

June 6, 2018 Wednesday 23 Sivan 5778

14:06 IST



Print



Print

Select Language ▼

THE JERUSALEM POST



A baby in a stroller or carriage (illustrative). (Photo by: INGIMAGE)

New link between sleep arousals and body temperature

By JUDY SIEGEL-ITZKOVICH

04/26/2018

Sudden infant death syndrome kills dozens of Israeli babies before their first birthday each year.

Scientists from Bar-Ilan University and Boston University have found a possible new link between body temperature, arousals from sleep and sudden infant death syndrome, which kills dozens of Israeli babies before their first birthday each year.

Elevated room temperature, too much crib bedding and putting babies to sleep on their stomach – all factors that contribute to higher body temperature – are known to increase the risk of sudden infant death syndrome (SIDS). So far, the mechanism of why higher body temperature increases the risk of crib death has been unknown.

Awakening for short periods during sleep – sometimes as many as 10 to 15 times per night – appears randomly in humans and even in animals. But the reason for such awakenings has not been understood.

The Ramat Gan and Boston scientists have discovered that the awakenings are probably triggered by the intrinsic electrical noise from wake-promoting neurons (WPN) in the brain. Their research, just published in the journal *Science Advances*, reveals a previously unrecognized neurophysiological mechanism that links sleep arousals with temperature regulation, and may also provide an important new link between temperature and crib death.

During sleep, WPN are suppressed by sleep-promoting neurons. Nevertheless, Dr. Hila Dvir, lead co-author of the study from Bar-Ilan's physics department, suggested that WPNs still maintain a low level of activity in the form of "neuronal noise" that is due to electrical fluctuations in the neuron voltage, which appear even without any input signal. For each neuron, this noise is very low. But since neurons are coupled to each other, the accumulated noise from many neurons can occasionally form a strong enough signal to activate WPN, causing a brief arousal.

Dvir and lead co-author Dr. Ronny Bartsch joined forces with Prof. Lior Appelbaum of BIU's Faculty of Life Sciences to test whether the temperature dependence of neuronal noise directly

translates into different arousal behavior in zebrafish.

These black-and-white-striped fish are the optimal species for such an experiment since their body temperature can be easily manipulated by water temperature. The researchers analyzed periods when the zebrafish were predominantly sleeping and determined sleep duration and number of arousals in varying water temperatures. They found that, indeed, an increase in water temperature led to fewer and shorter arousals.

These experimental results were in excellent agreement with computer simulations that Dvir and Bartsch developed prior to the experiments and that are based on a statistical physics model of the temperature-dependent noise.

“Because of this excellent agreement between model predictions and the experiment, we believe that sleep arousals can be attributed to the neuronal noise of wake-promoting neurons,” concluded Bartsch.

Since thermoregulation in young infants is not yet fully developed, their body temperature is highly affected by the environment/room temperature (similar to fish).

“We think that SIDS can occur when, as a result of higher temperature, neuronal noise levels and the associated probability for arousals are low,” said Dvir. “In contrast, when the temperature is lower, an infant has higher neuronal noise level that yield more arousals, during which the infant can change his position to help himself breathe more freely or move a blanket that may be covering his face.”



Print



Print

JPost.com: [Arab-Israeli Conflict](#) | [Israel News](#) | [Diaspora](#) | [Middle East](#) | [Opinion](#) | [Premium](#) | [Blogs](#) | [Not Just News](#) | [Edition Francaise](#) | [Green Israel](#)

[About Us](#) | [Advertise with Us](#) | [Subscribe](#) | [RSS](#)

Copyright © 2014 Jpost Inc. All rights reserved •
[Terms of Use](#) • [Privacy Policy](#)