Post-embryonic development of the circadian rhythms outside the optic lobe in the cricket, *Gryllus bimaculatus*

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Daily rhythms in physiology in animals are governed by the circadian system consisting of central and peripheral circadian clocks. In the cricket *Gryllus bimaculatus,* nymphs show a diurnally active, while adults are nocturnal. In this study, we investigated the central and peripheral relationships in the circadian organization in nymphs and adults. Measurement of mRNA levels of the clock genes, such as *period*, *timeless* and mammalian-type *cryptochrome*, revealed that most of the examined adult tissues showed circadian rhythmic expression of the clock genes, suggesting that they possess a circadian oscillator. Removal of the optic lobe, the central clock tissue, affected the rhythm in a tissue dependent manner. In nymphs, the tissues outside the optic lobes also showed a daily rhythmic expression of the clock genes with a similar phase to those in adults, but the amplitude of the rhythm was considerably smaller than that of adults. The mRNA expression rhythm disappeared after optic lobe removal, suggesting that the rhythms outside the optic lobe are weaker and less sustainable than those of adults. Taken these results together, it is likely that after imaginal molt, peripheral circadian oscillations may become robust and their control from the central clock is strengthened.