

Interpretation of Drug Testing Results in Court- Mandated Testing

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What Does This Result
Mean?

Two-Step Testing Approach

- screening test – designed to separate negative samples from samples that are “presumptively” positive
- confirmation test – follow-up procedure designed to validate positive test results
- why can't you adjudicate based on the screening test results?
- FALSE POSITIVES

Drug tests & cross reactivity:

- screening tests can and do react to “non-target” compounds
 - ◆ amphetamines
 - ◆ benzodiazepines
- obtain list of interfering compounds from lab or on-site test vendor
- study results have demonstrated accuracy rates for initial screening tests as low as 70%
- confirm positive results

Typical Cutoff Levels

screening & confirmation

■ amphetamines *	500 ng/mL	250 ng/mL
■ benzodiazepines	300 ng/mL	variable
■ cannabinoids *	20 & 50 ng/mL	15 ng/mL
■ cocaine (crack)*	150 ng/mL	100 ng/mL
■ opiates (heroin) *	300/2000 ng/mL	variable
■ phencyclidine (PCP) *	25 ng/mL	25 ng/mL
■ alcohol	20 mg/dL	10 mg/dL

◆ * SAMHSA (formerly NIDA) drugs

What is a “cutoff” level ?

- cutoffs are not designed to frustrate CJ professionals
- a drug concentration, *administratively* established for a drug test that allows the test to distinguish between negative and positive sample - “threshold”
- cutoffs provide important safeguards:
 - ◆ scientific purposes (detection accuracy)
 - ◆ legal protections (evidentiary admissibility)
- measured in ng/mL = ppb

Cutoffs and False Positives



as you lower
the cutoff
level of a
drug test



you increase
the potential
for false
positive test
results

How Do Drug Tests Work?

Drug tests & cross reactivity:

