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THE EFFECT OF ADENYLYL CYCLASE ACTIVITY ON THE REGULATION OF THE
ULTRADIAN RHYTHM OF *PARAMECIUM TETRAURELIA*

A Thesis

Submitted to the School of Graduate Studies and Research

in Partial Fulfillment of the

Requirements for the Degree

Master of Science

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Title: The Effect of Adenylyl Cyclase Activity on the Regulation of the Ultradian
Rhythm of *Paramecium tetraurelia*

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Paramecium tetraurelia possess an apparent ultradian rhythm in the frequency of a spontaneous avoidance response, which involves a brief reversal of swimming direction in the absence of external stimuli. This response is initiated by an action potential resulting from the influx of calcium ions into the cell via voltage-gated channels, dependent upon the activation of protein kinase A, which is caused by the presence of cAMP. The enzyme adenylyl cyclase converts ATP to cAMP, activating protein kinase. Adenylyl cyclase may therefore play an important role in the regulation of the ultradian rhythms. The addition of an adenylyl cyclase blocking drug and gene silencing via RNAi decreased the number of SARs recorded over a 3-hour period, but did not alter the oscillation of the ultradian rhythm. These results suggest that AC is not involved in the regulation of ultradian oscillation, but is important for action potentials that generate ciliary motor reversal.