
Context-Gated and Electrical Synapse-Mediated Brain-Wide Activity Reorganization Regulates Learning Behavior in *C. elegans*

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- 1 Online Resource Fig. 1 (associated with Extended Data Fig. 3, 4): Contrast odorants**
2 evoke neural responses in different contexts. **a-c**, Violin plots showing kernel densities of the
3 distribution of medians for neurons in response to the contrast odorants (Buffer or PA14-*gacA*(-))
4 in different contexts in naive (gray) and trained (purple) animals. **a**, Buffer-Buffer-Buffer. **b**,
5 OP50-Buffer-OP50. **c**, OP50-PA14-*gacA*(-)-OP50.
- 6 Online Resource Fig. 2 (associated with Extended Data Fig. 3, 4): PA14 evokes neural**
7 **responses in the *inx-7* mutant strain and the *inx-7* rescue strain.** **a-c**, Violin lots showing
8 kernel densities of the distribution of medians for the sensory-inter group I neurons in response to
9 the PA14 contrast odorants in naive (gray) and trained (purple) animals in the *inx-7*-mutant strain
10 (a) and the *inx-7*-rescue strain (b).
- 11 Online Resource Fig. 3 (associated with Fig. 5 and Extended Data Fig. 10): Loadings**
12 **for neural components, NC1, NC2, NC3, for sensory-inter-motor group I, sensory-inter-**
13 **motor group II, sensory-inter-motor group III, inter-motor group, sensory-inter group**
14 **II, sensory-inter group III.** Colors represent loading amplitudes.
- 15 Online Resource Fig. 4 (associated with Fig. 5 and Extended Data Fig. 10): Average**
16 **input scaling (*B*) matrices for the detection task (Buffer-PA14-Buffer stimulation**
17 **pattern) for different neuron groups and training conditions.** sensory-inter-motor group
18 I, sensory-inter-motor group III, inter-motor group, sensory-inter group II, sensory-inter group III,
19 sensory-inter-motor group II. Colors represent amplitudes.
- 20 Online Resource Fig. 5 (associated with Fig. 5 and Extended Data Fig. 10): Average**
21 **input scaling (*B*) matrices for OP50-Buffer-OP50 (left) and OP50-PA14-*gacA*(-)-OP50**
22 **(right) referred as OP50-gacA-OP50 for the sensory-inter group I neurons.** Colors
23 represent amplitudes.
- 24 Online Resource Fig. 6 (associated with Fig. 5 and Extended Data Fig. 10): Average**
25 **input scaling (*B*) matrices for the discrimination task (OP50-PA14-OP50 stimulation**
26 **pattern) for different neuron groups and training conditions.** sensory-inter-motor group
27 I, sensory-inter-motor group III, inter-motor group, sensory-inter group II, sensory-inter group III,
28 sensory-inter-motor group II. Colors represent amplitudes.

29 **Online Resource Fig. 7** (associated with Fig. 5 and Extended Data Fig. 10): Average
30 input scaling (B) matrices for Buffer-Buffer-Buffer stimulation pattern for different
31 neuron groups and training conditions. sensory-inter-motor group I, inter-motor group,
32 sensory-inter-motor group II, sensory-inter group I, sensory-inter group III. Colors represent loading
33 amplitudes.