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# Modeling and simulation of *Caenorhabditis elegans* chemotaxis in response to multiple chemoattractant sources

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## Abstract

Nematodes navigate towards potential food sources and hosts using olfaction of small molecules in a process called chemotaxis. While several studies have examined the behavior of nematodes, including the model nematode *Caenorhabditis elegans*, to various types of chemoattractants, the extent to which characteristics of the chemoattractant affect nematode behavior is relatively unexplored. Moreover the behavioral response of nematodes to the interaction of multiple chemoattractants with either similar or dissimilar properties has received little attention. Here, we build upon our prior random walk model for *C. elegans* chemotaxis to examine the influence of chemoattractant concentration and diffusion on worm behavior [1]. We find that the interaction of these properties can explain many non-intuitive chemotactic behaviors exhibited by *C. elegans* in response to two chemoattractants. Overall, our results provide non-intuitive evidence that chemotaxis in the presence of multiple sources of attraction may not be solely determined by chemoattractant preference.

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## References

[1] Pandya, D. A., Blanar, C. A., Smith, R. P., & Haskell, E. C. (2015). Modeling and simulation of Caenorhabditis elegans chemotaxis in response to a dynamic engineered bacteria. *Proceedings European Council for Modeling and Simulation*, 100-106.