

What causes sleepiness when sickness strikes

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It's well known that humans and other animals are fatigued and sleepy when sick, but it's a microscopic roundworm that's providing an explanation of how that occurs, according to a study from researchers at the Perelman School of Medicine at the University of Pennsylvania. A study published this week in *eLife* reveals the mechanism for this



sleepiness.

Working with a worm's simple nervous system shows how a single nerve cell named ALA coordinates an organism-wide response to sickness. During sickness, cells are under stress, and organisms experience sleepiness to promote sleep and recover from the <u>cellular stress</u>. In the worm, this sleepiness is caused by release from the ALA neuron of FLP-13 and other neuropeptides, a group of chemicals that send signals between <u>brain neurons</u>.

"Sleep is vitally important in helping both people and animals to recover during sickness," said senior author David M. Raizen, MD, PhD, an associate professor of Neurology and a member of the Center for Sleep and Circadian Neurobiology. "Similar signaling may operate in humans and other animals to regulate sleep during sickness. These findings create a launching pad towards future research into the mechanisms for illness-induced sleepiness in humans and other organisms."

These findings reveal that FLP-13 causes sleep by turning down activity in the nervous system cells that help keep an organism awake. Researchers examined <u>genetic mutations</u> to determine which genes cause the worms to fall asleep when FLP-13 is released. This revealed that worms with mutations that cause them to lack a receptor protein called DMSR-1 on cell surfaces do not become sleepy in response to FLP-13. This indicates that DMSR-1 is essential for FLP-13 to trigger sleep.

Next experiments will target whether illness-induced sleepiness in humans and other mammals is triggered via a similar mechanism. If so, this research may be a critical step towards developing drugs to treat <u>human</u> fatigue associated with <u>sickness</u> and other conditions.

More information: Michael J Iannacone et al, The RFamide receptor DMSR-1 regulates stress-induced sleep in, *eLife* (2017). <u>DOI:</u>



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Provided by Perelman School of Medicine at the University of Pennsylvania

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