Compensatory Growth in the Auditory System of the Cricket, *Teleogryllus oceanicus*

Muska Anwar, 2014

Write your project summary/description here in Times New Roman, no smaller that 11 pt font with at least 1/2” margins on the right and left, single-spaced. Consider including the purpose of the project, the methods used in the study, and the results found (if applicable). Please remember, people outside your field will be reading your description.

Crickets’ survival heavily depends on their ability to recognize sound, so it is crucial that they are able to distinguish between a 5 kHz mating song and a 15 kHz ultrasonic pulse emitted by bats that prey on the crickets. Consequently, they show a unique compensatory growth response to ear injuries. The cricket compensatory growth response could be triggered by chemical cues from the physical loss of the ear or by the lack of neuronal activity due to the physical loss of the ear. To begin to answer this question, we used tetrodotoxin (TTX) soaked in saline agarose beads to block all sensory and spontaneous activity in one ear. Recordings from the sensory nerve (nerve 5) on the treated side showed that activity in the ear can be blocked for up to 12 hours using a $2 \times 10^{-5}$ M TTX solution, after which activity returns. Simultaneous recordings from the untreated side showed response. Recordings from control crickets injected with cricket saline and beads showed that the injections or beads alone do not damage the ear. Our experiments suggested that 3% crosslinked, 6% crosslinked and 3% uncrosslinked agarose beads are equally effective when used with $5 \times 10^{-5}$ M TTX solution. We added fluorescein to our TTX solution to observe if the solution released from the agarose beads remains localized. Our injections stayed localized in the treated leg; solution didn’t travel to the prothoracic ganglion where it could damage other nerves.

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