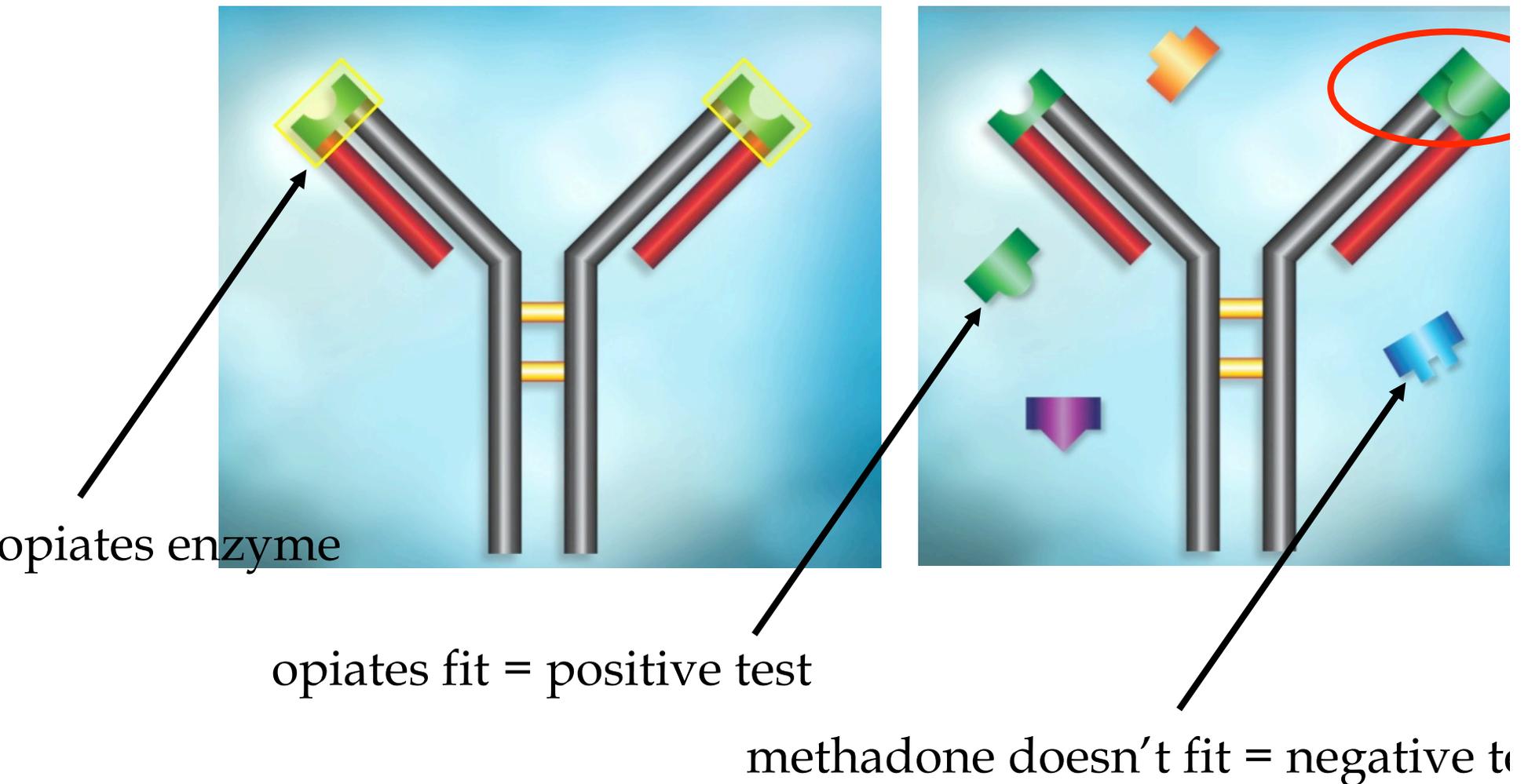
Drug Test

Drug



Drug tests & cross reactivity:

Immunoassay screening tests



Drug tests & cross reactivity:

morphine	100%
codeine	200%
heroin	80%
hydrocodone	75%
hydromorphone	45%
oxycodone	20%

Drug tests & cross reactivity:



(300 ng/mL opiate cutoff test)



150 ng/mL codeine



1500 ng/mL oxycodone



If oxycodone is a major substance of abuse in your jurisdiction, you should consider a separate drug test for oxycodone as part of your initial screening analysis.

Negative or None Detected Results

- indicates that no drugs or breakdown products (metabolites), tested for, were detected in the sample tested
- no such thing as “zero” tolerance or “drug free”
- negative does not mean NO drugs present

Negative/None Detected Interpretation

- client is not using a drug that can be detected by the test

Other possible explanations

- client not using enough drug
- client's drug use is too infrequent
- collection too long after drug use
- urine is tampered
- test being used not sensitive enough
- client using drug not on testing list

Negative/None Detected Interpretation

- no need to second-guess every “negative” result
- not suggesting withholding positive reinforcement & rewards for positive behaviors
- drug testing is a monitoring tool
- assess none detected drug testing results in the context of your client’s overall program compliance (or non-compliance) and their life’s skills success (or lack thereof)

Positive Test Result Interpretation

- indicates that drug(s) or breakdown products (metabolites), tested for, were detected in the sample tested
- drug presence is above the “cutoff” level
- greatest confidence achieved with confirmation
- ALWAYS confirm positive results in original sample

Result Interpretation for MAT Drugs

Medication-Assisted Treatment (MAT) is a form of pharmacotherapy and refers to any treatment for a substance use disorder that includes a pharmacologic intervention as part of a comprehensive substance abuse treatment plan with an ultimate goal of participant recovery with full social function.

MAT Drugs

■ Medications for Alcohol Dependence

- ◆ Naltrexone: (ReVia[®], Vivitrol[®], Depade[®])
- ◆ Disulfiram: (Antabuse[®])
- ◆ Acamprosate: (Campral[®])

