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Poster title: Semantic Models of Neural Circuit Knowledge in C.elegans

Abstract: In modern biology, new knowledge is generated quickly, making it challenging for researchers to efficiently acquire and synthesise new information from the large volume of primary publications. To address this problem, computational approaches that generate machine-readable representations of scientific findings in the form of knowledge graphs have been developed. These representations can integrate different types of experimental data from multiple papers and biological databases in a unifying data model, providing a complementary method to manual review for interacting with published knowledge. The Gene Ontology Consortium (GOC) has created a semantic modelling framework that extends individual functional gene annotations to structured descriptions of causal networks representing biological processes (Gene Ontology Causal Activity Modelling, or GO-CAM). In this study, we explored whether GO-CAM could be used to represent knowledge of the causal relationships between environmental inputs, neural circuits and behavior in the model nematode *C. elegans.* We found that, given extensions to several relevant ontologies, a wide variety of author statements from the literature about the neural circuit basis of egg-laying and carbon dioxide (CO_2) avoidance behaviors could be faithfully represented with GO-CAM. Through this process, we were able to generate generic data models for several categories of experimental results. We also generated representations of multisensory integration and sensory adaptation, and discuss how semantic modelling may be used to functionally annotate the *C. elegans* connectome. Gene Ontology-based semantic modelling has the potential to support various machine-readable representations of neurobiological knowledge.