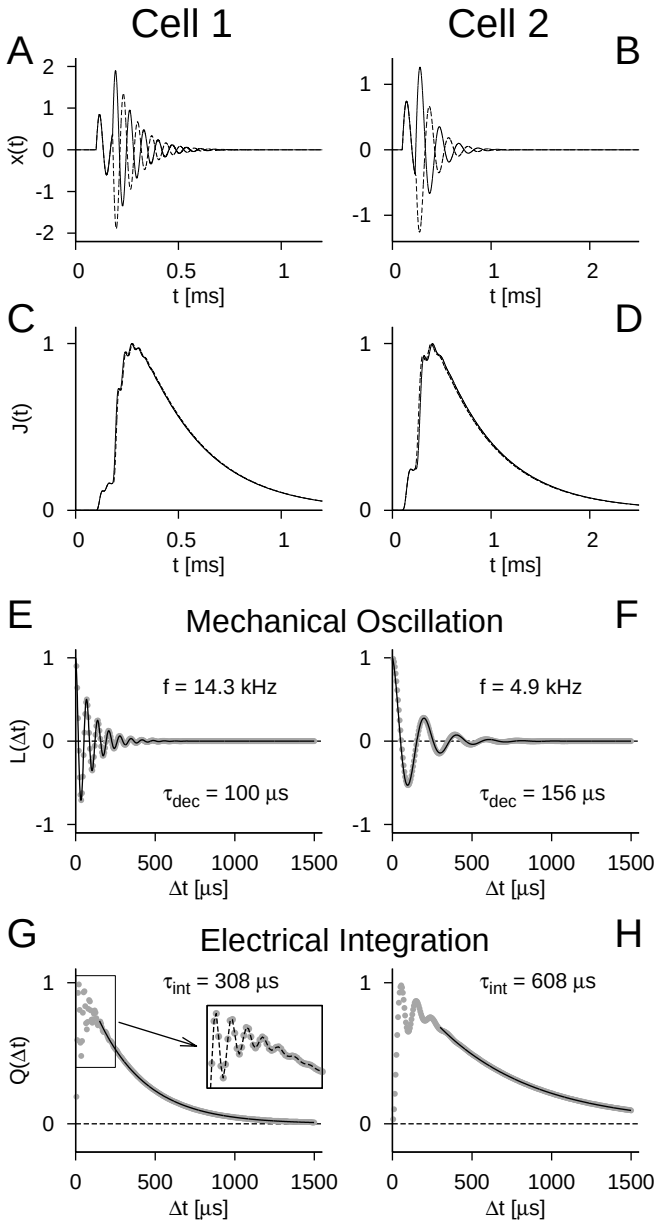
Figure S2



Simulation and analysis of the general cascade model in response to two-click stimuli.

The general cascade model, Eq. (2) in the main text, was used with filters modeled as $l(t) = \sin(2\pi f t)\exp(-t/\tau_{\mathrm{dec}})$ and $q(t) = \exp(-t/\tau_{\mathrm{int}})$. The parameters were taken from the first two cells presented in detail in the main text: $f = 14.5\,\mathrm{kHz}$, $\tau_{\mathrm{dec}} = 100\,\mu\mathrm{s}$, and $\tau_{\mathrm{int}} = 300\,\mu\mathrm{s}$ for Cell 1 (left column) and $f = 5.1\,\mathrm{kHz}$, $\tau_{\mathrm{dec}} = 154\,\mu\mathrm{s}$, and $\tau_{\mathrm{int}} = 590\,\mu\mathrm{s}$ for Cell 2 (right column). (**A**,**B**) Responses of tympanic vibration. $x(t)$ denotes the signal after application of the linear filter $l(\tau)$, arbitrary units, for positive second click (solid line) and negative second click (dashed line). Inter-click intervals in these two shown examples were $\Delta t = 80\,\mu\mathrm{s}$ for Cell 1 and $\Delta t = 130\,\mu\mathrm{s}$ for Cell 2. (**C**,**D**) Corresponding responses of $J(t)$. The second click was tuned so that the maximum of $J(t)$ was equal for positive and negative second clicks. This required click amplitudes of size 1.92 and -2.49 relative to the first click for Cell 1 and 2.09 and -1.27 for Cell 2. (**E**–**H**) Filters $L(\Delta t)$ and $Q(\Delta t)$ extracted according to Eq. (1) in the main text from tuning the maximum of $J(t)$ for many different values of Δt (gray dots). The parameters f, τ_{dec}, and τ_{int} indicated in the plots were obtained by fitting a damped harmonic oscillator and an exponential function to $L(\Delta t)$ and $Q(\Delta t)$, respectively (black lines). The initial part of $Q(\Delta t)$ shows small fluctuations that result from the oscillatory influx of charge following the tympanic vibrations. In panel G, a magnified view of the initial section is shown in the inset.