Medical Xpress

New study shows promise for first effective medicine to treat cocaine dependence

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New research published in *JAMA Psychiatry* reveals that topiramate, a drug approved by the U.S. Food and Drug Administration (FDA) to treat epilepsy and migraine headaches, also could be the first reliable medication to help treat cocaine dependence.

The study, led by Bankole A. Johnson, DSc. MD., MB.ChB., MPhil., chairman of the Department of Psychiatry at the University of Maryland School of Medicine and head of the School's new Brain Science Research Consortium Unit, with support from the National Institutes of Health and Agency for Healthcare Research and Quality, is one of the first to establish a pharmacological treatment for cocaine addiction, for which there are currently no FDA-approved medications.

Addiction affects 13.2 to 19.7 million cocaine users worldwide. Cocaine is responsible for more U.S. emergency room visits than any other illegal drug. Cocaine harms the brain, heart, blood vessels, and lungs—and can even cause sudden death.

Professor Johnson, one of the nation's leading neuroscientists and psychopharmacologists, had previously found that topiramate was a safe and effective treatment for alcohol dependence compared with placebo.

In releasing the new study, Professor Johnson, who conducted the research when he was with Department of Psychiatry and Neurobehavioral Sciences at the University of Virginia, provided full disclosures, which follow the text of this news announcement.

The study enrolled 142 participants, aged 18 years or older, seeking treatment for cocaine dependence. Following enrollment, participants were randomly assigned into a topiramate group or placebo group. Neither the participants nor the healthcare professionals administering the treatment knew who was in which group (double-blinded study).

Using an intent-to-treat analysis, the researchers found that topiramate was more efficacious than placebo at increasing the participants' weekly proportion of cocaine nonuse days and in increasing the likelihood that participants would have cocaine-free weeks. Furthermore, compared with placebo, topiramate also was significantly associated with a decrease in craving for cocaine and an improvement in participants' global functioning.

The study investigators also observed few side effects due to drug treatment. In general, participants in the topiramate group experienced mild side-effects, including abnormal tingling skin sensations, taste distortions, anorexia, and difficulty concentrating.

"Our findings reveal that topiramate is a safe and robustly efficacious medicine for the treatment of cocaine dependence, and has the potential to make a major contribution to the global health crisis of addiction," Professor Johnson said. "However, topiramate treatment also is associated with glaucoma, and higher doses of the drug can increase the risk of side effects; therefore, caution must be exercised when prescribing the drug, especially when given in high doses."

These results build upon earlier work from Professor. Johnson's group which indicated that individuals dependent on cocaine, but not seeking treatment, who took topiramate were more likely to experience reduced cravings and preference for cocaine, compared with placebo. The findings of the current study indicate that topiramate may be even more effective in treating people with addiction who actively want to quit

using cocaine.

"Because topiramate is the first medication to demonstrate a robust therapeutic effect for the treatment of cocaine or alcohol dependence, its fundamental neurochemical effects provide important clues as to common links in the neurobiological basis of the addictive process in general," remarked Professor Johnson. "These findings also add to our understanding of how addiction affects the brain because it demonstrates the unique concept that dual neurotransmitter modulation, by simultaneously augmenting the inhibitory action of gamma amino butyric acid and inhibiting the excitatory effects of glutamate, can result in therapeutic effects that reduce the propensity to use cocaine."

Professor Johnson's clinical expertise is in the fields of addiction, biological, and forensic psychiatry. He graduated from the University of Glasgow in Scotland in 1982 with a Medicinae Baccalaureum et Chirurgie Baccalaureum degree, (MB.Ch.B), the qualifying degree for a physician in the United Kingdom. From there, he trained in Psychiatry at the Royal London and Maudsley and Bethlem Royal Hospitals. In 1991, Professor Johnson earned his Master of Philosophy degree (M.Phil.) in neuropsychiatry from the University of London. He then went on to conduct doctoral research at Oxford University, and obtained the Medicinae Doctorem (M.D.) degree in biomedical sciences from the University of Glasgow in 1993. In 2004, Professor Johnson earned a Doctor of Science degree (D.Sc.) in medicine, the highest doctoral degree offered by a British university, from the University of Glasgow, specializing in neuroscience and neuropharmacology.

Professor Johnson's primary area of research expertise is the psychopharmacology of medications for treating addictions. Professor Johnson is a fellow of the American College of Neuropsychopharmacologists, a distinguished fellow of the American Psychiatric Association, and a fellow of the Royal College of

Psychiatrists. He is the principal investigator on NIH-funded research studies using neuroimaging, neuropharmacology, and molecular genetics techniques. All work for this study was conducted by Professor Johnson and his team in the Department of Psychiatry and Neurobehavioral Sciences at the University of Virginia. The University of Virginia's Institutional Review Board approved all clinical protocols and all participants provided informed consent prior to being admitted into the study. For more information about the study, refer to clinicaltrials.gov identifier NCT00249691.

Provided by University of Maryland