

# Homeostasis of a representational map in the neocortex

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In the format provided by the  
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## Supplementary Table 1.

Detailed statistical results used in main Figures. In general, one-way ANOVA was applied to test change of parameter of interest over time points, two-sided *t*-test with False Discovery Rate correction was applied to test difference of a parameter of interest between baseline time points and a post-ablation day. Comparison among the three groups (sound responsive ablation, non-sound responsive ablation, and control) was done by permutation test.

| 1)<br>Figure panel | 2)<br>Data type, group                                                                          | 3)<br>Test type                                                                                                                       | 4)<br>Statistical info., Degree of freedom, P values                                                                                                                                                                                                                                |
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| Fig. 1e            | Signal correlation to day 5 in control cohort.                                                  | One-way ANOVA over time points.                                                                                                       | $F(6, 56) = 7.77$ ,<br>$p = 4.21 \times 10^{-6}$                                                                                                                                                                                                                                    |
|                    |                                                                                                 | Two-sided paired <i>t</i> -test between day 3 and day 7, between day 1 and day 9.                                                     | day 3 vs day 7: $p = 0.69$ ,<br>day 1 vs day 9: $p = 0.12$                                                                                                                                                                                                                          |
| Fig. 1g            | Signal correlation for each day in control cohort.                                              | One-way ANOVA over time points.                                                                                                       | $F(6, 56) = 0.55$ ,<br>$p = 0.77$                                                                                                                                                                                                                                                   |
| Fig. 1i            | Normalized correlations of population response vectors in control cohort.                       | Two-sided <i>t</i> -test between baseline days vs. days after ablation with False Discovery Rate (FDR) correction.                    | Diagonal elements: $p = 0.83$ , $p > 0.9$ , $p = 0.059$ , $p = 0.059$ ;<br>Non-diagonal elements: $p = 0.84$ , $p = 0.84$ , $p = 0.029$ , $p = 0.021$ , for day 7, 9, 11, 15, respectively.                                                                                         |
| Fig. 2e            | Normalized correlations of population response vectors in sound responsive ablation cohort.     | Two-sided <i>t</i> -test of normalized average correlation between baseline days vs. days after ablation with FDR correction.         | Diagonal elements: $p = 0.044$ , $p = 0.96$ , $p = 0.96$ , $p = 0.96$ for day 7, 9, 11, 15, respectively.<br>Non-diagonal elements: $p = 2.06 \times 10^{-5}$ , $p = 0.24$ , $p = 0.24$ , $p = 0.014$ for day 7, 9, 11, 15, respectively.                                           |
|                    |                                                                                                 | One-way ANOVA of normalized average correlation across days.                                                                          | Diagonal elements: $F(6, 63) = 0.91$ , $p = 0.49$<br>Non-diagonal elements: $F(6, 63) = 2.25$ , $p = 0.049$ .                                                                                                                                                                       |
| Fig. 2g            | Normalized correlations of population response vectors in non-sound responsive ablation cohort. | Two-sided <i>t</i> -test of normalized average correlation between baseline days vs. days after ablation.                             | Diagonal elements: $p > 0.72$ for all post-ablation days.<br>Non-diagonal elements: $p > 0.83$ for all post-ablation days.                                                                                                                                                          |
|                    |                                                                                                 | One-way ANOVA of normalized average correlation across days.                                                                          | Diagonal elements: $F(6, 63) = 0.68$ , $p = 0.67$ ;<br>Non-diagonal elements: $F(6, 63) = 0.58$ , $p = 0.75$                                                                                                                                                                        |
| Fig. 3a            | Normalized response reliability over time points.                                               | Two-sided <i>t</i> -test of normalized reliability between baseline days vs. days after ablation with FDR corrected <i>p</i> -values. | Sound responsive cohort: $p = 0.034$ on day 7, $p > 0.6$ for the other post-ablation days (day 9, 11, 15);<br>Non-sound responsive cohort: $p = 0.50$ , $p = 0.276$ , $p = 0.28$ , $p = 0.53$ for day 7, 9, 11, 15, respectively;<br>Control: $p > 0.6$ for all post-ablation days. |
|                    | Normalized response reliability across three cohorts.                                           | Permutation test across groups on day 7.                                                                                              | Sound responsive cohort: $p = 0.045$ ;<br>Non-sound responsive cohort and Control: $p > 0.62$ .                                                                                                                                                                                     |
| Fig. 3b            | Normalized correlations from trial-averaged                                                     | Two-sided <i>t</i> -test of normalized correlation coefficient between baseline days vs. days                                         | Sound responsive cohort: $p = 7.90 \times 10^{-4}$ , $p = 0.081$ , $p > 0.60$ , $p = 0.040$ for day 7, 9, 11, 15, respectively;                                                                                                                                                     |

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|         | population response vectors.                                                                | after ablation (asterisks on top).                                                                                                      | Non-sound responsive cohort: $p > 0.60$ for all post-ablation days;<br>Control: $p > 0.60$ , $p = 0.48$ , $p = 0.051$ , $p = 0.051$ for day 7, 9, 11, 15, respectively.                                                                                                                                          |
|         |                                                                                             | Permutation test across groups.                                                                                                         | Sound responsive cohort: $p < 0.005$ , $p = 0.15$ , $p = 0.71$ , $p = 0.305$ for day 7, 9, 11, 15;<br>Non-sound responsive cohort: $p > 0.78$ for all post-ablation days;<br>Control: $p = 0.95$ , $p = 0.37$ , $p = 0.10$ , $p = 0.065$ for day 7, 9, 11, 15, respectively.                                     |
| Fig. 3c | Fraction of sound-responsive neurons over the imaging days.                                 | One-way ANOVA across days.                                                                                                              | Sound responsive cohort: $F(6, 63) = 1.47$ , $p = 0.20$ ;<br>Non-sound responsive cohort: $F(6, 63) = 0.80$ , $p = 0.57$ ;<br>Control: $F(6, 56) = 0.26$ , $p = 0.95$ .                                                                                                                                          |
| Fig. 3d | Normalized best response amplitude of neurons responsive for each day.                      | Two-sided $t$ -test between baseline days and days after ablation with FDR correction.                                                  | Sound responsive cohort: $p = 0.98$ , $p = 0.0045$ , $p = 1.77 \times 10^{-5}$ , $p = 3.71 \times 10^{-7}$ for day 7, 9, 11, 15;<br>Non-sound responsive cohort: $p = 0.835$ , $p = 0.595$ , $p = 0.595$ , $p = 0.0191$ for day 7, 9, 11, 15, respectively;<br>Control: $p > 0.82$ for all post-ablation days.   |
|         |                                                                                             | Permutation test across groups.                                                                                                         | Sound responsive cohort: $p = 0.57$ , $p = 0.11$ , $p = 0.005$ , $p = 0.005$ for day 7, 9, 11, 15;<br>Non-sound responsive cohort: $p = 0.49$ , $p = 0.70$ , $p = 0.925$ , $p = 0.315$ for day 7, 9, 11, 15;<br>Control: $p = 0.475$ , $p = 0.80$ , $p = 0.82$ , $p = 0.995$ for day 7, 9, 11, 15, respectively. |
| Fig. 3f | Change of normalized response amplitudes from baseline at 15th largest stimulus index.      | Two-sided $t$ -test between baseline days and days after ablation with FDR correction at 15th stimulus index.                           | Sound responsive cohort: day 7, $p = 0.0019$ ; day 9, $p = 0.049$ ; day 11, $p = 0.026$ ; day 15, $p = 5.66 \times 10^{-5}$ ;<br>Non-sound responsive cohort: $p > 0.89$ for day 7, 9, 11 respectively and $p = 0.033$ for day 15;<br>Control cohort: $p > 0.9$ for all post-ablation days.                      |
|         |                                                                                             | Permutation test across groups.                                                                                                         | Sound responsive cohort: $p = 0.020$ , $p = 0.11$ , $p = 0.025$ , $p = 0.005$ for day 7, 9, 11, 15, respectively;<br>Non-sound responsive cohort: $p > 0.39$ for all post ablation days;<br>Control: $p > 0.63$ for all post-ablation days.                                                                      |
| Fig. 3g | Normalized non-diagonal correlations from population response vectors shuffled across FOVs. | Comprison between normalized correlation ( $r_n$ ) of neuron-shuffled populations and the lower boundary ( $CI_L$ ) of the shaded area. | Sound responsive cohort: day 7: $r_n = 0.62$ , $CI_L = 0.71$ ; day 9: $r_n = 0.59$ , $CI_L = 0.66$ ; day 11: $r_n = 0.69$ , $CI_L = 0.70$ ; day 15: $r_n = 0.63$ , $CI_L = 0.66$ .                                                                                                                               |
|         |                                                                                             | Permutation test across groups by shuffling neurons.                                                                                    | Sound responsive cohort vs. Control cohort: $p < 0.006$ for all post-ablation days;<br>Non-sound responsive cohort vs. control cohort: $p = 0.010$ , $p = 0.86$ , $p = 0.19$ , $p = 0.74$ for day 7, 9, 11, 15, respectively.                                                                                    |
| Fig. 3h | Color map displaying the change in the fraction of pairs                                    | Two-way ANOVA across days and across amplitude bins.                                                                                    | Sound responsive cohort (left) : $F(6, 270) = 3.43$ , $p = 0.0028$ across days, $F(3, 270) = 8.33$ , $p = 2.55 \times 10^{-5}$ across amplitude bins (Average                                                                                                                                                    |

