

Caffeine: No longer just a mild stimulant!

Caffeine is the most popular stimulant worldwide and its use is growing among adolescents and young adults. It is commonly used as a performance enhancer and is gaining popularity in body building. Deaths directly associated with caffeine are rare but with an increase in availability of caffeine in a variety of easy-to-consume and highly concentrated formulations, overdose cases are occurring more frequently. Energy drink exposures reported to poison centers increased by 369% from 2010-2011. In 2013, poison centers received 3,032 reports of exposures to energy drinks; 60% involved children and teens. A recent fatality in a teen following the ingestion of bulk powder caffeine for body building has resulted in a FDA warning to avoid powdered pure caffeine. (<http://www.fda.gov/Food/RecallsOutbreaksEmergencies/SafetyAlertsAdvisories/ucm405787.htm>)

An 8 ounce cup of coffee contains 80-150 mg of caffeine. Stay-awake tablets contain up to 200 mg, whereas most energy drinks range from 50-250 mg of caffeine/can. Energy shot products (e.g. Pure Liquid Caffeine®) contain as much as 500 mg/oz. Powders for body building are sold in bulk quantities over the internet and have 200 mg of caffeine in only 1/16th of a teaspoon. Sodas, teas, chocolate based sweets, gums (e.g. Jolt®), and various snacks and breakfast foods also can contain substantial amounts of caffeine. Many supplements contain natural sources of caffeine such as guarana and yerba mate that are not listed on the label as caffeine.

Single ingestions of 400 mg in a healthy adult can produce mild adverse symptoms while 1 gram or 14 mg/kg is associated with significant toxic effects. The estimated lethal dose in adults is 10-20 grams. Children metabolize caffeine more rapidly and thus tolerate higher doses. Toddlers with ingestions of 35 mg/kg are considered at risk for serious toxicity. Serum caffeine concentrations are easily measured. Therapeutic caffeine concentrations (i.e. for apnea of the premature) are 1-15 mg/L. Because of variable tolerance to caffeine, concentrations above the therapeutic range are difficult to interpret. Lethal concentrations are estimated to be >80mg/L.

Large acute ingestions of caffeine can quickly produce nausea, vomiting and abdominal pain. Caffeine antagonizes adenosine receptors, inhibits phosphodiesterase, and stimulates catecholamine release producing stimulant effects, vasoconstriction of the cerebral arteries and vasodilation of the coronary arteries. Patients often complain of anxiousness, heart racing, palpitations and chest pain. Patients may also present with agitation, headache, lightheadedness, insomnia, perioral tingling, tachycardia, hypertension and hypokalemia. In severe cases, tachypnea, hypotension, widened pulse pressures, arrhythmias, rhabdomyolysis, confusion, tremors and seizures may also occur.

Administration of activated charcoal may be of benefit if given within 30-60 minutes of the ingestion. Symptomatic care with fluids, antiemetics, and benzodiazepines are usually sufficient in mild cases. Beta blockers (e.g. esmolol, propranolol) reverse cardiotoxic effects. Massive intoxications may require hemodialysis to enhance caffeine elimination.

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**1 teaspoon of caffeine powder =
the amount of caffeine in
25 cups of coffee**

Did you know?

Deaths due to fentanyl and acetyl fentanyl have been reported in Maryland.

The Maryland Office of the Chief Medical Examiner has reported recent cases of acetyl fentanyl-associated deaths in Montgomery and Prince George's Counties, as well as cases of fentanyl-associated deaths throughout the state. Both of these potent opioids are being mixed with heroin or substituted for heroin. For more information on fentanyl and acetyl fentanyl, read our July 2013 ToxTidbits at <http://mdpoison.com/publications/toxtidbits/2013/July%202013%20toxtidbits.pdf>.