

False Positive Urine Screens for Phencyclidine

Antibody-based enzyme-mediated immunoassays are used in the emergency department for screening of the urine for substances of abuse. These immunoassays have become the prevailing technology despite limitations such as the weak specificity for phencyclidine (PCP).

Tramadol is a centrally acting synthetic opioid that is commonly prescribed for pain. Recently, the Maryland Poison Center observed an increase in tramadol exposures. Toxicity can present with tachycardia and seizures. Tramadol has been detected in an increasing number of overdose deaths using gas chromatography (the gold standard assay) although it is usually not determined to be the cause of death by the medical examiner. In the emergency department, tramadol has been known to produce a false positive for PCP in urine immunoassay tests (EMIT II; DRI).

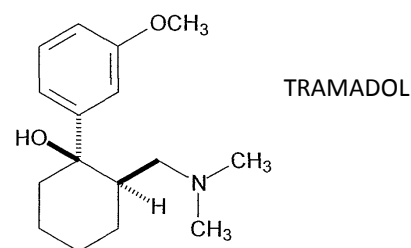
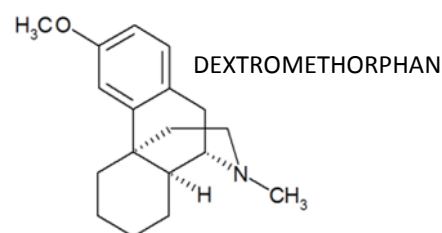
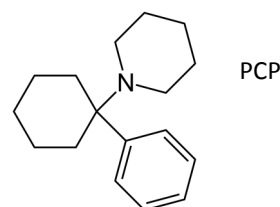
Dextromethorphan hydrobromide is an antitussive present in over 125 cough and cold remedies. Dextromethorphan will inhibit serotonin reuptake and inhibit NMDA receptors causing euphoria and hallucinations in large doses. Dextromethorphan can also produce a false positive PCP in the urine. Of note, the bromide ion will occasionally interfere with automated analyzers for chloride causing a false positive hyperchloremia.

3,4-methylenedioxypropylamphetamine (MDPV) is one of the psychoactive compounds in "bath salts". MDPV is 50-fold more potent than cocaine at blocking the dopamine transporter and is structurally similar to amphetamines. MDPV can interfere with the PCP immunoassay and cause a false positive (Synchron).

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References available on request



Drug	Molecular similarity to PCP by computational analysis
Dextromethorphan (Robitussin DM, Coricidin)	High
Meperidine (Demerol)	High
Thioridazine (Mellaril)	Moderate
Chlorpromazine (Thorazine)	Moderate
Mesoridazine (Serentil)	Moderate
Tramadol (Ultram)	Moderate
Venlafaxine (Effexor)	Moderate
Diphenhydramine (Benadryl)	Moderate
Ketamine (Ketalar)	Moderate
Lamotrigine (Lamictal)	Moderate-poor
MDPV ("Bath Salts")	Unknown

Did you know?

The estimated number of PCP-related ED visits increased more than 400% between 2005 and 2011 according to Drug Abuse Warning Network (DAWN).

However, hospital-based toxicology laboratories usually do not perform confirmatory testing on positive PCP specimens.