Abstract Submitted
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Inference of pain stimulus level from stereotypical behavioral response of *C.elegans* allows quantification of effects of anesthesia and mutation[1] KAWAI LEUNG, Emory University , AYLIA MOHAMMADI, WILLIAM RYU, University of Toronto, ILYA NEMENMAN, Emory University — In animals, we must infer the pain level from experimental characterization of behavior. This is not trivial since behaviors are very complex and multidimensional. To establish *C.elegans* as a model for pain research, we propose for the first time a quantitative model that allows inference of a thermal nociceptive stimulus level from the behavior of an individual worm. We apply controlled levels of pain by locally heating worms with an infrared laser and capturing the subsequent behavior. We discover that the behavioral response is a product of stereotypical behavior and a nonlinear function of the strength of stimulus. The same stereotypical behavior is observed in normal, anesthetized and mutated worms. From this result we build a Bayesian model to infer the strength of laser stimulus from the behavior. This model allows us to measure the efficacy of anaesthetization and mutation by comparing the inferred strength of stimulus. Based on the measured nociceptive escape of over 200 worms, our model is able to significantly differentiate normal, anaesthetized and mutated worms with 40 worm samples.

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