.m.

**Supplementary Figure 5.** Average TM displacements for the equal-level paradigm for all *f*2/*f*1 ratios. Created with: fig\_s3\_5\_L2\_equals\_L1\_ave\_plot.m.

**Supplementary Figure 6.** Average TM displacements for the swept-*f*2, fixed *f*2/*f*1 ratio paradigm. Created with: fig\_s6\_swept\_f2\_fixed\_f2f1ratio\_ave\_plot.m.

**Supplementary Figure 7.** Average BM displacements for the swept-*f*2, fixed DP frequency paradigm. Created with: fig\_s7\_8\_swept\_f2\_fixed\_dp\_ave\_plot.m.

**Supplementary Figure 8.** Average TM displacements for the swept-*f*2, fixed DP frequency paradigm. Created with: fig\_s7\_8\_swept\_f2\_fixed\_dp\_ave\_plot.m.