Molecular approach to understand circadian mating behavior of *Drosophila*

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Circadian clocks of *Drosophila melanogaster* motivate males to court females at a specific time of day. However, clock neurons involved in courtship rhythms in the brain of *Drosophila* remain totally unknown. The circadian locomotor behavior of *Drosophila* is controlled by morning (M cells) and evening (E cells) cells in the brain, which regulate morning and evening activities, respectively. Here, we identified the brain clock neurons that are responsible for the circadian rhythms of the close-proximity (CP) behavior that reflects male courtship motivation. Interestingly, the ablation or functional molecular clock disruption of E cells caused arrhythmic CP behavior, but that of M cells resulted in sustained CP rhythms even in constant darkness. In addition, the ablation of some dorsal lateral neurons (LNd) of E cells using neuropeptide-F (NPF)-GAL4 did not impair CP rhythms. These findings suggested that the NPF-negative LNds and DN1s of E cells include cells essential for circadian CP behavior in *Drosophila*.

Genes to Cells (2010) 15, 1240–1248、Proc.Natl Acad. Sci. USA (2001) 98, 9221–9225.