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|         | among responsive neurons showing a high signal correlation.                                                          |                                                                                                                             | <p>number of cell pairs during baseline days for each best response bin: 0-0.15 <math>\Delta F/F</math> bin of best amplitude: <math>3.1 \pm 1.1</math>; 0.15-0.25 bin: <math>28.6 \pm 10.2</math>; 0.25-0.55 bin: <math>68.1 \pm 15.2</math>; 0.55-10 bin: <math>54.2 \pm 15.5</math>).</p> <p>Non-sound responsive ablation (middle): <math>F(6, 269) = 1.26</math>, <math>p = 0.27</math> across days, <math>F(3, 269) = 0.894</math>, <math>p = 0.45</math> across amplitude bins (Average number of cell pairs: 0-0.15 bin: <math>4.8 \pm 1.0</math>; 0.15-0.25 bin: <math>43.5 \pm 12.3</math>; 0.25-0.55 bin: <math>105.9 \pm 24.9</math>; 0.55-10 bin: <math>68.6 \pm 20.6</math>).</p> <p>Control (right): <math>F(6, 241) = 1.91</math>, <math>p = 0.080</math> across days, <math>F(3, 241) = 2.01</math>, <math>p = 0.11</math> across amplitude bins (Average number of cell pairs: 0-0.15 bin: <math>2.3 \pm 0.8</math>; 0.15-0.25 bin: <math>13.5 \pm 4.4</math>; 0.25-0.55 bin: <math>32.8 \pm 9.1</math>; 0.55-10 bin: <math>33.4 \pm 9.9</math>).</p> |
| Fig. 3i | Change in fraction of neuron pairs with high signal correlation from baseline at the largest best response category. | Two-sided $t$ -test between baseline days vs. days after ablation with FDR correction.                                      | Sound responsive cohort: $p = 0.29$ , $p = 0.017$ , $p = 0.0017$ , $p = 1.05 \times 10^{-4}$ for day 7, 9, 11, 15; Non-sound responsive cohort: $p = 0.062$ , $p = 0.062$ , $p = 0.42$ , $p = 0.062$ for day 7, 9, 11, 15, respectively; Control: $p > 0.14$ for all post-ablation days;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|         |                                                                                                                      | Permutation test across groups.                                                                                             | Sound responsive cohort: $p = 0.65$ , $p = 0.23$ , $p = 0.035$ , $p = 0.005$ for day 7, 9, 11, 15, respectively; Non-sound responsive cohort: $p > 0.20$ for all post-ablation days; Control: $p > 0.58$ for all post-ablation days.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Fig. 4a | Response stability as the fraction of neurons categorized as sound responsive on two consecutive imaging days.       | One-way ANOVA across days.                                                                                                  | Sound responsive cohort: $F(5, 54) = 6.03$ , $p = 0.0002$ ; Non-responsive cohort, $F(5, 54) = 0.39$ , $p = 0.85$ ; Control cohort, $F(5, 48) = 0.50$ , $p = 0.78$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|         |                                                                                                                      | Post-hoc two-sided $t$ -test between change during baseline days vs. change from day 5 to day 7 in sound responsive cohort. | $p = 9.47 \times 10^{-5}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|         |                                                                                                                      | Two-sided $t$ -test with FDR correction on day 5 $\rightarrow$ 7.                                                           | Sound responsive cohort vs. control, $p = 0.064$ ; Sound responsive cohort vs the non-responsive cohort, $p = 0.017$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Fig. 4b | Average best response amplitude normalized to day 5 (left) in the three experimental cohorts.                        | Left; two-sided $t$ -test between day 3 vs. day 7.                                                                          | Sound responsive cohort: $p = 4.54 \times 10^{-4}$ ; Non-sound responsive cohort, $p = 0.33$ ; Control, $p = 0.63$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|         |                                                                                                                      | Group comparison by one-sided $t$ -test with FRA correction on day 7.                                                       | Sound responsive cohort vs. control, $p = 0.039$ ; Sound responsive cohort vs. Non-sound responsive cohort, $p = 0.096$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Fig. 4b | Average best response amplitude normalized to days 1 and 3 (right) in the                                            | Right: One-way ANOVA across days.                                                                                           | Sound responsive cohort: $F(5, 54) = 6.19$ , $p = 0.0001$ ; Non-sound responsive cohort: $F(5, 54) = 2.14$ , $p = 0.075$ ; Control: $F(5, 48) = 0.45$ , $p = 0.81$ ;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

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|         | three experimental cohorts.                                                                                                                                                                               | Two-sided $t$ -test with FDR correction for group comparison.                                                                             | Sound responsive cohort vs. control: $p = 0.74$ , $p = 0.14$ , $p = 0.017$ , $p = 0.0096$ for day 7, 9, 11, 15, respectively;<br>Sound responsive cohort vs. Non-sound responsive cohort: $p = 0.74$ , $p = 0.14$ , $p = 0.017$ , $p = 0.23$ for day 7, 9, 11, 15;<br>Non-sound responsive cohort vs. Control: $p = 0.74$ , $p = 0.88$ , $p = 0.82$ , $p = 0.068$ for day 7, 9, 11, 15.                                                                                                                                                                                                                           |
| Fig. 4c | Change of tuning width for neurons responsive on day 5 (left).                                                                                                                                            | Two-sided $t$ -test between baseline days vs. days after ablation.                                                                        | Sound responsive cohort: day 7: $p = 0.011$ ; day 9: $p = 0.25$ ; day 11: $p = 0.011$ ; day 15: $p = 0.0010$ .<br>Non-sound responsive cohort: $p > 0.48$ for all post-ablation days;<br>Control: $p > 0.08$ for all post-ablation days.                                                                                                                                                                                                                                                                                                                                                                          |
|         |                                                                                                                                                                                                           | Permutation test of sound responsive ablation across groups.                                                                              | $p = 0.040$ , $p = 0.25$ , $p < 0.005$ , $p = 0.015$ for day 7, 9, 11, 15, respectively.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Fig. 4c | Change of tuning width for neurons not responsive on day 5 but responsive on another day (Right).                                                                                                         | Two-sided $t$ -test between baseline days vs. days after ablation.                                                                        | Sound responsive cohort: $p = 0.14$ , $p = 0.57$ , $p = 0.57$ , $p = 0.034$ for day 7, 9, 11, 15, respectively.<br>Non-sound responsive cohort: $p > 0.52$ for all post-ablation days.<br>Control: $p > 0.51$ for all post-ablation days.                                                                                                                                                                                                                                                                                                                                                                         |
|         |                                                                                                                                                                                                           | Permutation test of sound responsive ablation across groups.                                                                              | $p = 0.17$ , $p = 0.39$ , $p = 0.41$ , $p = 0.065$ for day 7, 9, 11, 15, respectively.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Fig. 4d | Change in fraction of neuron pairs with high signal correlation, categorized as responsive on day 5 for sound responsive cohort (left), non-sound responsive cohort (middle), and control cohort (right). | Two-way ANOVA across days and across amplitude bins.<br><br>Two-sided $t$ -test between baseline days and days after ablation (day 9-15). | Sound responsive cohort (left): $F(6, 270) = 4.87$ , $p = 9.52 \times 10^{-5}$ across days; $F(3, 270) = 5.57$ , $p = 0.0010$ across amplitude bins.<br>$t$ -test, $p = 8.68 \times 10^{-6}$ .<br><br>Non-sound responsive cohort (middle): $F(6, 270) = 0.43$ , $p = 0.86$ across days; $F(3, 270) = 1.035$ , $p = 0.38$ across amplitude bins.<br>$t$ -test, $p = 0.098$ .<br><br>Control (right):<br>$F(6, 242) = 2.25$ , $p = 0.039$ across days; $F(3, 242) = 0.025$ , $p = 0.99$ across amplitude bins;<br>$t$ -test, $p = 0.41$ .                                                                          |
| Fig. 4e | Change in fraction of neuron pairs with high signal correlations for neurons of the largest best response category.                                                                                       | Permutation test across groups to each experimental cohort.                                                                               | Sound responsive cohort: $p = 0.010$ , $p = 0.035$ , $p = 0.13$ , $p = 0.21$ for day 7, 9, 11, 15, respectively.<br>Non-sound responsive cohort: $p > 0.71$ for all post-ablation days.<br>Control: $p > 0.41$ for all post-ablation days.<br>(Average number of cell pairs responsive on day 5 for each best response bin, sound responsive ablation cohort: 0-0.15 $\Delta F/F$ bin of best amplitude: $1.4 \pm 0.5$ ; 0.15-0.25 bin: $14.1 \pm 6.0$ ; 0.25-0.55 bin: $36.0 \pm 9.9$ ; 0.55-10 bin: $27.8 \pm 9.1$ ; non-sound responsive ablation: 0-0.15 bin: $2.7 \pm 0.8$ ; 0.15-0.25 bin: $20.3 \pm 6.4$ ; |

