

CONSTITUTIVE EXPRESSION OF THE *CLOCK* GENE UNDER CYCLING LIGHT AND TIDAL CONDITIONS IN *LIMULUS POLYPHEMUS*

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Circadian rhythms of physiology and behavior are ubiquitous in animals and are controlled by endogenous clocks consisting of four core genes: *clock*, *cycle*, *period*, and *timeless*. Recent evidence indicates that the American horseshoe crab, *Limulus polyphemus*, has the gene *clock*. An annotation of this gene indicates 13 exons, and phylogenetic results demonstrate clustering of this gene with other arthropods. Although arthropod activity is controlled by circadian clocks, in *Limulus*, activity is governed by a circatidal clock, the mechanism of which is unknown. However, because existing genes are often duplicated and repurposed in evolution, these two clocks are hypothesized to run on similar molecular components. To determine the expression pattern of the *clock* gene in *Limulus* during light-dark and tidal cycles, animals were exposed to a 12:12 hour light-dark and 6:6 hour tidal cycles. Since evidence suggests circadian clocks are located in the brain of *Limulus*, brain tissue was dissected and RNA extracted across four time points, six hours apart, during both high and low tides. Unlike many animals where clock mRNA expression is rhythmic, qPCR results indicates a novel constitutive expression of the *clock* gene in *Limulus*.