

Abstract Submitted
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Controlling neural activity in *Caenorhabditis elegans* to evoke chemotactic behavior ASKIN KOCABAS, CHING-HAN SHEN, Harvard University, ZENGCAI V. GUO, Janelia Farm Research Campus, Howard Hughes Medical Institute, SHARAD RAMANATHAN, Harvard University — Animals locate and track chemoattractive gradients in the environment to find food. With its simple nervous system, *Caenorhabditis elegans* is a good model system in which to understand how the dynamics of neural activity control this search behavior. To understand how the activity in its interneurons coordinate different motor programs to lead the animal to food, here we used optogenetics and new optical tools to manipulate neural activity directly in freely moving animals to evoke chemotactic behavior. By deducing the classes of activity patterns triggered during chemotaxis and exciting individual neurons with these patterns, we identified interneurons that control the essential locomotory programs for this behavior. Notably, we discovered that controlling the dynamics of activity in just one interneuron pair was sufficient to force the animal to locate, turn towards and track virtual light gradients.

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