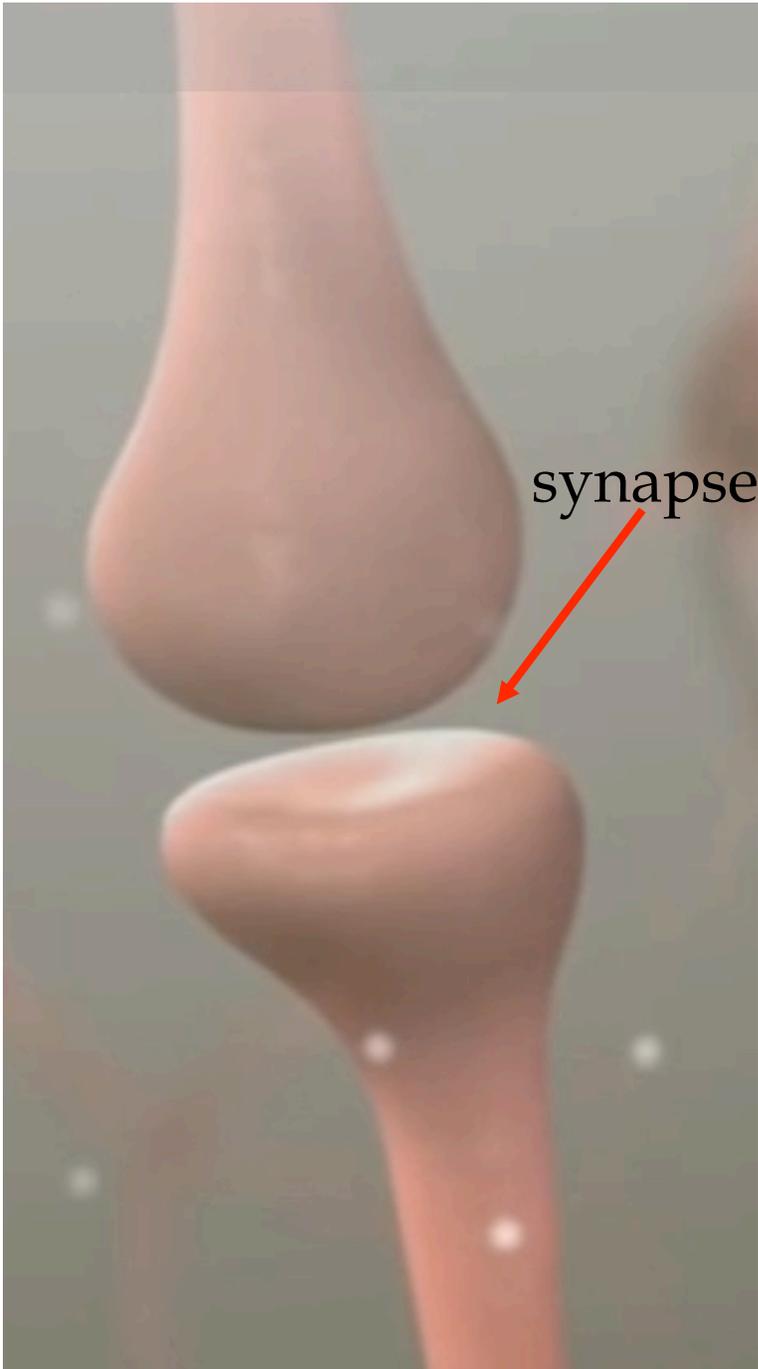
■ Medications for Opioid Dependence

- ◆ Methadone:
- ◆ Buprenorphine: (Suboxone[®] and Subutex[®])
- ◆ Naltrexone: (ReVia[®], Vivitrol[®], Depade[®])

What is Naltrexone?

- belongs to a class of drugs known as opiate antagonists
- block the brain's neurotransmitters
- displaces opiates from their binding site
- diminishes physical effects of opiates
- will naltrexone test positive on an opiate drug test?

