Neuroengineering B. discoidalis and B. dubia Antennae to Wirelessly Manipulate Locomotion as an Alternative to Robotics

Mann, Noah

Hardman, Samuel

Diesen, Hyrum

Antennae possessing arthropods have evolved to involuntarily move in the opposite direction of a stimulated antenna, normally allowing the organism to move away from obstacles. We take advantage of this sensory mechanism by implanting electrodes into the arthropod in order to artificially stimulate the antennae, allowing remote control of the arthropod at our direction. Two common species of cockroach, Blaberus. discoidalis and Blaptica. dubia, were used because of their well mapped nervous system. We tested our cyborg cockroaches for three abilities: reaction time, turning radius, and climbing ability. These results were compared to similar tests using a biomimicking robot. B. dubia was less suited for the protocol than B. discoidalis due to smaller antennae that were difficult to insert electrodes into. The results of our tests show potential in insect cyborgs as a cheaper and more advanced substitute for biologically inspired robots in the future.

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