

Identification of Transcripts Responsible for Neuronal Compensatory Plasticity

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ABSTRACT

The auditory neurons of the cricket reside in the prothoracic ganglion and are separated across a midline. When we remove a cricket's ear, the auditory interneurons that have lost input sprout new dendrites that grow across the midline and form functional connections with contralateral neurons. The shift is believed to be regulated by conserved guidance molecules such as Semaphorins, Slit, Robo, Plexin, etc. Since we only suspect these guidance molecules to be present, we intend to confirm their presence within control, uninjured ganglia first. To tackle this question, we extracted control ganglion RNA and converted it to cDNA. Moreover, we designed gene specific primers to amplify a specific transcript we are interested in by using PCR. Our findings indicate that Sema 1a, Plexin B, Robo2/3, Eph, and Slit are all found in the control ganglion.

To confirm if a transcript is indeed in the control ganglion of the cricket, we first extract RNA from the ganglion, then we turned it to complementary DNA or cDNA. We then create primers to amplify the suspected transcript using Geneious, a software program. Since we are dealing with minute amounts of DNA, we use Polymerase chain reaction (PCR) to create millions of copies. After running a gel to confirm that our DNA was amplified, we purify our solution and send it to be sequenced. Once we get the sequence back from the lab, we align the sequence to the transcript we are interested in. The alignment is done through Geneious. If the sequence and transcript aligned, then the transcript is indeed confirmed in the control ganglion.

RESULTS

Plexin B is one of the semaphorin receptors, therefore, we are interested in it. Most of Plexin B was indeed confirmed to be within the control ganglion (Fig.1). Robo is cell surface receptors are receptors that are embedded in the membranes of cells. Robo 2/3 is a combination of both Robo 2 and Robo 3. Most of Robo 2/3 was confirmed to be within the control ganglion. Slit is a repulsive axon guidance cue and was also confirmed to be within the control ganglion. Finally, Eph is another guidance molecule that we are interested in. Eph was confirmed to be within the control ganglion.

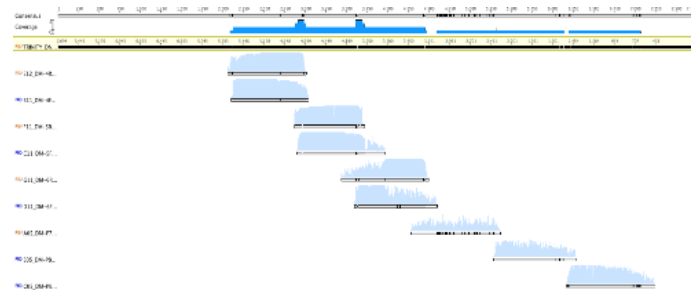


Figure 1. Plexin B sequence alignment using Geneious.

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