MedicalXpress

Flipping the brain's addiction switch without drugs

May 28 2009

When someone becomes dependent on drugs or alcohol, the brain's pleasure center gets hijacked, disrupting the normal functioning of its reward circuitry.

Researchers investigating this addiction "switch" have now implicated a naturally occurring protein, a dose of which allowed them to get rats hooked with no drugs at all.

The research will be published Friday in the journal *Science*.

"If we can understand how the brain's circuitry changes in association with drug abuse, it could potentially suggest ways to medically counteract the effects of dependency," said Scott Steffensen, a neuroscientist at Brigham Young University who co-authored the study with two of his undergraduate students, one of his grad students, and a team of researchers at the University of Toronto.

Chronic drug users, as noted by previous research, can experience an increase of a naturally-occurring protein called BDNF (brain-derived neurotrophic factor) in the brain's reward circuitry, a region scientists call the ventral tegmental area. In this study, the researchers took the drugs out of the equation and directly infused extra BDNF onto this part of the brain in rats.

The Toronto team noted that a single injection of BDNF made rats behave as though they were dependent on opiates (which they had never

received). Though rats instinctively prefer certain smells, lighting and texture, these rats left their comfort zone in search of a fix.

"This work may reveal a mechanism that underlies drug addiction," said lead author Hector Vargas-Perez, a neurobiologist at the University of Toronto.

The BYU team confirmed that the protein is a critical regulator of drug dependency. After the BDNF injection, specific chemicals that normally inhibit neurons in this part of the brain instead excited them, a "switch" known to occur when people become dependent on drugs.

Steffensen, who teaches in BYU's psychology department, says this work suggests that BDNF is crucial for inducing a drug dependent state, one important aspect of drug addiction.

Source: Brigham Young University (news : web)