Neuron Transmission



Neural Surface Membrane

opioid ligand

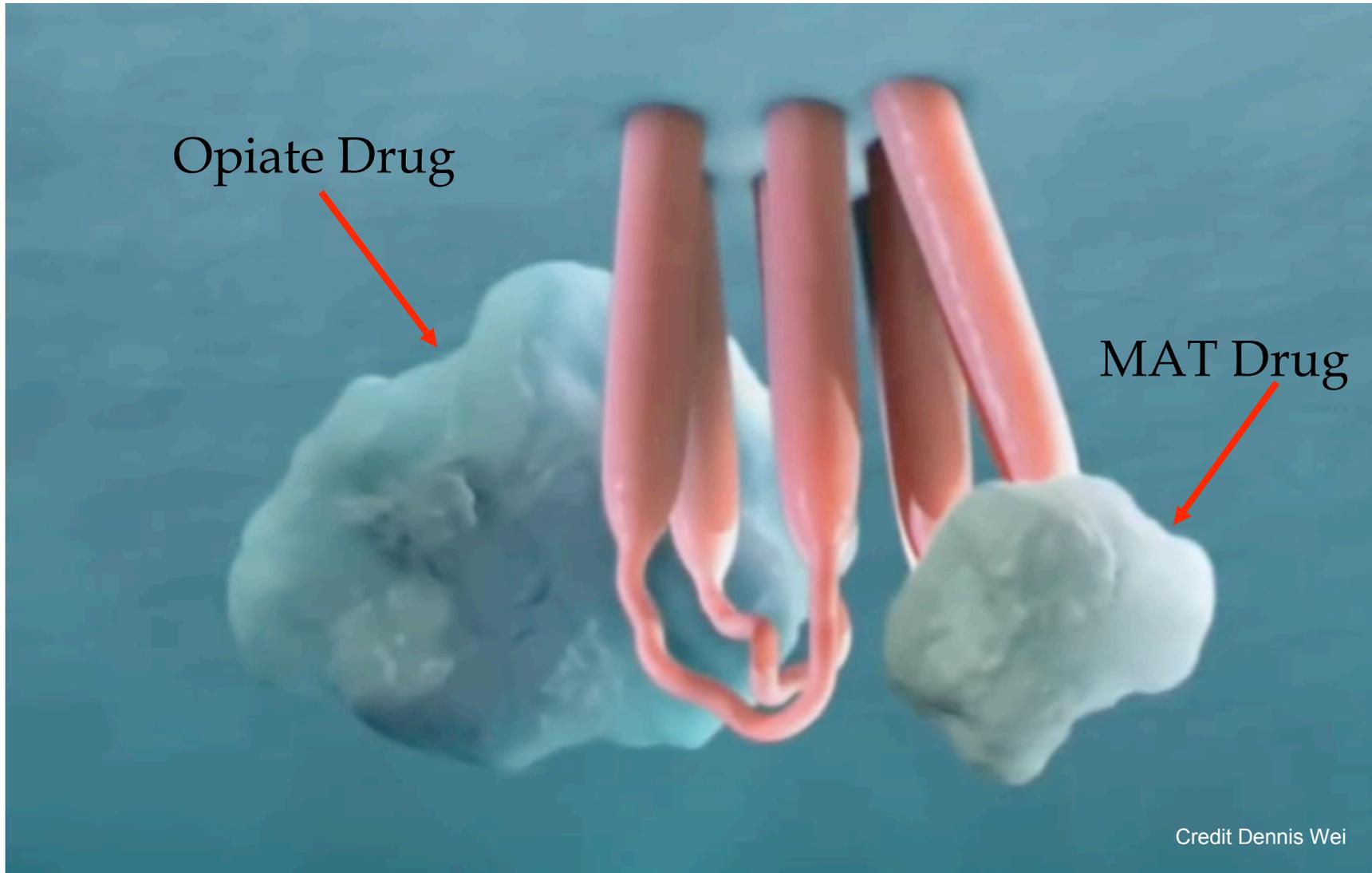
opioid receptor

Ligand could be heroin, morphine, oxycodone or a MAT drug

