

Mathematical modeling and analysis for the mechanism underlying biological clocks

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ABSTRACT

Circadian (~24 h) clocks are self-sustained endogenous oscillators with which organisms keep track of daily and seasonal time. Circadian clocks rely on interlocked transcriptional-translational feedback loops to generate rhythms that are robust against intrinsic and extrinsic perturbations. The identification of such molecular mechanism underlying the circadian clock is bestowed to the Nobel Prize this year. In this talk, I will describe how our understanding for the molecular circadian clock has been improved by the mathematical modeling and analysis. I will also discuss that how the mathematical modeling can be used to develop a new drug regulating our circadian rhythms in collaboration with Pfizer Inc.

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