Studies improve knowledge of underlying brain changes caused by addiction

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New research using animal models is enabling a deeper understanding of the neurobiology of compulsive drug addiction in humans — knowledge that may lead to more effective treatment options to weaken the powerful cravings that cause people to relapse. The findings were released today at Neuroscience 2009, the Society for Neuroscience's annual meeting.

Drug addiction is known to change the structure and function of the brain, affecting a person's self control and decision-making ability. According to the Substance Abuse and Mental Health Services Administration's latest survey, 23.6 million persons aged 12 or older needed treatment for an illicit drug or alcohol abuse problem in 2006.

These new studies have identified brain mechanisms that help explain how addictions form, as well as the cognitive problems associated with them. Additional research findings discussed could also offer hope against addiction relapses.

Today's new findings show that:

- Chronic alcohol consumption reduces the number of new brain cells that form in the hippocampus of primates. The hippocampus plays a key role in memory, perhaps explaining the association between chronic alcoholism and memory problems (Chitra Mandyam, PhD, abstract 30.17).

- After exposure to cocaine, rhesus monkeys developed impairments in learning, cognitive flexibility, and memory. This finding suggests that cognitive problems associated with cocaine addiction in humans result directly from the cocaine abuse rather than from a pre-existing trait or lifestyle factor (Charles W. Bradberry, PhD, abstract 158.4).

- A chemical already found in the body reduces cravings in addicted rats and appears to restore normal functioning in a brain circuit associated with cocaine addiction (Khaled Moussawi, abstract 346.14).

Other research findings being discussed at the meeting show that:

- Advanced neuroimaging technologies and behavioral research suggest that addiction disrupts the fine balance underlying reward, motivation, memory, and cognitive control. This research has important implications for developing therapies to treat addictive disorders (Nora D. Volkow, MD).

- Increasing evidence suggests chronic drug use may alter the brain's reward circuits on a genetic level, contributing to addiction. Focusing on the genetic effects of addiction may open new avenues for improved treatment (Eric J. Nestler, MD, PhD).

"The brain is the body's most complex organ and chemical alterations caused by drug abuse have significant overarching impact on neuroplasticity," said press conference moderator George F. Koob, PhD, of The Scripps Research Institute, an expert on addiction and stress. "Today's findings offer a better understanding of the impacts of this disease and provide a clearer approach toward treating addiction and

guarding against relapse."

Source: Society for Neuroscience (news : web)