

LIKE SHEEP AND GOATS, REINDEER TOO SLEEP WHILE CHEWING THEIR CUD

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Reindeer slept approximately the same amount during winter, summer, and autumn, despite the fact that they were much more active during the summer. File. | Photo Credit: AP

Researchers have discovered that the more time reindeer spend ruminating, the less time they spend in non-rapid eye movement (non-REM) sleep. EEG recordings revealed that reindeer's brainwaves during rumination resemble the brain waves present during non-REM sleep, and these brainwave patterns suggest that the reindeer are more "rested" after ruminating. The researchers speculate that this multitasking might help reindeer get enough sleep during the summer months, when food is abundant and reindeer feed almost 24/7. The results were published on December 22 in the journal *Current Biology*.

Light-dark cycles are absent in the Arctic during winter and summer, and previous studies showed that Arctic-dwelling reindeer don't display circadian behavioural rhythms during these seasons, though they tend to be more active during the daytime during the spring and autumn equinox, when light-dark cycles are present.

They found that reindeer slept approximately the same amount during winter, summer, and autumn, despite the fact that they were much more active during the summer. This is in contrast to other species who change the amount they sleep in response to environmental conditions. On average, the reindeer spent 5.4 hours in non-REM sleep, 0.9 hours in REM sleep, and 2.9 hours ruminating during a given 24-hour period, regardless of season.

One possible strategy is the opportunity for rest during rumination — the re-chewing of partially digested food, which is an important component of digestion for reindeer and other ruminants. Domestic sheep, goats, cattle, and lesser mouse-deer have all been previously observed to produce sleep-like brain waves during rumination, but it was unclear whether rumination could serve a similar restorative function to sleep.

The reindeer's EEG readings during rumination resembled brainwave patterns that are indicative of non-REM sleep including increased slow-wave activity and sleep spindles. Sleeping and ruminating reindeer also displayed similar behaviour, tending to quietly sit or stand during both activities, and were less reactive to disturbances such as a neighbouring reindeer sitting down or getting up.

Next, the researchers tested whether rumination could reduce the reindeer's drive to sleep by depriving the reindeer of sleep for two hours. Following sleep deprivation, the reindeer's EEG readings indicated a build-up of 'sleep pressure'— the unconscious biological drive for more and deeper sleep — suggesting that reindeer experience deeper sleep following sleep deprivation.

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