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|         |                                                                                                                                                                                                                                    |                                                                                                                                                | 0.25-0.55 bin: 56.7±15.6; 0.55-10 bin: 41.2±13.6; control: 0-0.15 bin: 0.9±0.3; 0.15-0.25 bin: 6.7±2.3; 0.25-0.55 bin: 16.7±4.8; 0.55-10 bin: 17.3±5.1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Fig. 4f | Colormaps showing changes in fraction of neuron pairs categorized as not responsive on day 5 but responsive on the other day for sound responsive cohort (left), non-sound responsive cohort (middle), and control cohort (right). | Two-way ANOVA across days and across amplitude bins.<br><br>Two-sided <i>t</i> -test between baseline days and days after ablation (day 9-15). | Sound responsive cohort (left): $F(5, 231) = 3.02, p = 0.012$ across days; $F(3, 231) = 3.09, p = 0.028$ across amplitude bins; <i>t</i> -test, $p = 0.034$ .<br><br>Non-sound responsive cohort (middle): $F(5, 229) = 1.43, p = 0.22$ across days; $F(3, 229) = 2.749, p = 0.044$ across amplitude bins; <i>t</i> -test, $p = 0.22$ .<br><br>Control cohort (right): $F(5, 206) = 0.58, p = 0.71$ across days; $F(3, 206) = 0.51, p = 0.68$ across amplitude bins; <i>t</i> -test, $p = 0.79$ .                                                                                                                                                                                                                      |
| Fig. 4g | Changes in fraction of neuron pairs categorized as not responsive on day 5 but responsive on the other day.                                                                                                                        | Permutation test across groups to each experimental cohort.                                                                                    | Sound responsive cohort: $p = 0.91, p = 0.21, p = 0.040, p = 0.010$ for day 7, 9, 11, 15, respectively.<br>Non-sound responsive cohort: $p > 0.11$ for all post-ablation days.<br>Control cohort: $p > 0.41$ for all post-ablation days.<br>(Average number of cell pairs unresponsive on day 5 but responsive on another day for each best response bin, sound responsive ablation cohort: 0-0.15 bin: 0.4±0.2; 0.15-0.25 bin: 4.0±1.0; 0.25-0.55 bin: 8.9±2.3; 0.55-10 bin: 13.4±7.0; non-sound responsive ablation: 0-0.15 bin: 0.5±0.2; 0.15-0.25 bin: 6.1±2.1; 0.25-0.55 bin: 14.2±4.1; 0.55-10 bin: 9.7±3.4; control: 0-0.15 bin: 0.4±0.1; 0.15-0.25 bin: 2.4±0.8; 0.25-0.55 bin: 4.3±1.1; 0.55-10 bin: 7.3±2.1) |
| Fig. 4h | Colormaps showing changes in fraction of neuron pairs of neurons in which one neuron was categorized responsive on day 5 and the other categorized not responsive on day 5 but responsive on another day.                          | Two-way ANOVA across days and across amplitude bins.                                                                                           | Sound responsive cohort (left): $F(5, 217) = 0.33, p = 0.89$ across days; $F(3, 217) = 2.85, p = 0.038$ across amplitude bins.<br><br>Non-sound responsive cohort (middle): $F(5, 221) = 0.25, p = 0.94$ across days; $F(3, 221) = 0.070, p = 0.98$ across amplitude bins.<br><br>.Control cohort (right): $F(5, 195) = 0.42, p = 0.83$ across days; $F(3, 195) = 2.53, p = 0.059$ across amplitude bins.                                                                                                                                                                                                                                                                                                              |
| Fig. 4i | Changes in fraction of neuron pairs of neurons in which one neuron was categorized responsive on day 5 and the other categorized not                                                                                               | Permutation test across groups for all post-ablation days.                                                                                     | Sound responsive cohort : $p > 0.18$ ;<br>Non-sound responsive cohort: $p > 0.11$ ;<br>Control : $p > 0.43$ .<br>(Average number of cell pairs responsive on day 5 vs. unresponsive on day 5 for each best response bin, sound responsive ablation cohort: 0-0.15 bin: 0.8±0.3; 0.15-0.25 bin: 9.3±3.4; 0.25-0.55 bin: 21.2±5.6; 0.55-10 bin:                                                                                                                                                                                                                                                                                                                                                                          |

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|         | responsive on day 5 but responsive on another day.                                                                                                                                                      |                                                                                                                                                             | 16.8±4.8; non-sound responsive ablation: 0-0.15 bin: 1.0±0.3; 0.15-0.25 bin: 14.6±4.8; 0.25-0.55 bin: 33.8±8.4; 0.55-10 bin: 21.9±6.5; control: 0-0.15 bin: 0.7±0.3; 0.15-0.25 bin: 3.8±1.2; 0.25-0.55 bin: 10.3±3.1; 0.55-10 bin: 11.2±3.5)                                                                                                                                                                                                   |
| Fig. 5d | Normalized change in fraction of spared neurons with high signal correlation (>0.6) between spared neurons responsive on day 5 and high category neurons.                                               | One-way ANOVA over days.                                                                                                                                    | Sound responsive ablation $F(5, 114) = 3.58, p = 0.0048$ ;<br>Non-responsive ablation: $F(5, 114) = 3.7, p = 0.0039$ ;<br>Control: $F(5, 101) = 1.44, p = 0.21$ .                                                                                                                                                                                                                                                                              |
|         |                                                                                                                                                                                                         | Comparison across groups by two-sided $t$ -test with FDR correction (two-colored asterisks on top)                                                          | Sound responsive ablation vs. control on day 7, $p = 0.042$ ; day 9, $p = 0.0051$ ; day 11, $p = 0.049$ ; day 15, $p = 0.061$ ;<br>Sound responsive ablation vs. non-sound responsive ablation on day 7, $p = 0.15$ ; day 9, $p = 0.057$ ; day 11, $p = 0.18$ ; day 15, $p = 0.85$ ;<br>Non-responsive ablation vs. control on day 7, $p = 0.16$ ; day 9, $p = 0.047$ ; day 11, $p = 0.18$ ; day 15, $p = 0.061$ .                             |
|         | Normalized change in fraction of spared neurons with high signal correlation (>0.6) between spared neurons non-responsive on day 5 but gaining responsiveness on a given day and high category neurons. | Comparison across groups by one-sided $t$ -test with FDR correction.                                                                                        | Sound responsive ablation vs. Control on day 7, $p = 0.21$ ; day 9, $p = 0.05$ ; day 11, $p = 0.049$ ; day 15, $p = 0.43$ ;<br>Sound responsive ablation vs. Non-responsive ablation on day 7, $p = 0.21$ ; day 9, $p = 0.29$ ; day 11, $p = 0.054$ ; day 15, $p = 0.47$ ;<br>Non-responsive ablation vs. Control on day 7, $p = 0.15$ ; day 9, $p = 0.086$ ; day 11, $p = 0.35$ ; day 15, $p = 0.43$ .<br>(two-colored asterisks on top)      |
|         |                                                                                                                                                                                                         | One-sided $t$ -test with FDR correction between early baseline days (day 1 and 3) and late post ablation days (day 9, 11, 15) for each experimental cohort. | Sound responsive cohort: $p = 0.043$ ;<br>Non-sound responsive cohort: $p = 0.21$ ;<br>Control cohort: $p = 0.41$ .<br>(asterisk at bottom)                                                                                                                                                                                                                                                                                                    |
| Fig. 6c | Normalized response reliability across trials of single neurons averaged for all excitatory (left) on each given day.                                                                                   | Two-sided $t$ -test of normalized reliability between baseline days vs. days after ablation with FDR correction. sound responsive cohort.                   | Sound responsive cohort (orange): $p = 0.041, p = 0.041, p = 0.33, p = 0.14$ for day 7, 9, 11, 15, respectively;<br>Non-sound responsive cohort (blue): $p > 0.60$ for all post-ablation days;<br>Control (green): $p > 0.14$ for all post-ablation days.                                                                                                                                                                                      |
|         |                                                                                                                                                                                                         | Permutation test across groups (one-sided $p$ -values).                                                                                                     | Sound responsive cohort (orange): $p = 0.048, p = 0.035, p = 0.26, p = 0.27$ for day 7, 9, 11, 15, respectively;<br>Non-sound responsive cohort (blue): $p > 0.13$ for all post-ablation days;<br>Control (green): $p > 0.16$ for all post-ablation days.<br>(Average number of responsive excitatory neurons during baseline days for sound responsive cohort: $103.7 \pm 19.1$ (mean $\pm$ s.e.m. across mice); non-sound responsive cohort: |

