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ARTIFICIAL LIGHT DISRUPTS NATURAL DAY/NIGHT VARIATION IN ANTIOXIDANT SYSTEM OF TREE FROG (*HYLA ARBOREA*)

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One of the adaptive features that organisms developed throughout their long natural history is the ability to change the activity of cells, tissues, and organs on a daily, 24-hour, basis. These cyclical changes are synchronized to the external environment through a light-dark regime and internal circadian clock. Daily recurring environmental changes are followed by variations in animal behavior and physiology, which include oscillations in neuroendocrine, metabolic, cardiovascular, and immune functions. By transforming the circadian periodicity of day, artificial light from anthropogenic sources might interfere with organisms leading to a disturbance in hormone levels and physiological stress. In this study, we investigated daily natural variations in the antioxidant system and the effects of artificial light on the redox balance in larvae of tree frogs. We compared antioxidant parameters in tadpoles from the natural day/night cycle (control) with ones exposed to artificial light at night (treatment). The antioxidant response was measured at four time points during 24h (morning, day, evening, and night). Our results showed that only GR activity did not display day/night changes nor was affected by night illumination. For GSH-Px and GST we reported changes in activity at different times of day that were in the same manner for both treatment and control. The highest values were in the morning compared to the other time points. Variation during 24h was also observed for SOD, CAT and GSH. However, exposure to night light affected the pattern and intensity of these parameters compared to the control group. Overall our study suggests that daily differences in metabolic activity can result in variations in the antioxidant system and that the presence of artificial light affects these changes. The disrupted natural rhythm of the antioxidant response may further reflect on other physiological processes and lead to a state of oxidative stress.