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Daily Cycling of Neural Auditory Response in the Zebra Finch

Humans are among the few animal species that exhibit vocal learning. Two traits make the zebra finch an appropriate model species for this phenomenon: it possesses anatomically distinct brain areas that are dedicated to vocal learning, and it learns song during a well-characterized developmental critical period. Each male zebra finch learns a consistent song, first memorizing a tutor song and then comparing its own vocalizations to this memory template using auditory feedback.

Song behavior undergoes a daily cycle during development, becoming more complex each day and degrading over each night of sleep. Previous research in our lab suggests that premotor activity during singing in the song system nucleus HVC cycles daily and thus may underlie daily changes in behavior. It is not known whether neural auditory responses, which are essential for vocal learning, also cycle daily. In this experiment, we use chronic electrophysiological recordings to study HVC auditory responses to the playback of natural stimuli, including the bird's own song and his tutor song, across entire days. To examine potential instructive effects of auditory signals on HVC activity during song learning, we will perturb auditory feedback across the day and examine HVC activity during singing. We predict that auditory responses to playback and the access of auditory feedback to HVC will cycle daily. Testing these hypotheses will illuminate the regulation of sensory signals in a sensorimotor brain area.



Poster Number: Session: