



THE UNIVERSITY OF CHICAGO

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STATISTICS COLLOQUIUM

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Mitigation of Non-lethal Deprivation of Worm Sleep

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Eckhart 133, 5734 S. University Avenue

Refreshments following the seminar in Eckhart 110.

ABSTRACT

Sleep may be universal in the animal kingdom. Yet, fundamental aspects of sleep remain controversial. Questions under debate include its universality (do all animals sleep?), natural history (when did it evolve?), and core function (what for, originally?).

A key feature distinguishing sleep from other states of decreased activity is its intricate homeostatic regulation. This talk will describe two mechanisms for homeostatic compensation in the presence of disruptions to lethargus, the sleep-like state of the nematode *C. elegans*. In addition, recent findings regarding the protective responses required for mitigating the long-term consequences of nematode sleep loss will be discussed.

Using tunable stimulation and computational approaches for analyzing posture and motion, we identified two distinct categories of homeostatic responses during lethargus. In the presence of weak or no stimuli, behavioral dynamics are stabilized by peptidergic signaling. Strong stimuli evoke a stress response and a different form of compensatory behavior. When the disruption is too severe for the animal to compensate for, long-term effects (loosely analogous to 'tiredness') can be detected. In the latter case, the protective responses known from other stressors may be involved in a process of long-term recovery.

These findings add to the list of similarities between *C. elegans* lethargus and vertebrate sleep and open to the door to a better understanding of its ancient cellular functions.

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