SDRL Laboratory

TOXICOLOGY TIMES

SDRL Laboratory

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A FREE Monthly Newsletter for Substance Abuse and Opioid Treatment Programs from San Diego Reference Laboratory

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Cocaine

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Cocaine is a powerful plant alkaloid obtained from the *Erythroxylum* plant genus. When ingested it has remarkable stimulant and euphoric qualities. The plant is cultivated largely in South America and southern Mexico, and cocaine comprises 0.25 to 0.77% of the leaves.[1] Cocaine is extracted from the leaves of the plant by a solvent process or an acid process, then the extract is treated with dilute sulfuric acid to produce a paste of cocaine sulfate. The paste is then treated with an oxidizing agent and hydrochloric acid to precipitate cocaine hydrochloride from the solution.[2]

The cocaine alkaloid was first isolated by Fredrich Gaedcke in Germany in 1885. Through the late 1800s cocaine was medicalized due to its anesthetic and euphoric qualities. In 1879 cocaine was even used to treat morphine addiction. Sigmund Freud published his work on cocaine in 1884, initially interested in its medical qualities.[3] In 1885, Parke-Davis was selling cocaine in various forms including cigarettes, powder and an injectable form that included a needle. It is also true that the Coca-Cola company included cocaine in their original preparation of the popular soft drink but discontinued its use in 1903.

Cocaine is an effective local anesthetic and a vasoconstrictor, rendering it useful for surgical procedures for the mouth and nose. For this reason, cocaine is a Schedule II narcotic on the Drug Enforcement Agency (DEA) list and sees limited use in the medical community.

Non-medical ingestion of cocaine hydrochloride can be via insufflation, injection or orally. In the mid-1980s, a method to extract the free base of cocaine with baking soda became popular in the US, allowing users to smoke the drug and feel the results almost as rapidly as injecting the hydrochloride. The free-base form was nicknamed "crack" for the crackling sound it made when heated in a smoking apparatus.

Cocaine is the second-most abused illegal drug after marijuana.[4] Cocaine acts by inhibiting the reuptake of serotonin, norepinephrine and dopamine. The reward aspect of the euphoria and feeling of well-being it causes can lead to addiction, even after a short period of use. It is also a central nervous system stimulant, causing users to be alert, show more motor activity and have more energy.

Cocaine use increases the risk of stroke, myocardial infarction and sudden cardiac death. Due to its effects on the heart and circulatory system, cocaine is sometimes referred to as the "heart-attack drug".[5] Lung and oral problems may also present in those who smoke crack. Constant pursuit of a cocaine "high" can disrupt the lifestyles and families of cocaine users. Withdrawal from cocaine can leave the user fatigued, depressed, unable to feel pleasure and perhaps with suicidal thoughts or actions.

Cocaine is rapidly and extensively metabolized in the liver and plasma by cholinesterase enzymes. Only about 1% of the dose is excreted unchanged in the urine. The primary metabolites measured in urine are benzoylecgonine (BE) and ecgonine methyl ester. Hydroxylated metabolites are produced in minor amounts and may be of interest from a forensic standpoint, as they are not produced in vitro (as BE can be). BE is generally detectable by most drug tests for approximately 2-4 days after ingestion. Screening immunoassays are remarkably accurate for BE as the plant alkaloid and its metabolites are unique in nature. Confirmation may be performed by GC/MS or LC/MS/MS.

??? Did You Know ???

Individual and group counseling include a variety of treatments used to treat behavioral health problems. Counseling and more specialized psychotherapies seek to change behaviors, thoughts, emotions, and how people see and understand situations. Counseling is provided by trained clinicians such as psychologists, psychiatrists, social workers, and counselors.

Different clinicians have different orientations, or schools or thought, about how to provide these services. One common orientation is cognitive-behavioral; clinicians who use this approach provide Cognitive-Behavioral Therapy (CBT). CBT helps people in treatment seek their own solutions to problems by addressing behaviors, thoughts, and feelings with systematic goal-oriented strategies. Source: SAMHSA

Question of the Month

Question: *Can urine be tested specifically for heroin?*

Answer: Heroin itself is not tested for in urine; however, 6-Monoacetylmorphine (6MAM), which is often referred to as Heroin because it is a specific biomarker for the consumption of Heroin, can be tested for. Heroin first metabolizes into 6MAM which is quickly eliminated from the system – within 24 hours of ingestion – even in higher drug concentrations. Due to 6MAM's fast metabolism it is difficult to specifically detect. However, 6MAM metabolizes into Morphine which can be detected in urine for up to 4 days from last use. Since Morphine can be identified for a longer period of time, it is the primary drug tested for in Heroin abuse. Morphine can also be a prescription for pain. The only way to decipher Morphine prescriptions from Heroin use is testing for 6MAM. If 6MAM is found negative, it does not indicate lack of Heroin use; it simply means it is not present in the sample or a Morphine prescription was used.

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