

# Stimulants Drug Information

## Classification

Stimulants are psychoactive drugs that induce temporary improvements in mental and/or physical function. The effects of stimulants include enhanced alertness, wakefulness, endurance, productivity and motivation; increased arousal, locomotion, heart rate/blood pressure; and a perception of a diminished requirement for sleep. Symptoms of excessive stimulation of the central nervous system (CNS) include restlessness, difficulty sleeping, tremor, headaches and even psychotic episodes. Loss of appetite (anorexia) and weight loss also occur with CNS stimulants.

Most stimulants are classified as Controlled Substances (CS) in the United States. Designer drugs like MDMA (ecstasy), which have no medical use, are classified as Schedule I CS; the others belong to Schedule II - IV substances. There are several categories of stimulants possessing different chemical structures and employing different pharmacological mechanisms:

- Amphetamine, Methamphetamine, their precursors and structurally related designer drugs represent a broad range of classic stimulant agents.
- Cocaine is the most potent of naturally-occurring stimulants. It is commonly abused and a highly addictive drug.
- Piperazines, such as benzylpiperazine and trifluoromethylpiperazine, possess stimulant and hallucinogenic activity. They became especially popular worldwide as party drugs in the recent years.
- Eugeroics, like adrafinil and modafinil, are prescribed for the treatment of narcolepsy (excessive daytime sleepiness). They were abused as "wakefulness promoting agents" and as CNS stimulants in sports .
- Methylxanthines, such as caffeine, are found in tea, coffee and "energy" drinks. They are also potent stimulants. However, their use is widely accepted in the society.
- Nicotine in tobacco products is also a stimulant, which is not currently banned.
- Other Stimulants—this is a broad group of Controlled Substances with different chemical structures and common CNS pharmacological effects. Many of them, like fenfluramine and phentermine, were originally designed as weight loss drugs. They are no longer used due to severe side effects.

## Metabolism

Most stimulants are excreted in urine unchanged with only minor metabolites. Numerous precursor drugs metabolize extensively into active amphetamine and methamphetamine. Cocaine is rapidly inactivated in the body and excreted with urine fully metabolized.

## Abuse

Stimulants may cause extreme psychological dependence. As drugs of abuse, stimulants are frequently taken to produce a sense of exhilaration, enhance self esteem, improve mental performance, increase activity, produce prolonged wakefulness, and to "get high". Stimulants are also popular as appetite suppressants. Ability to improve short-term physical performance made stimulants one of the most abused drug classes in sports.

## Methods of Analysis

Immunoassay screens with gas chromatography/mass spectrometry (GC/MS) or liquid chromatography/tandem mass spectrometry (LC/MS/MS) for confirmation is a classic approach for amphetamines and cocaine analysis in urine. RTL's comprehensive stimulant test for athletic doping control employs gas chromatography/mass spectrometry (GC/MS).