|         |                                                                                                                                |                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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|         |                                                                                                                                |                                                                                                                                    | 105.8±11.4; control cohort: 117.7±26.7, respectively)                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Fig. 6c | Normalized response reliability across trials of single neurons averaged for all inhibitory (right) neurons on each given day. | Two-sided <i>t</i> -test of normalized reliability between baseline days vs. days after ablation with FDR correction.              | Sound responsive cohort (orange): $p = 0.32$ , $p = 0.033$ , $p = 0.0074$ , $p = 0.049$ for day 7, 9, 11, 15, respectively;<br>Non-sound responsive cohort (blue): $p > 0.66$ for all post-ablation days;<br>Control (green): $p > 0.36$ for all post-ablation days.                                                                                                                                                                                                        |
|         |                                                                                                                                | One-sided <i>p</i> -values from permutation test across groups.                                                                    | Sound responsive cohort: $p = 0.15$ , $p = 0.013$ , $p = 0.0025$ , $p = 0.12$ for day 7, 9, 11, 15, respectively;<br>Non-sound responsive cohort: $p > 0.32$ for all post-ablation days;<br>Control cohort: $p > 0.27$ for all post-ablation days.<br>(Average number of responsive inhibitory neurons during baseline days for sound responsive cohort: 6.8±2.1 (mean ± s.e.m. across mice); non-sound responsive cohort: 7.3±2.1; control cohort: 8.0±1.9, respectively.) |
| Fig. 6d | Fraction of sound responsive neurons for excitatory (Left) and inhibitory (Right) neurons.                                     | Two-sided <i>t</i> -test of fraction between baseline days vs. days after ablation with FDR correction.                            | Excitatory neurons<br>Sound responsive cohort for all post-ablation days: $p > 0.30$ ;<br>Non-sound responsive cohort for all post-ablation days: $p > 0.90$ ;<br>Control cohort: $p > 0.61$ .<br><br>Inhibitory neurons<br>Sound responsive cohort: $p = 0.022$ on day 11, but $p > 0.47$ for the other post-ablation days;<br>Non-sound responsive cohort: $p > 0.97$ ;<br>Control: $p > 0.57$ for all post-ablation days.                                                |
| Fig. 6e | Normalized best response amplitude of excitatory (left) neurons responsive for each day.                                       | One-sided <i>t</i> -test of best response between baseline days vs. days after ablation in excitatory neurons with FDR correction. | Sound responsive cohort: $p = 0.45$ , $p = 0.045$ , $p = 0.0017$ , $p = 0.0003$ for day 7, 9, 11, 15, respectively;<br>Non-sound responsive cohort: $p = 0.38$ , $p = 0.076$ , $p = 0.15$ , $p = 0.076$ for day 7, 9, 11, 15, respectively;<br>Control cohort: $p > 0.48$ for all post-ablation days; inhibitory neurons: $p > 0.25$ for all post-ablation days.                                                                                                            |
|         |                                                                                                                                | Permutation test of each ablation cohort to control cohort for all post-ablation days.                                             | Sound responsive ablation cohort: $p > 0.05$ , for day 7, 9, 11, $p < 0.025$ for day 15, respectively;<br>Non-sound responsive ablation cohort: $p > 0.05$ , for all post-ablation days.                                                                                                                                                                                                                                                                                    |
| Fig. 6e | Normalized best response amplitude of inhibitory (right) neurons responsive for each day.                                      | One-sided <i>t</i> -test between baseline days vs. days after ablation in inhibitory neurons with FDR correction.                  | Sound responsive cohort: $p = 0.053$ , $p = 0.043$ , $p = 0.078$ , $p = 0.17$ for day 7, 9, 11, 15, respectively;<br>Non-sound responsive cohort: $p = 0.37$ , $p = 0.059$ , $p = 0.059$ , $p = 0.44$ for day 7, 9, 11, 15, respectively.                                                                                                                                                                                                                                   |
|         |                                                                                                                                | Permutation test of each ablation cohort to control                                                                                | Sound responsive ablation cohort: $p > 0.05$ , for day 7, 9, 15, $p < 0.05$ for day 11, respectively;                                                                                                                                                                                                                                                                                                                                                                       |

|         |                                                                                                                                                |                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                              |
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|         |                                                                                                                                                | cohort for all post-ablation days.                                                                                                                                                                                                                            | baseline normalized amplitude on day 15: $1.15 \pm 0.26$ .<br>Non-sound responsive ablation cohort to control cohort: $p > 0.05$ , for day 7, 15, $p < 0.025$ for day 9, 11, respectively.                                                                   |
| Fig. 6f | Normalized fraction of neurons responsive on both days for excitatory (left) neurons.                                                          | Two-sided $t$ -test between the overlap during baseline days ( $1 \rightarrow 3$ , $3 \rightarrow 5$ ) vs. the overlap during post-ablation days ( $5 \rightarrow 7$ , $7 \rightarrow 9$ , $9 \rightarrow 11$ , $11 \rightarrow 15$ ) for excitatory neurons. | Sound responsive ablation, $p = 0.0024$ ;<br>Non-sound responsive ablation, $p = 0.21$ ;<br>Control, $p = 0.67$ ;                                                                                                                                            |
|         |                                                                                                                                                | Two-sided $t$ -test with FDR adjustment for group comparison in the overlap during post-ablation days, in excitatory neurons.                                                                                                                                 | Sound responsive ablation vs. Non-sound responsive ablation: $p = 9.11 \times 10^{-5}$ ;<br>Sound responsive ablation vs. Control: $p = 0.003$ ;<br>Non-sound responsive ablation vs. Control: $p = 0.34$ ;                                                  |
| Fig. 6f | Normalized fraction of neurons responsive on both days for inhibitory (right) neurons.                                                         | Two-sided $t$ -test between the overlap during baseline days vs. the overlap during post-ablation days for inhibitory neurons.                                                                                                                                | Sound responsive ablation: $p = 7.49 \times 10^{-4}$ ;<br>Non-sound responsive ablation: $p = 0.15$ ;<br>Control: $p = 0.15$ .                                                                                                                               |
|         |                                                                                                                                                | Two-sided $t$ -test with FDR adjustment for group comparison during post-ablation days, in inhibitory neurons.                                                                                                                                                | Sound responsive ablation vs. non-sound responsive ablation: $p = 1.79 \times 10^{-4}$ ;<br>Sound responsive ablation vs. control: $p = 3.99 \times 10^{-4}$ ;<br>Non-sound responsive ablation vs. control, $p = 0.76$ .                                    |
| Fig. 7d | Normalized correlations of population response vectors averaged across diagonal elements and non-diagonal elements in the similarity matrices. | Two-sided $t$ -test of normalized average correlation between baseline days vs. days after ablation with FDR correction.                                                                                                                                      | Diagonal elements: $p = 4.84 \times 10^{-4}$ , $p = 0.011$ , $p = 0.011$ , $p = 0.043$ for day 7, 9, 11, 15, respectively;<br>Non-diagonal elements: $p = 7.87 \times 10^{-4}$ , $p = 0.039$ , $p = 0.0047$ , $p = 0.50$ for day 7, 9, 11, 15, respectively. |
|         |                                                                                                                                                | One-way ANOVA of normalized average correlation across days.                                                                                                                                                                                                  | Diagonal elements: $F(6, 34) = 4.11$ , $p = 0.0033$ ;<br>Non-diagonal elements: $F(6, 34) = 2.19$ , $p = 0.068$ .                                                                                                                                            |
| Fig. 8a | Normalized response reliability across trials of single neurons averaged across all neurons on each given day.                                 | One-way ANOVA over the imaging days.                                                                                                                                                                                                                          | $F(6, 34) = 2.76$ , $p = 0.027$ .                                                                                                                                                                                                                            |
|         |                                                                                                                                                | Two-sided $t$ -test between baseline days vs. day 7, 9, 11, and 15, after FDR correction.                                                                                                                                                                     | $p = 0.016$ , $0.0014$ , $0.0036$ , $0.048$ for day 7, 9, 11, and 15.                                                                                                                                                                                        |
|         |                                                                                                                                                | Permutation test for group comparison between inhibitory neuron cohort and control.                                                                                                                                                                           | $p = 0.10$ , $p = 0.0050$ , $p = 0.020$ , $p = 0.48$ for day 7, 9, 11, 15, respectively.                                                                                                                                                                     |
| Fig. 8b | Normalized correlations averaged across non-diagonal elements in the similarity matrix                                                         | One-way ANOVA over the imaging days.                                                                                                                                                                                                                          | $F(6, 34) = 0.68$ , $p = 0.66$ .                                                                                                                                                                                                                             |
|         |                                                                                                                                                | Two-sided $t$ -test of normalized correlation coefficient between                                                                                                                                                                                             | $p > 0.26$ for all post-ablation days.                                                                                                                                                                                                                       |

|         |                                                                                                                                                                                  |                                                                                                                                                                 |                                                                                                               |
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|         | constructed from trial-averaged population response vectors.                                                                                                                     | baseline days vs. days after ablation with FDR correction.                                                                                                      |                                                                                                               |
|         |                                                                                                                                                                                  | Permutation test across inhibitory neuron ablation and control cohorts.                                                                                         | $p = 0.21, p = 0.69, p = 0.87, p = 0.93$ for day 7, 9, 11, 15, respectively.                                  |
| Fig. 8c | Fraction of sound-responsive neurons over the imaging days.                                                                                                                      | One-way ANOVA over the imaging days.                                                                                                                            | $F(6, 34) = 0.36, p = 0.90$ .                                                                                 |
| Fig. 8d | Normalized best response amplitude of neurons responsive for each day.                                                                                                           | One-way ANOVA across days.                                                                                                                                      | $F(6, 34) = 0.95, p = 0.47$ .                                                                                 |
|         |                                                                                                                                                                                  | Two-sided $t$ -test between baseline days vs. days after ablation.                                                                                              | $p = 0.43, p = 0.43, p = 0.13, p = 0.43$ for day 7, 9, 11, 15, respectively.                                  |
|         |                                                                                                                                                                                  | Permutation test across groups.                                                                                                                                 | $p = 0.68, p = 0.38, p = 0.36, p = 0.13$ for day 7, 9, 11, 15, respectively.                                  |
| Fig. 8e | Change of normalized response amplitudes from baseline at 15th largest stimulus index in the tuning curve over days.                                                             | Two-sided $t$ -test between baseline days vs. days after ablation with FDR correction.                                                                          | $p = 0.34, p = 0.043, p = 0.17, p = 0.34$ for day 7, 9, 11, 15, respectively.                                 |
|         |                                                                                                                                                                                  | Permutation test for comparison between inhibitory neuron ablation and control.                                                                                 | $p = 0.49, p = 0.18, p = 0.085, p = 0.16$ for day 7, 9, 11, 15, respectively.                                 |
| Fig. 8f | Change in fraction of neuron pairs with high signal correlation from baseline at the largest best response category.                                                             | Two-sided $t$ -test between baseline days vs. days after ablation with FDR correction.                                                                          | $p = 0.079, p = 0.017, p = 0.10, p = 0.15$ for day 7, 9, 11, 15, respectively.                                |
|         |                                                                                                                                                                                  | Permutation test across inhibitory neuron ablation and control.                                                                                                 | $p = 0.37, p = 0.25, p = 0.27, p = 0.17$ for day 7, 9, 11, 15, respectively.                                  |
| Fig. 8g | Response stability as the fraction of neurons categorized as sound responsive on two consecutive imaging days.                                                                   | Two-sided $t$ -test of normalized fraction of stably responsive neurons during baseline days ( $1 \rightarrow 3, 3 \rightarrow 5$ ) vs. day $5 \rightarrow 7$ . | $p = 0.026$                                                                                                   |
|         |                                                                                                                                                                                  | Two-sided $t$ -test between inhibitory neuron ablation cohort vs. control cohort during post-ablation days ( $7 \rightarrow 9, 9 \rightarrow 11$ ).             | $p = 0.048$                                                                                                   |
| Fig. 8i | Change in fraction of spared neurons with high signal correlation ( $>0.6$ ) between spared neurons responsive on day 5 and high category neurons in inhibitory neuron ablation. | Comparison between inhibitory neuron ablation cohort vs. control cohort by two-sided $t$ -test with FDR correction.                                             | day 5: $p = 0.025$ ; day 7: $p = 0.0061$ ; day 9: $p = 0.0053$ ; day 11: $p = 0.0028$ ; day 15: $p = 0.018$ . |
|         | Change in fraction of spared neurons with high signal                                                                                                                            | Comparison between inhibitory neuron ablation                                                                                                                   | day 7: $p = 0.35$ ; day 9: $p = 0.028$ ; day 11: $p = 0.072$ ; day 15: $p = 0.24$ .                           |

