

TWO CYCLE OR NOT TO CYCLE: CLOCK GENES IN THE AMERICAN HORSESHOE CRAB, *LIMULUS POLYPHEMUS*

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Behavioral clocks temporally regulate an organism's physiology and behavior. In *Drosophila melanogaster*, the circadian clock is composed of core proteins that include CYCLE, a transcription factor that activates other core genes. However, in the American horseshoe crab, *Limulus polyphemus*, the molecular basis of these clocks is unknown. In addition, the mechanism of the circatidal clock, which controls the timing of locomotion in *L. polyphemus*, is completely unknown in any species. Recent analysis of the *L. polyphemus* genome and transcriptome suggests the novel finding that two *cycle* genes are present. Both genes have eleven exons and are phylogenetically related to insect *cycle* and each other. Structural similarities between both *L. polyphemus* genes and insect *cycle* suggest they are functionally conserved. To test the hypothesis that *cycle* is part of the *L. polyphemus* circadian and circatidal clocks, animals were exposed to a 6:6 tidal cycle and a 12:12 light dark cycle for ten days. The protocerebrum of the brain was removed from animals at ZT2, 8, 14, and 20 at high and low tides. The tissue was homogenized in Trizol® and cDNA was generated to use as a template for qPCR. Primers were designed for one of the two *cycle* genes and a control gene, synaptotagmin. Results from this experiment will be presented.