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A dictionary of behavioral motifs reveals clusters of genes affecting C. elegans locomotion ANDRE BROWN, EVIATAR YEMINI, LAURA GRUNDY, TADAS JUCIKAS, WILLIAM SCHAFER, MRC Laboratory of Molecular Biology — Visible phenotypes based on locomotion and posture have played a critical role in understanding the molecular basis of behavior and development in *C. elegans* and other model organisms. However, it is not known whether these human-defined features capture the most important aspects of behavior for phenotypic comparison nor whether they are sufficient to discover new behaviors. Here we show that four basic shapes, or eigenworms, previously described for wild type worms also capture mutant shapes, and that this representation can be used to build a dictionary of repetitive behavioral motifs in an unbiased way. By measuring the distance between each individual's behavior and the elements in the motif dictionary, we create a fingerprint that can be used to compare mutants to wild type and to each other. This analysis has revealed previously undescribed phenotypes and has allowed clustering of mutants into related groups. Behavioral motifs provide a compact and intuitive representation of behavioral phenotypes.

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