Determining the role of Semaphorin proteins in the compensatory growth observed in adult *Gryllus Bimaculatus*

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The Mediterranean Field cricket, *Gryllus bimaculatus*, demonstrates compensatory growth when subjected to removal of the ear. The cricket auditory system, necessary for mating and avoiding predators, consists of two ears located in each foreleg with Nerve5 extending from the ear and into the prothoracic ganglion where it terminates and communicates with its postsynaptic partner, AN-2. When one ear is removed, Nerve5 is severed and retracts. AN-2, however, does not degenerate as a result of this deafferentation as expected; instead, its dendrites extend across the midline of the prothoracic ganglion and form new and functional synapses with the AN-2 of the contralateral ear. This form of plasticity is unusual to see in adult systems, and understanding the molecules involved in this compensatory growth is key to understanding the process of adult plasticity. Previous research in the Horch laboratory has shown that the levels of semaphorin protein expression fluctuate concurrently with the anatomical changes that occur during the compensatory growth. With this, it is hypothesized that the down-regulation of Sema1a is enabling the dendrites to cross over the midline of the ganglion. In order to explore the role that Sema1a plays in regulating AN-2 dendritic morphology, Sema1a double stranded RNA was synthesized and injected into the crickets in order to experimentally lower the expression of the Sema1a protein within the body. The anatomical effects of doing so were visualized using confocal microscopy. Trouble-shooting and initial results are presented.