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Dietary prebiotics improve sleep, buffer impacts of stress, says study

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In recent years, reams of research papers have shed light on the health benefits of probiotics, the "good bacteria" found in fermented foods and dietary supplements. Now a first-of-its kind study by University of

Colorado Boulder scientists suggests that lesser-known gut-health promoters called prebiotics - which serve as food for good bacteria inside the gut—can also have an impact, improving sleep and buffering the physiological impacts of stress.

"We found that dietary prebiotics can improve non-REM sleep, as well as REM sleep after a stressful event," said Robert Thompson, a post-doctoral researcher in the Department of Integrative Physiology and first author of the new study published in the journal *Frontiers in Behavioral Neuroscience*.

Prebiotics are dietary fibers found naturally in foods like chicory, artichokes, raw garlic, leeks and onions. When beneficial bacteria digest prebiotic fiber, they not only multiply, improving overall gut health, but they also release metabolic byproducts. Some research suggests these byproducts can influence brain function, explains lead author Monika Fleshner, a professor in the Department of Integrative Physiology.

For the study, the researchers fed 3-week-old male rats a diet of either standard chow or chow that included prebiotics. They then monitored the rats' body temperature, gut bacteria and sleep-wake cycles - using EEG, or brain activity testing—over time.

They found that the rats on the prebiotic diet spent more time in non-rapid-eye-movement (NREM) sleep, which is restful and restorative, than those on the non-prebiotic diet.

"Given that sufficient NREM sleep and proper nutrition can impact brain development and function and that sleep problems are common in early life, it is possible that a diet rich in prebiotics started in early life could help improve sleep, support the gut microbiota and promote optimal brain/psychological health," the authors wrote.

After being exposed to a stressor, the rats on the prebiotic diet also spent more time in rapid-eye-movement (REM) sleep. REM sleep is believed to be critical for promoting recovery from stress, with research showing that those who get more REM sleep post-trauma are less likely to suffer from post-traumatic stress disorder.

Stress has previously been shown to reduce healthy diversity of gut bacteria and to lead to a temporary flattening of natural fluctuations in body temperature.

But rats on the prebiotic diet were buffered from these impacts, maintaining a healthy and diverse gut microbiota and normal temperature fluctuations even after stress exposure.

Fleshner said it's far too early to recommend prebiotic supplements as a sleep aid. More studies are in the works to examine what role prebiotics can play in promoting sleep, or buffering stress in people.

But she does recommend loading up on healthy prebiotic fiber from food. "It can't hurt and it might help," she said.

More information: Robert S. Thompson et al, Dietary Prebiotics and Bioactive Milk Fractions Improve NREM Sleep, Enhance REM Sleep Rebound and Attenuate the Stress-Induced Decrease in Diurnal Temperature and Gut Microbial Alpha Diversity, *Frontiers in Behavioral Neuroscience* (2017). DOI: 10.3389/fnbeh.2016.00240

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