Mathematical Modelling of Temperature Effects on the AFD Neuron of *Caenorhabditis elegans*

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Temperature fluctuations can affect neurological processes at a variety of levels, with the overall output that higher temperatures generally increase neuronal activity. Here we utilize computer simulations of a mathematical model for a *C. elegans* sensory neuron to investigate the dynamical properties of temperature sensation in the worm. Thermoreception is known to originate in the bilateral symmetric pair of amphid neurons with finger-like ciliated endings (AFD) of *C. elegans*, to which we target our modeling efforts. We build upon a previously-developed deterministic model for salt-sensing in the chemosensitive ASER neuron of *C. elegans* by implementing temperature-dependent Arhennius factors. Multiple experimental results involving time series data of intracellular AFD calcium ion concentration in response to ambient temperature changes are reproduced using this model. Among other things, we find that our model neuron requires synchronous temperature and chemical stimuli to exhibit dynamics qualitatively similar to those of a real AFD neuron.