

Finding the larynx control area in the brain of the Egyptian fruit bat

Name: Annmarie Lang-Hodge

SFU Faculty/Major: Faculty of Science, Kinesiology

Presentation Description:

To understand how our brains move the larynx for speech production, we can study this control in animals like bats who use their larynx to communicate through sounds. I discuss how we are searching for the region of an Egyptian fruit bat's brain that controls the movements of its larynx.

Abstract:

Humans produce speech using their larynx muscles. Studying how the brain controls these muscles is difficult, but it is possible to observe similar brain regions in other species and use these as models for the human system. Egyptian fruit bats also use their larynx to produce calls for communication. They possess a diverse and complex repertoire of calls, some of which are learnt throughout life. The ability to produce learned vocalizations is rare in mammals, making this species an ideal model to study the neural circuitry involved in human vocal plasticity. We are looking for the brain region that controls the larynx muscles in Egyptian fruit bats. We have preliminary results from a previous experiment performed on a bat suggesting that this region does exist. In the first bat tested here, we implanted a pair of electrodes in the larynx to record its electrical activity using a technique called electromyography (EMG). We stimulated 87 sites across the fronto-parietal cortex using an electrical current. This region is centered on the motor cortex, a brain area that controls movements. We used custom-written code to detect larynx contractions induced by stimulations. We observed the EMG data obtained during stimulations, but we did not find any significant evidence that we induced larynx movements. In upcoming experiments, we will stimulate more rostromedially in the brain since this is where we previously found promising results. We will perform real-time analysis to revisit promising areas during the experiment, increasing our likelihood of finding the larynx control region.