Sex-based Differences in *C. elegans* Responsiveness to Aversive Stimuli

Ronald Aaron S. Bola[1], Michelle C. Krzyzanowski[1], Jordan F. Wood[1], Douglas S. Portman, Ph.D.[2], and Denise M. Ferkey, Ph.D.[1]
[1]University at Buffalo, State University of New York, and [2]University of Rochester

Behavioral differences between sexes are evident across many species. The underlying mechanisms surrounding such differences are not fully elucidated, however, due to the complexities of animal behavior. The nematode *Caenorhabditis elegans* (*C. elegans*) is a well-characterized, genetically amenable species with two sexes, hermaphrodites (XX) and males (XO). This makes it an appropriate model system for investigating sex-based behavioral differences.

Chemosensation in *C. elegans* is mediated by exposed ciliated sensory neurons, one of which is ASH. ASH is a polymodal nociceptor that elicits reversal when an animal encounters aversive stimuli. We hypothesized that hermaphrodite and male *C. elegans* worms respond differently to stimuli detected by ASH such as the bitter tastant quinine, the detergent sodium dodecyl sulfide (SDS), and the heavy metal copper ($CuCl_2$).

Wild-type assay-age hermaphrodites and males were picked from a nematode growth media (NGM) plate with *E. coli* OP50 and kept on an NGM plate without food for 10 minutes prior to assaying. A drop of aversive stimulus was placed in front of a forward-moving animal, and the animal's response was recorded. A positive response is backwards movement within 4 seconds after contact with the stimulus.

Our results reveal a quantifiable difference in how wild-type hermaphrodite and male *C. elegans* respond to aversive stimuli. Specifically, wild-type males are less responsive than hermaphrodites to quinine, SDS, and $CuCl_2$. Further investigations will be conducted through experiments with *C. elegans* strains in which hermaphrodites have masculinized, and males have feminized nervous systems or subsets of neurons. Through these experiments, we aim to explore potential sites of difference that lead to these observable differences in responsiveness to aversive stimuli.

Keywords: C. elegans, animal behavior, behavioral differences, sensory neurons, chemosensation, nociception