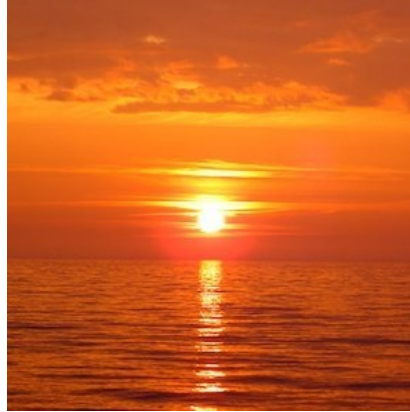




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## Significance of Circadian Rhythms in Brain-Damaged Patients



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A new study published in *Neurology* indicates that circadian rhythms could play an important role in the recovery of consciousness of patients with severe brain injuries. Researchers say that the circadian body temperature holds vital clues to the state of consciousness of patients which could potentially enable doctors to tailor medical treatment more effectively.

The study investigated circadian body temperature variations of 18 patients suffering from severe brain injuries and the potential link to consciousness. Circadian rhythms are an approximate 24-hour cycle governed by the body's internal clock and they determine a number of physiological processes in the body including core body temperature, which fluctuates throughout the day.

To assess the body temperature of patients, researchers used four external skin sensors to monitor the circadian rhythm, which was found to range between 23.5 hours and 26.3 hours. The level of consciousness of each patient was evaluated through the Coma Recovery Scale-Revised, which among others measures responsiveness to sound or a patient's ability to spontaneously open eyes without or only with stimulation by the examiner.

Results showed that patients who scored better on the Coma Recovery Scale-Revised, especially those patients with a stronger arousal, had body temperature patterns that were more closely aligned with a healthy 24-hour rhythm.

"Our study suggests that the closer the body temperature patterns of a severely brain injured person are to those of a healthy person's circadian rhythm, the better they scored on tests of recovery from coma, especially when looking at arousal, which is necessary for consciousness," said lead author Dr. Christine Blume, from the University of Salzburg in Austria. This finding implies that patient's consciousness levels should be assessed during time windows when their circadian rhythm predicts them to be more responsive.

In the same study, researchers also examined the effects of bright light stimulation on patients with severe brain injuries. Eight patients received bright light stimulation, three times per day for one hour over the course of one week. After one week, improvements were found in the level of consciousness of two patients, whose condition improved from vegetative state/unresponsive wakefulness to a minimally conscious state. Interestingly, in these two patients, a shift in their circadian body temperature, closer to a healthy 24-hour rhythm was also recorded.

“Circadian variations is something doctors should keep in mind when diagnosing patients, especially the time of the day when patients are tested could be crucial. Also, it may be important to create an environment that mimics the normal light-dark cycle to support a healthy circadian rhythm,” according to Dr. Blume.

**Source:** [University of Surrey](#)

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