Credit Dennis Wei

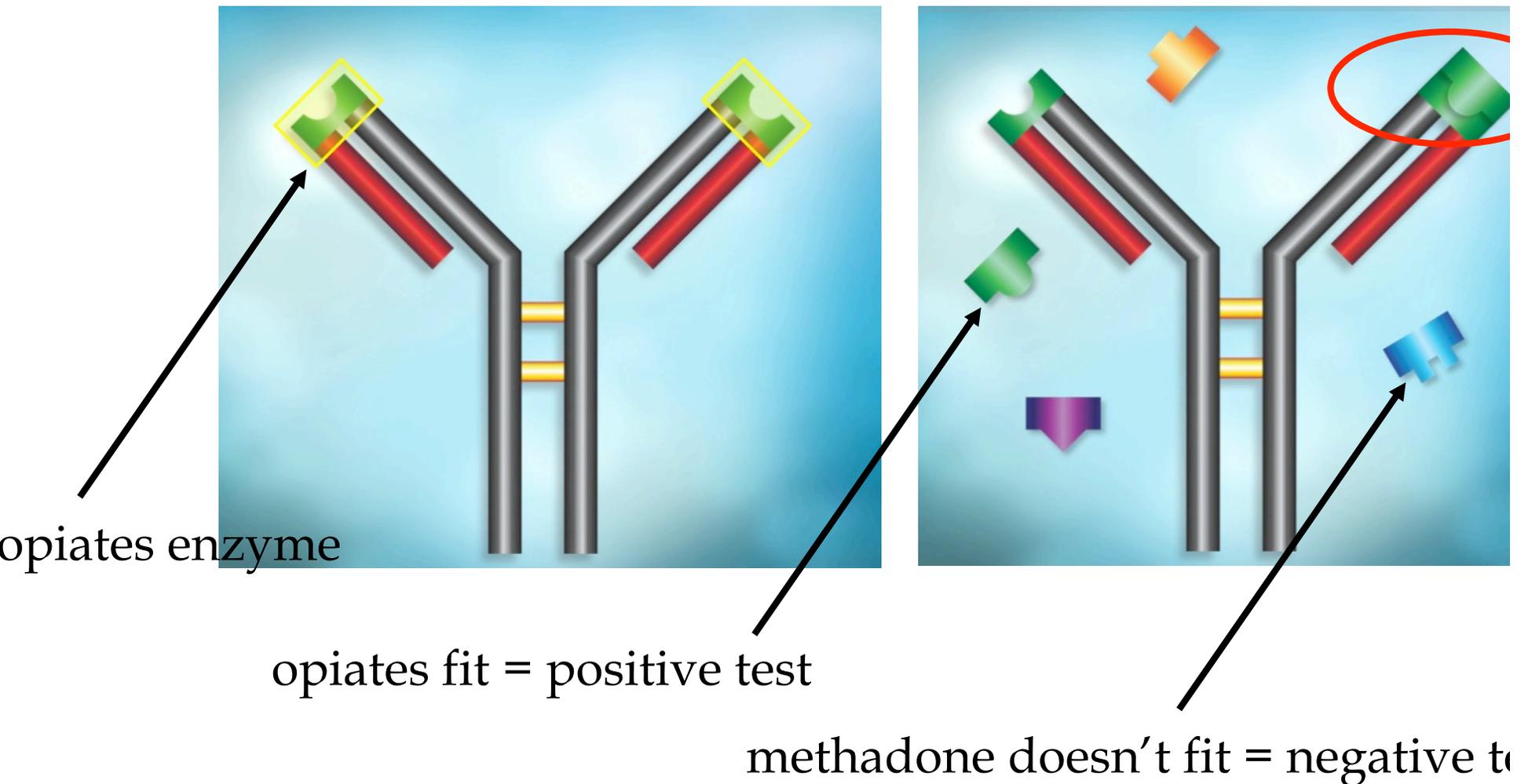


Ligand (MAT drug) Binds to Receptor

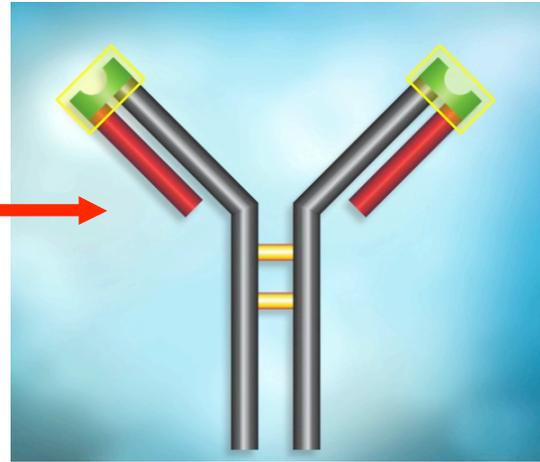
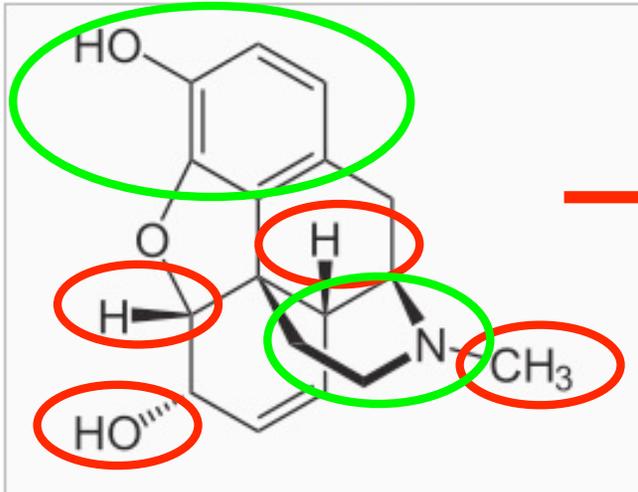


