Dragons do not warm their brain during sleep, unlike pigeons and mammals

In many mammals, the brain cools down during non-REM sleep and warms up during REM sleep. In this article published in the journal *iScience*, researchers showed that pigeons exhibit similar changes in brain temperature during sleep, whereas brain temperature did not change in sleeping bearded dragons. Hence, brain warming and it is probable associated functions do not seem universal for all species.

Sleep in mammals is composed of two major states, non-rapid eye movement (NREM) sleep and rapid eye movement (REM) sleep. REM sleep is a state characterized by wake-like brain activity. In many mammals, after cooling during NREM sleep, the brain warms up during REM sleep. This brain temperature increase was suggested to prepare the brain for waking.

Through a collaboration with the Max Planck Institute for Ornithology, researchers were able to study brain temperature in pigeons and bearded dragons. These species, belonging to the same evolutionary branch, share a common ancestor with mammals and have two sleep states similar in some respects to those of mammals. Like mammals, birds are able to maintain a high metabolism and a constant body temperature; however, this is not the case for lizards. Thus, studying these species is important for understanding the function of REM sleep.

In pigeons, researchers found a decrease in brain temperature during NREM sleep and a small, but consistent increase in brain temperature related to REM sleep. In sleeping bearded dragons, the brain temperature did not change when the animals switched to a sleep state with wake-like activity. These results are at odds with the hypothesis that there is a universal function for different sleep states, and more precisely that the function of REM sleep is to warm up the brain to prepare it for wakefulness. The lack of brain warming during sleep in bearded dragons also questions the homology between sleep – and particularly REM sleep – in lizards and mammals.

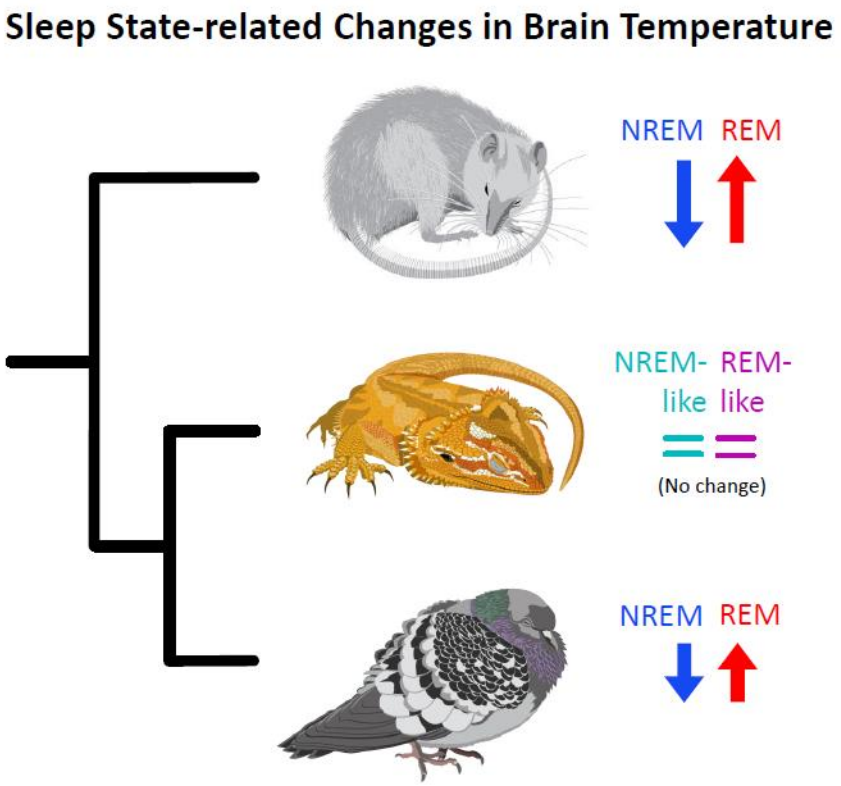

Figure: Schematic illustration depicting a decrease in brain temperature during NREM sleep and an increase in brain temperature during REM sleep in rats and pigeons, but no change in brain temperature in bearded dragons during sleep states that were suggested to be homologous to those described in birds and mammals

To know more :

Comparative perspectives that challenge brain warming as the primary function of REM sleep
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