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Extremely Active Rats Become Lazy when They Artificially Receive “Runners’ High”

Research could lead to treatments for addicts who seek similar pleasure-center activation

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COLUMBIA, Mo. – Past research has shown that the pleasure and reward centers of the brain are activated similarly by dangerous drugs as well as by exercise, which is why therapies have been developed for drug addicts that include lots of exercise. Now, researchers at the **University of Missouri** have found that activating these pleasure and reward receptors in the brain could provide the “reward” of dangerous drugs without having to consume those drugs.

For the study, a team of scientists led by Frank Booth, a professor at the [MU College of Veterinary Medicine](#), selectively bred rats that exhibited traits of either extreme activity or extreme laziness. The researchers then gave chemicals to the rats to either activate or shut off their mu-opioid receptors, which are the genes in the brains of rats and humans which release dopamine, a pleasure-inducing chemical. Greg Ruegsegger, a doctoral student in the MU College of Veterinary Medicine and lead author of the study, says that when the receptors of the extremely energetic rats were activated, those rats were much less inclined to exercise.

“These highly active rats would run on their wheels constantly,” Ruegsegger said. “However, when we chemically activated their mu-opioid receptors, those rats drastically reduced their amounts of activity. Since exercise and addiction to substances follow this same chemical process in the brain, it stands to reason that activating these receptors in people with dangerous addictions could provide the same rewards they are craving without the use of dangerous drugs or alcohol.”

When MU researchers studied the brains of the rats, they found 400 percent more of the reward receptors in the extremely active rats than the extremely lazy rats. They believe this indicates that the extremely active rats were active to receive “rewards” from their mu-opioid receptors, which may explain why they voluntarily run such extreme amounts.

The researchers also used chemicals to shut off the mu-opioid receptors in the active rats, but found that it similarly reduced activity in the rats, though not as drastically as turning on those receptors in the active rats. Researchers found that activating and shutting off the receptors in the lazy rats seemed to have no significant effect on those rats’ overall activity levels.

This study was published in the journal *Neuropharmacology*.

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