

Sleeping medications used for insomnia may combat drug and alcohol addiction

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Rutgers researchers think they have identified a biological process for drug and alcohol addiction, and believe existing insomnia treatments could be used to reduce or eliminate cravings.

A review in *Biological Psychiatry* explains how ongoing work at the Rutgers Brain Health Institute and elsewhere demonstrates that the brain's orexin system—which regulates sleep/wake states, reward systems and mood—motivates drug-seeking behavior. The researchers report that many drugs of abuse increase orexin production in both animal and [human brains](#), and that blocking this system reverses [addiction](#) in animals. Another study has even demonstrated that one of the three orexin-blocking sleep aids approved for insomnia treatment reduces opioid cravings in human subjects.

"There's still much to discover about how orexin drives drug craving, but we know more than enough to justify testing orexin antagonists in clinical trials as addiction treatments," said Gary Aston-Jones, co-author of the review and director of the Brain Health Institute.

The review, which draws on more than a decade of publications from researchers at Rutgers and peer institutions, suggests that orexin spurs drug craving, and thus, motivation to procure a drug.

Under normal circumstances, many orexin-producing cells in the brain turn orexin production on and off in ways that raise and lower motivation. These cells turn on when, for example, people face a tight deadline and need to get work done, and turn off at night to enable sleep. However, when people become addicted to opioids, cocaine, alcohol and other substances, these cells increase orexin production but no longer turn it off. They stay on constantly, producing high levels of orexin that motivates one behavior: getting another hit.

Controlled studies of mice, rats, zebrafish and other animals have allowed researchers to systematically examine each step in the process. Postmortem analysis of brain tissue from people who used heroin shows the same increase in the human orexin system that researchers have observed in addicted animals. Once triggered, this overactivity may last

forever—indeed, the research team observed increased orexin levels in cocaine-addicted rats that stayed sober for more than a quarter of their natural lifespan.

Earlier research into orexin's sleep-blocking effects spurred the creation of anti-orexin [insomnia](#) medications, three of which have been approved by the U.S. Food and Drug Administration (Belsomra, Quviviq and Davigo). As orexin's role in addiction has emerged, researchers have tested these medications as addiction treatments, mostly in animals. Research at Rutgers has found that low doses of one of these medications can reduce drug-seeking behavior in rats without sedating them or impairing cognitive function. Moreover, a recent study from Johns Hopkins University showed that this medication can reduce cravings in people detoxifying from opioids.

"There's obviously no guarantee [orexin](#) agonists will effectively treat addiction, but our research gives us good reason for hope," said Morgan James, coauthor of the review and a professor of psychiatry at Rutgers Robert Wood Johnson Medical School. "And the need for effective treatments is enormous. Overdose deaths have skyrocketed past 100,000 a year and existing treatment options have limited efficacy."

More information: Morgan H. James et al, Orexin Reserve: A Mechanistic Framework for the Role of Orexins (Hypocretins) in Addiction, *Biological Psychiatry* (2022). [DOI: 10.1016/j.biopsych.2022.06.027](#)

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