|  |                                                                                                                                          |                                                                   |                                                                 |
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|  | correlation ( $>0.6$ ) between spared neurons newly responsive on the other day and high category neurons in inhibitory neuron ablation. | cohort vs. control cohort by two-sided $t$ -test.                 |                                                                 |
|  |                                                                                                                                          | Two-sided $t$ -test between baseline days vs. days during 9 – 15. | Inhibitory neuron ablation: $p = 0.032$ ; Control: $p = 0.31$ . |

## Supplementary Table 2.

Same as Supplementary Table 1., but statistical results used in Extended Data Figures.

| 1)<br>Figure panel    | 2)<br>Data type, group                                                                                       | 3)<br>Test type                                                                             | 4)<br>Statistical info., Degree of freedom, P values                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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| Extended Data Fig. 4f | Number of microablated neurons per mouse across experimental groups.                                         | One-way ANOVA test across groups.                                                           | $F(2, 23) = 0.47, p = 0.63$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Extended Data Fig. 4g | Number of high category neurons per mouse.                                                                   | One-way ANOVA test across groups.                                                           | $F(3, 30) = 0.56, p = 0.65$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Extended Data Fig. 4h | Number of low category neurons per mouse.                                                                    | One-way ANOVA test across groups.                                                           | $F(3, 30) = 0.12, p = 0.95$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Extended Data Fig. 4i | Response amplitude of microablated neurons averaged during baseline days.                                    | Two-sided <i>t</i> -test with FDR correction.                                               | Sound responsive ablation vs. non-responsive ablation: $p = 2.68 \times 10^{-9}$ ;<br>Sound responsive ablation vs. inhibitory neuron ablation: $p = 2.99 \times 10^{-5}$ ;<br>Non-responsive ablation vs. inhibitory neuron ablation: $p = 3.90 \times 10^{-9}$ .                                                                                                                                                                                                                                     |
| Extended Data Fig. 4k | Response amplitude of low category neurons during baseline days.                                             | One-way ANOVA test across groups.                                                           | $F(3, 30) = 1.98, p = 0.14$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Extended Data Fig. 4l | Number of spared neurons per FOV considered for analysis.                                                    | One-way ANOVA test across groups.                                                           | $F(3, 31) = 0.25, p = 0.86$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Extended Data Fig. 5a | Normalized correlations averaged across diagonal elements and non-diagonal elements.                         | Two-sided <i>t</i> -test between baseline days vs. days after ablation with FDR correction. | Average of diagonal elements: $p = 0.93, p = 0.93, p = 0.53, p = 0.084$ , for day 7, 9, 11, 15, respectively;<br>Average of non-diagonal elements: $p = 0.88, p = 0.28, p = 0.0072, p = 0.0072$ for day 7, 9, 11, 15, respectively.                                                                                                                                                                                                                                                                    |
| Extended Data Fig. 5e | Cumulative distribution of baseline normalized correlation coefficient.                                      | Dunn's test.                                                                                | $Q_{\text{critical}} = 2.39$<br>all <i>Q</i> values between groups for both diagonal and non-diagonal components in the similarity matrices, $Q < Q_{\text{critical}}$ .                                                                                                                                                                                                                                                                                                                               |
|                       |                                                                                                              | Mann-Whitney <i>U</i> test between groups with FDR correction.                              | The diagonal and the non-diagonal components, all <i>p</i> values, $p > 0.5$ .                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Extended Data Fig. 5f | Cumulative distribution of baseline normalized correlation coefficient on day 7 in the representational map. | Dunn's test.                                                                                | Diagonal components, $Q_{\text{critical}} = 2.39$ :<br>Sound responsive ablation vs. Control: $Q = 2.93$ ;<br>Sound responsive ablation vs. Non-responsive ablation: $Q < Q_{\text{critical}}$ ;<br>Non-responsive ablation vs. Control: $Q < Q_{\text{critical}}$ ;<br><br>Non-diagonal components:<br>Sound responsive ablation vs. Control: $Q = 3.44$ ;<br>Sound responsive ablation vs. Non-responsive ablation: $Q = 2.57$ ;<br>Non-responsive ablation vs. Control: $Q < Q_{\text{critical}}$ . |
|                       |                                                                                                              | Mann-Whitney <i>U</i> test with FDR                                                         | Diagonal components:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

|                       |                                                                                                                                                                                                                                         |                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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|                       |                                                                                                                                                                                                                                         | correction between experimental cohorts.                                                                                    | <p>Sound responsive ablation vs. Control: <math>p = 0.016</math>;</p> <p>Sound responsive ablation vs. Non-responsive ablation: <math>p = 0.077</math>;</p> <p>Non-responsive ablation vs. Control: <math>p = 0.20</math>;</p> <p>Non-diagonal components:</p> <p>Sound responsive ablation vs. Control: <math>p = 0.0018</math>;</p> <p>Sound responsive ablation vs. Non-responsive ablation: <math>p = 0.015</math>;</p> <p>Non-responsive ablation vs. Control: <math>p = 0.33</math>.</p> |
| Extended Data Fig. 5k | Simulated non-diagonal correlation of similarity matrix.                                                                                                                                                                                | Two-sided $t$ -test between baseline correlation vs. simulated correlation after downscaling.                               | <p>Sound responsive cohort: <math>p = 0.0083</math>;</p> <p>Non-sound responsive cohort: <math>p = 0.19</math>;</p> <p>Control: <math>p = 0.27</math>.</p>                                                                                                                                                                                                                                                                                                                                     |
|                       |                                                                                                                                                                                                                                         | Two-sided $t$ -test between simulated correlation after downscaling vs. correlation on day 7.                               | <p>Sound responsive: <math>p = 0.42</math>;</p> <p>Non-sound responsive: <math>p = 0.89</math>;</p> <p>Control cohort: <math>p = 0.58</math>.</p>                                                                                                                                                                                                                                                                                                                                              |
| Extended Data Fig. 6a | Baseline-normalized Pearson correlations of population vectors averaged across diagonal elements (left) and non-diagonal elements (right), split into pure tones (blue) and complex sounds (red), for sound responsive ablation cohort. | Two-way ANOVA between PT and CS stimuli and across days.                                                                    | <p>Diagonal elements: <math>F(1, 132) = 0.31, p = 0.58</math> between PT and CS stimuli; <math>F(6, 132) = 1.52, p = 0.18</math> across days.</p> <p>Non-diagonal elements: <math>F(1, 132) = 0.13, p = 0.72</math> between PT and CS stimuli; <math>F(6, 132) = 1.32, p = 0.25</math> across days.</p>                                                                                                                                                                                        |
|                       |                                                                                                                                                                                                                                         | Two-sided $t$ -test between PT and CS stimuli with FDR correction across post-ablation days.                                | <p>Diagonal elements: <math>p &gt; 0.65</math>;</p> <p>Non-diagonal elements: <math>p &gt; 0.57</math>.</p>                                                                                                                                                                                                                                                                                                                                                                                    |
| Extended Data Fig. 6b | Normalized response reliability across trials for PT and CS stimuli for sound responsive ablation cohort.                                                                                                                               | Two-way ANOVA between PT and CS tunings.                                                                                    | $F(1, 132) = 0.014, p = 0.91$ between PT and CS tunings.                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                       |                                                                                                                                                                                                                                         | Two-sided $t$ -test of reliability between PT response vs. CS response with FDR correction across post ablation days.       | day 7, 9, 11, 15: $p > 0.50$ ;                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Extended Data Fig. 6c | Fraction of responsiveness for PT and CS stimuli for sound responsive ablation cohort.                                                                                                                                                  | Two-way ANOVA between PT and CS stimuli and across days.                                                                    | <p><math>F(1, 132) = 1.41, p = 0.24</math> between PT and CS stimuli;</p> <p><math>F(6, 132) = 1.86, p = 0.092</math> across days.</p>                                                                                                                                                                                                                                                                                                                                                         |
|                       |                                                                                                                                                                                                                                         | Two-sided $t$ -test of response fraction between PT response vs. CS response with FDR correction across post ablation days. | day 7, 9, 11, 15: $p > 0.92$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                       | Maximum response amplitude for PT and                                                                                                                                                                                                   | Two-way ANOVA between PT and CS                                                                                             | $F(1, 132) = 3.79, p = 0.054$ between PT and CS tunings;                                                                                                                                                                                                                                                                                                                                                                                                                                       |