Drug tests & cross reactivity:

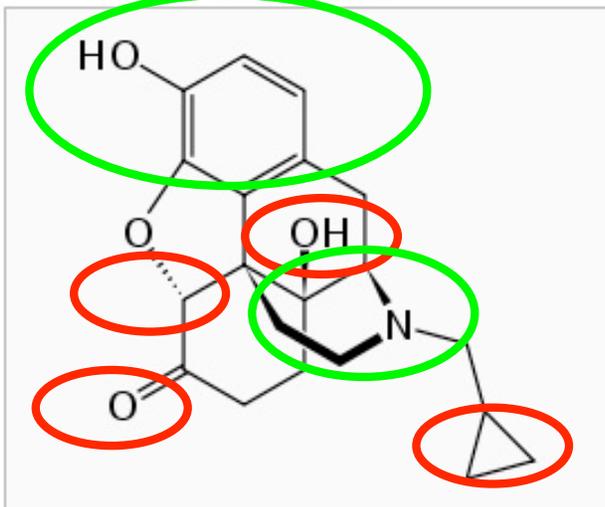
Immunoassay screening tests



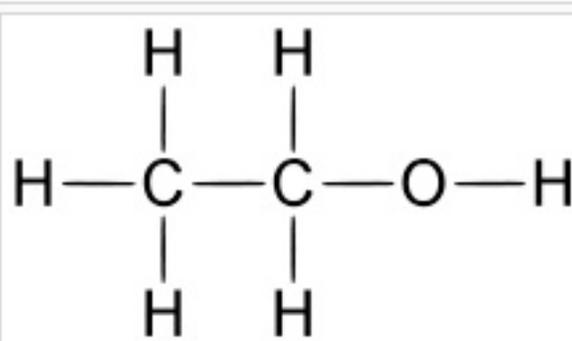
Morphine



Naltrexone



Ethanol



EMIT® II PLUS – OPIATE

Negative
 The compounds below were negative for the Opiate 300 and 2000 cutoffs at the concentrations shown except where noted.
 Concentrations listed are in µg/mL.

Acetaminophen	1000	EMDP	100
Acetylsalicylic Acid	1000	Enalapril Maleate	1000
Albuterol	1000	Ephedrine	1000
Alendronate	1000	Escitalopram	1000
Alprazolam	1000	Escomeprazole	1000
5-Aminosalicylic Acid	1000	Eszopiclone	1000
Amitriptyline @ 300	500	Ezetimibe	1000
Amitriptyline @ 2000	1000	Fentanyl	1000
Amlodipine	1000	Fexofenadine	1000
Amoxicillin	1000	Fluoxetine	900
d-Amphetamine	1000	Fluticasone Propionate	1000
Atomoxetine	1000	Furosemide	1000
Atorvastatin	1000	Gabapentin	1000
Azithromycin	1000	Glutethimide	500
AZT (Zidovudine)	2000	Glyburide	1000
Benazepril	1000	Goldenseal	tea solution
Benzoyllecgonine	1000	Griseofulvin	1000
Buprenorphine	1000	Hydrochlorothiazide	1000
Bupropion	1000	Ibuprofen	1000
Caffeine	1000	d,l-Isoproterenol	1000
Carisoprodol	1000	Isoxsuprine	1000
Celecoxib	1000	Ketamine	100
Cephalexin	1000	Ketoprofen	1000
Cetirizine	1000	Ketorolac Tromethamine	1000
Chlorpheniramine	1000	LAAM (l-α-Acetylmethadol)	25
Chlorpromazine	125	dinor LAAM (α-Acetyl-N,N-dinormethadol)	25
Cimetidine	1000	Lamotrigine	1000
Ciprofloxacin	1000	Lansoprazole	1000
Citalopram	1000	Lidocaine	1000
Clomipramine	2.5	Lisinopril	1000
Clonazepam	1000	Loperamide	1000
Clonidine	1000	Lormetazepam	1
Clopidogrel Hydrogen Sulfate	1000	LSD (Lysergic acid diethylamide)	0.01
Clotrimazole	1000	MDA (Methylenedioxyamphetamine)	5
Cotinine	100	MDMA (Methylenedioxyamphet- amine)	200
Cyclobenzaprine	63	Meloxicam	1000
Desipramine	800	Meprobamate	1000
Dextromethorphan	63	Metaproterenol	1000
Dezocine	1000	Metformin	1000
Diazepam	1000	Methadone	100
Diclofenac	1000	d-Methamphetamine	35
Dihydroergotamine	1000	Methaqualone	1500
Diltiazem	1000	Metoprolol Tartrate	1000
Diphenhydramine	1000	Metoprolol	1000
Dothiepin	100	Myoglobin	287
Doxepin	10	Naltrexone	1000
Doxycycline	1000	NAPA (N-Acetylprocainamide)	400
Doxylamine	500	Naproxen	1000
Droperidol	1000	Netazocine	1000
DDP 2-Ethylidene-1, 3-dimethyl-3, 3-diphenylpyrrolidine	1000	Nortriptyline	250
		Nylidrin	1000

