

On the role of the circadian system in the earliest evolution of life: The diel hypothesis.

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On the role of the circadian system in the earliest evolution of life: The diel hypothesis

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Every living organism has a circadian clock. The evolutionary study of circadian rhythms usually begins like other evolutionary studies with questions of adaptation, competition, and natural selection at the organismal level. I argue here that this is in error with reference to the earliest life because in my opinion it was not that living creatures evolved a circadian system so much as that the circadian system evolved us.

Like the great migration of plankton that takes place up and down the water column every day, so it seems likely to me that the primordial soup contained such an oscillation. My primary evidence for this is that so many molecules important for the development of life absorb photons readily, including a couple of my favorites, melatonin and serotonin.

Light as well as heat from the sun probably drove many of the autocatalysis reactions thought to be important for the early evolution of life. The very earliest competition for something we might think of as food but a chemist would call a substrate probably happened near the surface of the ocean during the day.

Timekeeping in nature, the ability to predict the sun's appearance, likely predates the evolution of life as we think of it. Indeed I'm arguing that life is a manifestation of this timekeeping. I would guess that

molecules in the late primordial soup and also the earliest biological organisms used replication as a means of timekeeping, probably to wake up on time.

At the very least, that I can make this proposal reminds us how deeply ingrained the circadian system is in our biology.

REFERENCES

Prigogine, I; Nicolis, G., "Self-Organization in Non-Equilibrium Systems." Wiley, 2014: ISBN 0-471-02401-5.

Paranjpe, D.A.;Sharma,V.K., "Evolution of temporal order in living organisms." *Journal of Circadian Rhythms*, 2005: 3,p.Art. 7. doi: [10.1186/1740-3391-3-7](https://doi.org/10.1186/1740-3391-3-7)

Hut, R.A., Beersma, D.G.M., "Evolution of time-keeping mechanisms: early emergence and adaptation to photoperiod. *Phil. Trans. R. Soc. B*, 2011: 366 2141-2154. doi:[10.1098/rstb.2010.0409](https://doi.org/10.1098/rstb.2010.0409)