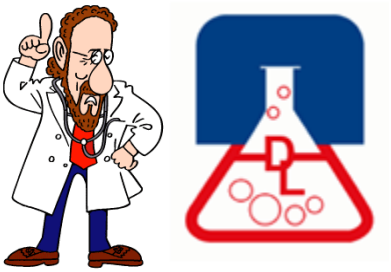

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**Directory of Toxicology**

# Toxicology Topics

## AMPHETAMINES

Amphetamine family of drugs consists primarily of two drugs, amphetamine and d-methamphetamine which are central nervous system stimulants that have been widely abused over the last several decades. Amphetamine has been significantly restricted because of this history of abuse.

A synthetic relative of the *khat* alkaloids, amphetamine (α-methylphenethylamine) was first produced in 1887, but its psychopharmacological properties were not described until 1927. For the next 30 years, medical use of amphetamine (as a bronchodilator, as an appetite suppressant, in the treatment of hyperkinesias in children, and for narcolepsy) was extensive, but by 1967 the potential for abuse of the drug was causing widespread concern.

The only preparation of d-methamphetamine listed in the 2004 edition of the Physicians Desk Reference is Desoxyn®, from Abbott Labs. There are two legal preparations of amphetamine listed which are Adderall Tablets, and Adderall XR Capsules from Shire US, Inc.

Another important form of amphetamines is benzphetamine (Didrex®), supplied by Pharmacia & Upjohn. This compound is metabolized to d-methamphetamine (and subsequently to amphetamine). The anti-Parkinson's disease drug selegiline (Eldepryl®) is metabolized to l-methamphetamine, the structural mirror image of d-methamphetamine, and can cause a positive result for most methamphetamine assays.

The major medical uses for amphetamines are for attention deficit disorder with hyperactivity in children, narcolepsy, occasional use for depression which has not responded to other somatic treatments, and in obesity cases refractory to other treatment. Though greatly restricted in legal pharmaceutical production and medical use, these drugs are synthesized in clandestine laboratories and used illegally as street drugs.

Regular oral use of amphetamine can cause paranoid psychosis and disabling dependence. Intravenous use is even more likely to lead to these effects. Primarily because of an initial euphoria, especially following intravenous injection, amphetamine has become a major drug of abuse. Appetite suppression, insomnia, sudden changes in mood, and compulsiveness are the common results of even moderate amphetamine use. Tolerance develops rapidly, so that increasing doses

are required to achieve the desired stimulation.

Methamphetamine is also a potent central nervous system stimulant with less peripheral actions than amphetamines. It is sold on the street under the name "crystal meth" and has become one of the most widely abused illicit drugs, second only to marijuana. Methamphetamine is metabolized to its active metabolite amphetamine.

Accurate testing for amphetamines requires a two-step "forensic" method. The first step is an immunoassay designed to eliminate most NEGATIVE samples. This test is very similar in principle to the home pregnancy test kits, and is available for on-site testing. Depending upon the quality of the product used, the proper storage of that product while waiting to be used, and the analytical ability of the person conducting the test, false positive results may occur. For this reason, no adverse action should be taken against a donor based solely on the results from any immunoassay procedure, especially in the face of denial of drug involvement by the donor. The second test which should be used is analytically specific for both amphetamine and methamphetamine and the most common method is gas chromatography mass-spectrometry (GC-MS). This method will provide a confirmed POSITIVE result.

3,4-Methenedioxymethamphetamine (MDMA), commonly know as the street drug ECSTACY or XTC, is a derivative of methamphetamine that has seen widespread recreational abuse resulting in it being place on the DEA list in Schedule I (no legitimate medical use with high potential for abuse). The drug is usually taken in oral doses of 100 – 150 mg. About 65% of the drug is excreted as the parent compound within 3 days and approximately 7% excreted as the metabolite methylenediooxyamphetamine (MDA). Testing or this drug requires a specific assay both for screening and for confirmation.