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Title: How male roundworms decode Sex Pheromone signals

Abstract: In many organisms, chemical language facilitates communication between individuals. Sex pheromones are broadly secreted by nematodes, which communicate their fertility status, indicate sexual maturity and their readiness to mate. *C. elegans* hermaphrodites (essentially females that make a limited number of sperm) have two types of sex pheromone: soluble and volatile. Compared with vertebrates, worms largely rely on their olfactory system to find a mating partner. When males detect the sex pheromone, they chase the volatile sex pheromone signal and immediately recognize the presence of a suitable mating partner from afar. They are also able to locate the vulva and complete the mating process with the help of only the non-volatile sex pheromone, cuticle cue, and mechanical signals.

In *C. elegans,* the wiring diagram of all neurons of both genders have been reported. The functional circuits for particular behaviors like sensory perception and goal-oriented behaviors have not yet been fully characterized. We are currently mapping the functional circuits of volatile sex pheromone perception. In *C. elegans,* the four cephalic male-specific neurons, CEM, the two head amphid neurons, AWA, and the two male tail phasmid neurons, PHD, are required for the volatile sex pheromone perception. SRD-1, a GPCR expressed in both AWAs and PHDs, is required for sex pheromone perception. However, the specialization of these neuron types in pheromone perception is not clear. To understand the pheromone information processing by the nervous system, it is necessary to reveal the functional connectivity of those component neurons. The antagonistic activity of head and tail sensory neurons is integrated to guide olfactory navigation in the natural environment.

In this talk, we will discuss how reception of sex pheromones are processed in this sexually dimorphic nervous system and evoke various behaviors. We will discuss how males able to locate mating partners across a large odor concentration range, how they sense pheromone by defining a head-to-tail spatial map of the chemical environment, and how the receivers interpret chemical information based on individual's life experience and olfactory history.