

# International study finds meth messes up brains of youths far more than those of adults

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Adolescents who chronically use methamphetamine suffer greater and more widespread alterations in their brain than adults who chronically abuse the drug-and damage is particularly evident in a part of the brain believed to control the "executive function," researchers from the University of Utah and South Korea report.

In a study with chronic adolescent and adult meth abusers in South Korea, MRI brain scans showed decreased thickness in the gray matter of younger users' frontal cortex, the area of the brain believed to direct people's ability to organize, reason and remember things, known as the [executive function](#). A different type of MRI, [diffusion tensor imaging](#) (DTI), indicated alterations to the adolescents' white matter, meaning possible [damage](#) to neurons-the cells that relay information via electrical signals from one part of the brain to another. The gray and [white matter](#) of chronic adult meth users showed far less damage than that of the adolescents.

The researchers found the evidence of damage to cortical thickness in the [frontal cortex](#) of adolescent users alarming.

"It's particularly unfortunate that meth appears to damage that part of the brain, which is still developing in young people and is critical for cognitive ability," says In Kyoon Lyoo, M.D., Ph.D., of Ewha W. University in Seoul, South Korea. "Damage to that part of the brain is

especially problematic because adolescents' ability to control risky behavior is less mature than that of adults. The findings may help explain the severe behavioral issues and relapses that are common in adolescent drug addiction."

Lyoo is first author on the study, published Feb. 10, 2015, in *Molecular Psychiatry* online. Perry F. Renshaw, M.D., Ph.D., M.B.A., University of Utah USTAR investigator and professor of psychiatry, is the study's senior author. The results also indicate that it might take much less meth to cause greater damage in adolescent brains because youths typically use smaller amounts of the drug than adults.

Meth is the one of the most widely abused drugs in Asia, but it's also a problem in the United States, with the Western region of the country experiencing the highest rates of use. Studies with rodents have shown that meth damages the brains of adult rats more than young ones, but whether that holds true in people has been cause for debate.

In one of the largest studies of its type, Lyoo, Renshaw and their colleagues scanned the brains of 111 South Korean adolescents and 114 adults. Among the younger people, 51 used meth while 60 did not. The adults included 54 meth users and 60 non-users.

"There is a critical period of [brain](#) development for specific functions, and it appears that adolescents who abuse methamphetamine are at great risk for derailing that process," Renshaw says. "I think the results show it is hugely important to keep kids off drugs."

Provided by University of Utah Health Sciences

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