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Inhalant abuse: 'Sniffing' toluene for a high

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Toluene, a commonly abused toxic compound, is shown to stimulate dopamine release in specific regions of the rat brain known as drug reward pathways, according to research published online in *Neuropsychopharmacology* this week. Until now it has been unclear whether toluene affects reward centers in the brain, and where, so ultimately this knowledge could help in developing strategies to prevent and treat addiction to substances containing toluene.

Toluene is found in paint thinners, varnishes and even nail polish remover. Researchers from the University of Arizona and the National Institute of Drug Abuse (NIDA) demonstrate that toluene directly stimulates dopamine neurons causing dopamine release. Dopamine is a neurotransmitter and is released by reward centers in the brain causing a feeling of euphoria. The results suggest that the brain likely also interprets sniffing toluene as rewarding which can result in further abuse and possibly future use of other drugs.

Besides showing where in the brain toluene acts, the researchers also demonstrate that, surprisingly, toluene substances are most effective when used at low concentrations. Since toluene is rapidly absorbed in the brain, this might explain why the preferred mode of delivery is by "huffing" or "sniffing". Sniffing is frequently considered a harmless recreational or party drug but unlike other drugs, even a single session of inhaling the compound can disrupt heart rhythms

enough to cause cardiac arrest and lower oxygen levels enough to cause suffocation. Despite a decline in overall adolescent drug use since the late 90's, recreational use of inhalants is increasing. Inhalant abuse is now considered the fourth most abused drug among US teens according to NIDA. Because inhalants activate the same area of the brain that other drugs of abuse affect (e.g. cocaine and methamphetamines), future research will involve the investigation of their combined interactions on the brain.

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