Do all animals sleep?

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Credit: AI-generated image (disclaimer)

"Nothing is certain except for death and taxes," said Benjamin Franklin. Of course, he left out another certainty for humankind: sleep. All humans sleep, albeit some better than others. But do all animals sleep, too?

"It all depends on what you mean by sleep," says Franks, a researcher at Imperial College London. "If I asked you the question, 'are all animals

conscious?' what would you say?" Franks likens the two phenomena for two reasons. Sleep, like consciousness, is a first-person experience. And we still don't have a concrete reason why either should exist.

We can safely say that all humans sleep, says Franks, and probably all mammals too, because similar brain patterns and behaviors can be seen using an EEG. Yet extrapolating beyond mammals is fraught with difficulties, he adds. In part this is because of technical issues—you can't measure EEG in flies.

Also confounding us is the fact that we are still yet to prove what sleep is actually for. We know sleep in humans is essential, that it must keep the brain healthy, and that it can't be done while we are conscious. But that might not be the same for a fly, whose brain is a more passive structure, explains Franks: "The benefit that a fly gets from sleep may be very different to the benefits we get."

All animals appear to follow circadian rhythms, biological changes based on Earth's 24-hour pattern of light and dark. These regulate our sleep patterns, and the effect is even present in blind animals. It's true that all animals have a period of quiescence each day, Franks remarks, such as moving less. "The question is, are they really getting sleep as we understand it in humans?"

Like consciousness, it may be difficult to ever know whether all animals sleep—and whether they experience it in the same way we do.

Finding the underlying mechanisms for sleep

As part of the EU-funded DNCSS project, Franks and his colleagues investigated the underlying regulatory mechanisms of sleep. They studied the brain activity of mice to find out more about the phenomena at the level of brain circuitry.

The work greatly expanded our knowledge of which brain regions are involved in sleep regulation. Sleep-related neurons aren't just found in commonly associated areas such as the hypothalamus or brainstem, the team found, but are spread throughout the brain.

By better understanding these circuits, the researchers hope to better understand the relationships between sleep malfunctions and conditions such as dementia.

How to get a better sleep

As for how humans can get a better night's sleep, Franks suggests paying attention to two key variables. The first is temperature: a study in Franks' lab showed having a warm bath before bed induces the brain's circuitry to make you sleepier.

The second, and most important, is light. This means not just keeping your bedroom dark, but also making sure you get enough light during the day, to reinforce your circadian rhythms.

For those finding it difficult to drop off, rest assured it will always come in the end, says Franks: "The drive is so powerful that sleep is truly inescapable." And far more welcome than death and taxes.

Provided by CORDIS

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