



Figure 2. Running had variable effects on neural activity, overall increasing spontaneous firing rates and reducing the encoding of sounds.

A. Spontaneous firing rate during sitting and running trials. Green: narrow-spiking neurons, grey: regular-spiking neurons. Red filled circle: population mean, red unfilled circle: median. Running FR: 6.50 ± 0.38 Hz, sitting FR: 4.87 ± 0.32 Hz, mean \pm SEM, $N = 235$ cells, signed-rank $p = 10^{-14}$, effect size $r = 0.35$. Dashed line is unity in all figures.

B. Onset response firing rate evoked by white noise stimulus (0-100 ms) during sitting and running trials (without baseline subtraction). Running FR: 13.97 ± 1.09 , sitting FR: 15.81 ± 1.18 , $N = 177$ cells, signed-rank $p = 10^{-6}$, effect size $r = 0.22$.

C. Example response to a white noise stimulus in two behavioral conditions. Mean response during sitting trials plotted with solid grey line, mean response during running trials plotted with dashed grey line. White noise stimulus is shown in magenta with a dashed line indicating the onset of the stimulus.

D. Distributions of sound modulation indices during sitting (solid line) and running (dashed line). Sitting: 0.54 ± 0.02 , running: 0.23 ± 0.04 , $N = 154$ cells, signed-rank $p = 10^{-19}$, effect size $r = 0.52$.

E. Mean and SEM of sound modulation indices across cortical layers in sitting and running conditions (means \pm SEM, L2/3 sitting = 0.48 ± 0.03 , running = -0.20 ± 0.06 , $n = 10$; L4 sitting = 0.36 ± 0.03 , running = 0.13 ± 0.04 , $n = 19$; L5 sitting = 0.51 ± 0.01 , running = 0.20 ± 0.03 , $n = 58$; L6 sitting = 0.71 ± 0.03 , running = 0.35 ± 0.07 , $n = 14$).

F. Sound modulation index during sitting trials plotted against sound modulation index during running trials.