|                       |                                                                                                                                                                                     |                                                                                                                                                   |                                                                                                                                                                    |
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| Extended Data Fig. 6d | CS stimuli in sound responsive neurons.                                                                                                                                             | tunings and across days.                                                                                                                          | $F(6, 132) = 8.78, p = 4.69 \times 10^{-8}$ across days.                                                                                                           |
|                       |                                                                                                                                                                                     | Two-sided $t$ -test of maximum amplitude between PT response vs. CS response with FDR correction across post ablation days.                       | day 7, 9, 11, 15: $p > 0.42$ .                                                                                                                                     |
| Extended Data Fig. 6e | Normalized tuning curves for pure tones (left) and complex sounds (right) overlaid across days.                                                                                     | Two-sided $t$ -test with FDR correction between PT tuning vs. CS tuning at 15th stimulus index.                                                   | day 7, 9, 11, 15: $p = 0.39, p = 0.39, p = 0.41, p = 0.27$ .                                                                                                       |
| Extended Data Fig. 6f | Stability of single-trial responses between PT and CS stimuli analyzed analogous to a previous study <sup>43</sup> .                                                                | Two-way ANOVA between PT and CS tunings and across days.                                                                                          | $F(1, 132) = 0.58, p = 0.45$ between PT and CS tunings;<br>$F(6, 132) = 14.15, p = 2.13 \times 10^{-12}$ across days.                                              |
|                       |                                                                                                                                                                                     | Two-sided $t$ -test of single-trial stability between PT and CS stimuli                                                                           | day 1, 3, 5: $p > 0.32$ ;<br>day 7, 9, 11, 15: $p > 0.56$ .                                                                                                        |
| Extended Data Fig. 7a | Best response amplitude of neurons responsive on both day 5 and day 5 $\pm$ i normalized by the average best response during early baseline days (1 and 3).                         | One-way ANOVA test across days.                                                                                                                   | Sound responsive ablation: $F(5, 54) = 1.29, p = 0.28$ ;<br>Non-sound responsive ablation: $F(5, 54) = 1.35, p = 0.26$ ;<br>Control: $F(5, 48) = 0.58, p = 0.72$ . |
| Extended Data Fig. 7c | Spatial extent of the microablation-induced effect on normalized best response amplitudes in the spared neurons. Spared neurons were split into neurons responsive on day 5 (Left). | In the control group, normalized best responses of neurons responsive on day 5, Two-sided $t$ -test between short and long distance, across days. | day 1 to day 15: $p = 0.13, p = 0.82, p = 0.14, p = 0.049, p = 0.061, p = 0.0014, p = 0.0012$ .                                                                    |
|                       | Spatial extent of the microablation-induced effect on normalized best responses of spared neurons newly responsive neurons (Right) across distance during and after baseline days.  | Two-sided $t$ -test between short and long distance.                                                                                              | day 1, $p = 0.066$ ; day 3, $p = 0.014$ ; day 7, $p = 0.96$ ; day 9, $p = 0.13$ ; day 11, $p = 0.080$ ; day 15, $p = 0.19$ .                                       |
| Extended Data Fig. 7d | Normalized best responses of neurons responsive on day 5 in sound responsive ablation cohort (left).                                                                                | Two-way ANOVA, across distance bins and across days.                                                                                              | Neurons responsive on day 5:<br>$F(6, 244429) = 0.45, p = 0.85$ across distance bins;<br>$F(6, 244429) = 151.58, p < 1.0 \times 10^{-10}$ across days.             |

|                       |                                                                                                                                                                               |                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       | Normalized best responses of neurons not responsive on day 5 but newly responsive on another day (right).                                                                     | Two-way ANOVA across distance bins and across days.                                                                                        | Neurons unresponsive on day 5 but newly responsive on another day:<br>$F(6, 121590) = 10.9, p = 3.56 \times 10^{-12}$ across distance bins;<br>$F(5, 121590) = 543.19, p < 1.0 \times 10^{-12}$ across days.                                                                                                                                                                                                                                  |
|                       |                                                                                                                                                                               | Two-sided $t$ -test between short ( $< 100 \mu\text{m}$ ) and long distance (250-350 $\mu\text{m}$ ).                                      | day 1: $p = 0.49$ ; day 3: $p = 0.42$ ; day 7: $p = 0.0001$ ; day 9: $p = 1.0 \times 10^{-5}$ ; day 11: $p = 0.0002$ ; day 15: $p = 0.12$ .                                                                                                                                                                                                                                                                                                   |
| Extended Data Fig. 7e | Normalized best responses of neurons responsive on day 5 for non-responsive ablation cohort (left).                                                                           | Two-way ANOVA across distance bins and across days.                                                                                        | $F(6, 284429) = 9.47, p = 1.99 \times 10^{-10}$ across distance bins;<br>$F(6, 284429) = 230.36, p < 1.0 \times 10^{-10}$ across days;                                                                                                                                                                                                                                                                                                        |
|                       |                                                                                                                                                                               | Two-sided $t$ -test between short and long distance.                                                                                       | day 1, $p = 0.012$ ; day 3, $p = 0.50$ ; day 5, $p = 0.031$ ; day 7, $p < 1.0 \times 10^{-4}$ ; day 9, $p = 0.0005$ ; day 11, $p = 0.0003$ ; day 15, $p = 0.0004$ .                                                                                                                                                                                                                                                                           |
|                       | Normalized best responses of newly responsive neurons for non-responsive ablation cohort (right).                                                                             | Two-way ANOVA across distance bins and across days.                                                                                        | $F(6, 146974) = 1.85, p = 0.085$ across distance bins;<br>$F(5, 146974) = 274.42, p = 1.0 \times 10^{-10}$ across days.                                                                                                                                                                                                                                                                                                                       |
|                       |                                                                                                                                                                               | Two-sided $t$ -test between short and long distance.                                                                                       | day 1, $p = 0.26$ ; day 3, $p = 0.036$ ; day 7, $p < 1.0 \times 10^{-5}$ ; day 9, $p = 0.63$ ; day 11, $p = 0.012$ ; day 15, $p = 0.085$ .                                                                                                                                                                                                                                                                                                    |
| Extended Data Fig. 7f | Normalized best responses of neurons responsive on day 5 for inhibitory neuron ablation (left).                                                                               | Two-way ANOVA across distance bins and across days.                                                                                        | $F(6, 212481) = 1.08, p = 0.37$ across distance bins;<br>$F(6, 212481) = 348.61, p < 1.0 \times 10^{-10}$ across days;                                                                                                                                                                                                                                                                                                                        |
|                       | Normalized best responses of newly responsive neurons for inhibitory neuron ablation (right).                                                                                 | Two-way ANOVA across distance bins and across days.                                                                                        | $F(6, 96363) = 0.84, p = 0.54$ across distance bins;<br>$F(5, 96363) = 78.00, p = 6.23 \times 10^{-82}$ across days.                                                                                                                                                                                                                                                                                                                          |
| Extended Data Fig. 7g | Normalized tuning curves of day 5 responsive neurons (top) for sound responsive cohort (left), non-sound responsive cohort (middle) and control cohort (right), respectively. | Two-sided $t$ -test of normalized amplitude at 15 <sup>th</sup> stimulus between baseline days and post ablation days with FDR correction. | Sound responsive cohort, neurons responsive on day 5:<br>day 7: $p = 0.011$ ; day 9: $p = 0.25$ ; day 11: $p = 0.011$ ; day 15: $p = 0.0010$ ;<br><br>Non-sound responsive cohort, neurons responsive on day 5:<br>day 7: $p = 0.85$ ; day 9: $p = 0.73$ ; day 11: $p = 0.85$ ; day 15: $p = 0.48$ ;<br><br>Control cohort, neurons responsive on day 5<br>day 7: $p = 0.19$ ; day 9: $p = 0.080$ ; day 11: $p = 0.34$ ; day 15: $p = 0.72$ ; |
|                       | Normalized tuning curves of neurons unresponsive on day 5 but responsive on the other day (bottom), for sound responsive cohort (left), non-sound                             | Two-sided $t$ -test of normalized amplitude at 15 <sup>th</sup> stimulus between baseline days and post ablation days with FDR correction. | Sound responsive cohort, neurons not responsive on day 5 but responsive on another day:<br>day 7: $p = 0.14$ ; day 9: $p = 0.57$ ; day 11: $p = 0.57$ ; day 15: $p = 0.034$ ;<br><br>Non-sound responsive cohort,                                                                                                                                                                                                                             |

|                       |                                                                                                                                                                                                  |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                       |
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|                       | responsive cohort (middle) and control cohort (right), respectively.                                                                                                                             |                                                                                                                                                                                                                      | neurons not responsive on day 5 but responsive on another day:<br>day 7: $p = 0.82$ ; day 9: $p = 0.82$ ; day 11: $p = 0.82$ ; day 15: $p = 0.52$ ;<br><br>Control cohort,<br>neurons not responsive on day 5 but responsive on another day:<br>day 7: $p = 0.51$ ; day 9: $p = 0.65$ ; day 11: $p = 0.64$ ; day 15: $p = 0.64$ ;                                     |
| Extended Data Fig. 7i | Change in the fraction of neuron pairs with high signal correlation from baseline at the largest response amplitude bin.                                                                         | Two-sided $t$ -test between baseline days and days after ablation with FDR correction.                                                                                                                               | Sound responsive cohort: $p = 0.243$ , $p = 0.067$ , $p = 0.015$ , $p = 0.018$ for day 7, 9, 11, 15;<br>Non-sound responsive cohort: $p = 0.12$ , $p = 0.19$ , $p = 0.12$ , $p = 0.0055$ for day 7, 9, 11, 15;<br>Control cohort: $p > 0.40$ for all post-sham ablation days.                                                                                         |
|                       |                                                                                                                                                                                                  | Permutation test for group comparison.                                                                                                                                                                               | $p > 0.05$ from day 7 - 11 for all the three cohorts. $p < 0.05$ on day 15 for sound responsive cohort.                                                                                                                                                                                                                                                               |
| Extended Data Fig. 7j | Cumulative distribution of all pairwise signal correlations between high category neurons and spared neurons                                                                                     | One-way ANOVA test of signal correlation ( $> 0.6$ ) over days                                                                                                                                                       | $F(6,63) = 0.48$ , $p = 0.82$                                                                                                                                                                                                                                                                                                                                         |
| Extended Data Fig. 8e | Baseline-normalized ratio of the total sound-evoked activity in excitatory and inhibitory neurons (sound responsive cohort: $n = 5$ ; non-sound responsive cohort: $n = 5$ , control: $n = 7$ ). | Two-sided $t$ -test with FDR adjusted $p$ -values between sound responsive cohort vs. control, between non-sound responsive cohort vs. control, and between sound responsive cohort vs. non-sound responsive cohort. | day 7: $p > 0.5$ for all combinations;<br>day 9: $p = 0.039$ , $p = 0.039$ , $p = 0.16$ ;<br>day 11: $p = 0.045$ , $p = 0.032$ , $p = 0.27$ ;<br>day 15: $p > 0.5$ for all combinations, respectively;<br><br>(The normalized ratio of best amplitudes on day 15, $1.09 \pm 0.088$ for sound responsive ablation, $1.10 \pm 0.11$ for non-sound responsive ablation.) |
| Extended Data Fig. 8g | Traces of detected calcium transients of an inhibitory neuron over days.<br>Decay time constant of calcium transients of all identified interneurons over days across mice.                      | One-way ANOVA test over the imaging days.                                                                                                                                                                            | $F(6, 28) = 0.48$ ; $p = 0.82$ .                                                                                                                                                                                                                                                                                                                                      |
| Extended Data Fig. 8h | Change of tuning width by using normalized response amplitudes at 15th largest stimulus index in the tuning curve over days for excitatory (left) neurons.                                       | Two-sided $t$ -test of $\Delta$ normalized amplitude for excitatory neurons between baseline days vs. days after ablation with FDR correction.                                                                       | Sound responsive cohort: $p = 0.011$ , $p = 0.25$ , $p = 0.35$ , $p = 0.011$ , for day 7, 9, 11, 15, respectively;<br>Non-sound responsive cohort: $p > 0.47$ for all post-ablation days;<br>Control: $p > 0.67$ for all post-ablation days.                                                                                                                          |
|                       | Change of tuning width by using normalized response amplitudes at 15th largest stimulus index in the tuning                                                                                      | Two-sided $t$ -test of $\Delta$ normalized amplitude for inhibitory neurons.                                                                                                                                         | Sound responsive cohort: $p = 0.21$ , $p = 0.88$ , $p = 0.33$ , $p = 0.072$ for day 7, 9, 11, 15, respectively;<br>Non-sound responsive cohort: $p > 0.20$ for all post-ablation days;                                                                                                                                                                                |

|                       |                                                                                                                                                               |                                                                                                            |                                                                                                                                                                                                                      |
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|                       | curve over days for inhibitory (right) neurons.                                                                                                               |                                                                                                            | Control: $p > 0.24$ for all post-ablation days.                                                                                                                                                                      |
| Extended Data Fig. 8i | Change in fraction of neuron pairs with high signal correlation and with large response amplitude from baseline among excitatory-excitatory neurons (left).   | Two-sided $t$ -test of $\Delta$ fraction of excitatory-excitatory neuron pairs with FDR correction.        | Sound responsive cohort: $p = 0.15, p = 0.051, p = 0.11, p = 0.0034$ for day 7, 9, 11, 15;<br>Non-sound responsive cohort: $p > 0.29$ for all post-ablation days;<br>Control: $p > 0.43$ for all post-ablation days. |
|                       |                                                                                                                                                               | Permutation test for group comparison.                                                                     | Sound responsive cohort: $p > 0.05$ for day 7, 9, 11, $p < 0.025$ on day 15;<br>Both non-sound responsive and control cohorts: $p > 0.05$ for all post-ablation days.                                                |
|                       | Change in fraction of neuron pairs with high signal correlation and with large response amplitude from baseline among inhibitory-inhibitory neurons (middle). | Two-sided $t$ -test of $\Delta$ fraction of inhibitory-inhibitory neuron pairs with FDR correction.        | Sound responsive cohort: $p > 0.15$ for all post-ablation days;<br>Non-sound responsive cohort: $p > 0.28$ for all post-ablation days;<br>Control: $p > 0.16$ for all post-ablation days.                            |
|                       | Change in fraction of neuron pairs with high signal correlation and with large response amplitude from baseline among excitatory-inhibitory neurons (right).  | Two-sided $t$ -test of $\Delta$ fraction of excitatory-inhibitory neuron pairs with FDR correction.        | sound responsive cohort: $p > 0.25$ for all post-ablation days;<br>Non-sound responsive cohort: $p > 0.30$ for all post-ablation days;<br>Control: $p > 0.26$ for all post-ablation days.                            |
|                       |                                                                                                                                                               |                                                                                                            |                                                                                                                                                                                                                      |
| Extended Data Fig. 8j | Baseline-normalized best response amplitude of neurons responsive on day 5 in excitatory (left) neurons for the three experimental groups.                    | One-way ANOVA across days, for excitatory neurons.                                                         | sound responsive ablation, $F(6, 28) = 4.21, p = 0.0038$ ;<br>Non-responsive ablation, $F(6, 28) = 1.01, p = 0.43$ ;<br>Control, $F(6, 42) = 1.36, p = 0.25$ ;                                                       |
|                       |                                                                                                                                                               | Two-sided paired $t$ -test of the normalized best amplitude of excitatory neurons between day 3 vs. day 7. | Sound responsive ablation, $p = 0.023$ ;<br>Non-responsive ablation, $p = 0.34$ ;<br>Control, $p = 0.38$ .                                                                                                           |
|                       | Baseline-normalized best response amplitude of neurons responsive on day 5 in inhibitory (right) neurons for the three experimental groups.                   | One-way ANOVA across days, for inhibitory neurons.                                                         | Sound responsive ablation: $F(6, 21) = 7.44, p = 2.3 \times 10^{-4}$ ;<br>Non-responsive ablation: $F(6, 28) = 0.51, p = 0.80$ ;<br>Control: $F(6, 42) = 1.02, p = 0.42$ ;                                           |
|                       |                                                                                                                                                               | Two-sided paired $t$ -test of the normalized best amplitude of inhibitory neurons between day 3 vs. day 7. | Sound responsive ablation: $p = 0.049$ ;<br>Non-responsive ablation: $p = 0.38$ ;<br>Control: $p = 0.59$ .                                                                                                           |

|                       |                                                                                                                                                                                     |                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Extended Data Fig. 8k | Baseline-normalized best response amplitude of the excitatory neurons (left) unresponsive on day 5 but being responsive on the other day.                                           | One-way ANOVA across days, in excitatory neurons.                                                                         | Sound responsive ablation: $F(5, 24) = 7.97, p = 1.5 \times 10^{-4}$ .<br>Non-responsive ablation: $F(5, 24) = 1.12, p = 0.37$ ;<br>Control: $F(5, 36) = 0.28, p = 0.92$ ;                                                                                                                                                                                                                       |
|                       |                                                                                                                                                                                     | Group comparison by two-sided $t$ -test with FDR correction.                                                              | Sound responsive ablation vs. non-responsive ablation; Sound responsive ablation vs. control; Non-responsive ablation vs. control; day 7 and day 9: $p > 0.2$ for all combinations; day 11: $p = 0.011$ ; $p = 0.024$ ; $p = 0.93$ ; day 15: $p = 0.14$ ; $p = 0.011$ ; $p = 0.19$ , respectively.                                                                                               |
|                       | Baseline-normalized best response amplitude of the inhibitory neurons (right) unresponsive on day 5 but being responsive on the other day.                                          | One-way ANOVA across days.                                                                                                | Inhibitory neurons in<br>Sound responsive ablation: $F(5, 24) = 1.01, p = 0.43$ ;<br>Non-responsive ablation: $F(5, 23) = 1.18, p = 0.35$ ;<br>Control: $F(5, 25) = 1.44, p = 0.24$ .                                                                                                                                                                                                            |
| Extended Data Fig. 9a | Cumulative distributions of normalized correlation on day 5 along diagonal elements and non-diagonal elements for sound responsive, inhibitory neuron ablation and control cohorts. | Dunn's test for all group combinations in both diagonal and non-diagonal elements.                                        | $Q < Q_{\text{critical}}$ .                                                                                                                                                                                                                                                                                                                                                                      |
|                       |                                                                                                                                                                                     | Mann-Whitney $U$ test between groups with adjusted p-values by FDR correction.                                            | $p$ values $> 0.5$ for all combinations.                                                                                                                                                                                                                                                                                                                                                         |
| Extended Data Fig. 9b | Cumulative distributions of normalized correlation on day 7 along diagonal elements and non-diagonal elements for sound responsive, inhibitory neuron ablation and control cohorts. | Dunn's test for group comparison.                                                                                         | Diagonal elements:<br>Sound responsive ablation vs. control, $Q = 3.00 (> Q_{\text{critical}})$ ;<br>Inhibitory neuron ablation vs. control, $Q < Q_{\text{critical}}$ .<br><br>Non-diagonal elements:<br>sound responsive ablation vs. control, $Q = 3.48 (> Q_{\text{critical}})$ ;<br>$Q < Q_{\text{critical}}$ for the other group comparison.                                               |
|                       |                                                                                                                                                                                     | Mann-Whitney $U$ test between groups, with adjusted p-values by FDR correction, along diagonal and non-diagonal elements. | Diagonal elements:<br>Sound responsive ablation vs. control: $p = 0.016$ ; Inhibitory vs. control: $p = 0.020$ ;<br>Sound responsive ablation vs. inhibitory: $p = 0.51$ .<br><br>Non-diagonal elements:<br>Sound responsive ablation vs. control: $p = 0.0018$ ;<br>Inhibitory neuron ablation vs. control: $p = 0.06$ ; Sound responsive ablation vs. inhibitory neuron ablation: $p = 0.29$ . |
| Extended Data Fig. 9c | Cumulative distributions of normalized correlation during late after                                                                                                                | Dunn's test along diagonal elements.                                                                                      | Inhibitory neuron ablation vs control: $Q = 2.44 (> Q_{\text{critical}})$ ;<br>Sound responsive ablation vs. inhibitory neuron ablation: $Q = 2.43 (> Q_{\text{critical}})$ .                                                                                                                                                                                                                    |

|                       |                                                                                                                                                                                             |                                                                                                                                                              |                                                                                                                                                                                   |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       | microablation, day 9-11.                                                                                                                                                                    | Mann-Whitney $U$ test, adjusted $p$ -values.                                                                                                                 | Sound responsive ablation vs. control, $p = 0.87$ ; Inhibitory neuron ablation vs. control, $p = 0.056$ ; Sound responsive ablation vs. inhibitory neuron ablation, $p = 0.056$ . |
| Extended Data Fig. 9d | Normalized tuning curve of responsive neurons overlaid across days in inhibitory neuron ablation.                                                                                           | Two-sided $t$ -test of average of normalized amplitudes across the stimulus with 2nd largest amplitude to the last stimulus between baseline days vs. day 7. | $p = 0.20$ .                                                                                                                                                                      |
| Extended Data Fig. 9e | Normalized non-diagonal correlations in the similarity matrix constructed from the population vectors shuffled across FOVs in inhibitory neuron ablation.                                   | Two-sided $t$ -test of normalized correlation during all post-ablation days between inhibitory neuron ablation and control.                                  | $p = 0.33$ .                                                                                                                                                                      |
| Extended Data Fig. 9f | The colormap of the change in fraction of responsive neuron pairs with high signal correlation from baseline according to the best response amplitude in inhibitory neuron ablation cohort. | Two-way ANOVA across days and across amplitude bins.                                                                                                         | $F(6, 154) = 2.05$ , $p = 0.062$ across days; $F(3, 154) = 5.10$ , $p = 0.0022$ across amplitude bins.                                                                            |

### Supplementary Table 3.

*n* number in the analysis for distance dependence of response amplitude in Extended Data Fig. 7c-f.

| <b>Sound responsive ablation</b>                             |                         |       |        |         |         |         |         |         |
|--------------------------------------------------------------|-------------------------|-------|--------|---------|---------|---------|---------|---------|
| ▪ Neurons responsive on day 5                                |                         |       |        |         |         |         |         |         |
|                                                              | Distance, $\mu\text{m}$ | 15-50 | 50-100 | 100-150 | 150-200 | 200-250 | 250-300 | 300-350 |
|                                                              | day 5                   | 811   | 4118   | 7540    | 8440    | 6943    | 4923    | 2293    |
| ▪ Neurons unresponsive on day 5 but responsive on other days |                         |       |        |         |         |         |         |         |
|                                                              | Distance, $\mu\text{m}$ | 15-50 | 50-100 | 100-150 | 150-200 | 200-250 | 250-300 | 300-350 |
| days                                                         | day 1                   | 560   | 2780   | 4551    | 5389    | 4727    | 3359    | 1489    |
|                                                              | day 3                   | 500   | 2562   | 4379    | 5108    | 4606    | 3349    | 1641    |
|                                                              | day 5                   | 0     | 0      | 0       | 0       | 0       | 0       | 0       |
|                                                              | day 7                   | 404   | 2103   | 3789    | 4334    | 3704    | 2549    | 1166    |
|                                                              | day 9                   | 499   | 2466   | 4579    | 5125    | 4362    | 2911    | 1341    |
|                                                              | day 11                  | 454   | 2337   | 4101    | 4578    | 4001    | 2734    | 1155    |
|                                                              | day 15                  | 446   | 2282   | 3981    | 4147    | 3511    | 2408    | 1135    |
| <b>Non-sound responsive ablation</b>                         |                         |       |        |         |         |         |         |         |
| ▪ Neurons responsive on day 5                                |                         |       |        |         |         |         |         |         |
|                                                              | Distance, $\mu\text{m}$ | 15-50 | 50-100 | 100-150 | 150-200 | 200-250 | 250-300 | 300-350 |
|                                                              | day 5                   | 1112  | 5253   | 9003    | 10052   | 8242    | 5903    | 2820    |
| ▪ Neurons unresponsive on day 5 but responsive on other days |                         |       |        |         |         |         |         |         |
|                                                              | Distance, $\mu\text{m}$ | 15-50 | 50-100 | 100-150 | 150-200 | 200-250 | 250-300 | 300-350 |
| days                                                         | day 1                   | 752   | 3726   | 6609    | 7240    | 6256    | 4506    | 2065    |
|                                                              | day 3                   | 675   | 3491   | 5858    | 6623    | 5608    | 4048    | 2085    |
|                                                              | day 5                   | 0     | 0      | 0       | 0       | 0       | 0       | 0       |
|                                                              | day 7                   | 541   | 2500   | 4493    | 4859    | 4357    | 3111    | 1631    |
|                                                              | day 9                   | 592   | 2749   | 4862    | 5322    | 4667    | 3212    | 1552    |
|                                                              | day 11                  | 602   | 2942   | 5362    | 5744    | 4716    | 3248    | 1458    |
|                                                              | day 15                  | 638   | 3076   | 5586    | 5999    | 4827    | 3208    | 1424    |
| <b>Control</b>                                               |                         |       |        |         |         |         |         |         |
| ▪ Neurons responsive on day 5                                |                         |       |        |         |         |         |         |         |
|                                                              | Distance, $\mu\text{m}$ | 15-50 | 50-100 | 100-150 | 150-200 | 200-250 | 250-300 | 300-350 |
|                                                              | day 5                   | 802   | 4040   | 7020    | 7789    | 6503    | 4476    | 2143    |
| ▪ Neurons unresponsive on day 5 but responsive on other days |                         |       |        |         |         |         |         |         |
|                                                              | Distance, $\mu\text{m}$ | 15-50 | 50-100 | 100-150 | 150-200 | 200-250 | 250-300 | 300-350 |
| days                                                         | day 1                   | 533   | 2592   | 4603    | 4989    | 4173    | 2826    | 1351    |
|                                                              | day 3                   | 465   | 2366   | 4175    | 4917    | 4006    | 2898    | 1394    |
|                                                              | day 5                   | 0     | 0      | 0       | 0       | 0       | 0       | 0       |
|                                                              | day 7                   | 417   | 2096   | 3708    | 4217    | 3468    | 2508    | 1111    |
|                                                              | day 9                   | 403   | 1971   | 3381    | 3892    | 3352    | 2395    | 1124    |
|                                                              | day 11                  | 390   | 2057   | 3719    | 4248    | 3592    | 2568    | 1254    |
|                                                              | day 15                  | 414   | 2186   | 3746    | 4526    | 3821    | 2686    | 1189    |
| <b>Inhibitory neuron ablation</b>                            |                         |       |        |         |         |         |         |         |
| ▪ Neurons responsive on day 5                                |                         |       |        |         |         |         |         |         |
|                                                              | Distance, $\mu\text{m}$ | 15-50 | 50-100 | 100-150 | 150-200 | 200-250 | 250-300 | 300-350 |
|                                                              | day 5                   | 646   | 3125   | 5762    | 6728    | 5945    | 4208    | 2019    |
| ▪ Neurons unresponsive on day 5 but responsive on other days |                         |       |        |         |         |         |         |         |

|      | Distance, $\mu\text{m}$ | 15-50 | 50-100 | 100-150 | 150-200 | 200-250 | 250-300 | 300-350 |
|------|-------------------------|-------|--------|---------|---------|---------|---------|---------|
| days | day 1                   | 414   | 1881   | 3566    | 4175    | 3689    | 2653    | 1279    |
|      | day 3                   | 391   | 1926   | 3532    | 3971    | 3610    | 2603    | 1308    |
|      | day 5                   | 0     | 0      | 0       | 0       | 0       | 0       | 0       |
|      | day 7                   | 261   | 1267   | 2323    | 2777    | 2466    | 1730    | 883     |
|      | day 9                   | 268   | 1359   | 2471    | 2974    | 2630    | 1909    | 982     |
|      | day 11                  | 301   | 1479   | 2846    | 3287    | 2928    | 2202    | 1191    |
|      | day 15                  | 303   | 1470   | 2806    | 3153    | 2795    | 2109    | 1197    |