Siemens EMIT Assay Cross-Reactivity Data

Myoglobin	287
Naltrexone	1000
NAPA (N-Acetylprocainamide)	400
Naproxen	1000

= 1,000,000 ng/mL

CEDIA® Opiate Cross-Reactivity Table
For catalog #s 100089, 100098 & 1661248

POSITIVE COMPOUNDS

The following compounds tested POSITIVE on the CEDIA® DAU Opiate assay at the 300 ng/mL cutoff.

Positive Compounds	Trade Name	Concentration Tested (ng/mL)
6-Monoacetylmorphine		370
Clomipramine HCl	Anafranil	500,000
Codeine		240
Cyclazocine		500,000
Cyamemazine		31,125
Diacetylmorphine	Heroin	570
Dihydrocodeine	DHC Plus, Synalgos-DC	600
Hydrocodone	Lortab, Vicodin	625
Hydromorphone	Dilaudid	530
Levorphanol tartrate	Levo-Dromoran	100,000
Morphine		300
Morphine SO4	MS Contin, MSIR, Oramorph SR, Roxanol	100,000
Morphine-3-glucuronide		370
Morphine-6-glucuronide		640
Nalorphine HCl		100,000
Naloxone	Narcan	6,000
Naltrexone HCl	Depade, ReVia	50,000
Ofloxacin	Floxin	100,000
Oxycodone	OxyContin	320,000
Pholcodine		500
Rifampin	Rifadin	65,000
Thebaine		1,250

Abstract: A clinical evaluation of the naltrexone, a biodegradable sustained-release dosage was carried out in 4 healthy normal males.

Subjects were given an intravenous dose of 10 mg naltrexone and approximately one week later a 63-mg dose of naltrexone by subcutaneous administration.

Urine levels for naltrexone were 79-215 ng/mL.

Naloxone	Narcan	6,000
Naltrexone HCl	Depade, ReVia	50,000
Ofloxacin	Floxin	100,000

MAT Drugs

■ Medications for Alcohol Dependence

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- ◆ Disulfiram: (Antabuse[®])
- ◆ Acamprosate: (Campral[®])

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- ◆ Methadone:
- ◆ Buprenorphine: (Suboxone[®] and Subutex[®])
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Home > Q & A > Questions > Why does naltrexone post a...



chet1

Why does naltrexone post a positive opiate result on a UA test?

Posted: 4 Nov 2010 by [chet1](#)

Topics: [naltrexone](#), [opiate](#)

does naltrexone cause a positive opiate or benzo result on a UA test?

Wnt signaling products

Wnt proteins reporter cell lines Drug screening kits and services



Question is Closed

Report Favorite

Responses (1)



Marvell

5 Nov 2010

Because naltrexone is actually a special narcotic drug that blocks the effects of other narcotic [medicines](#) and alcohol. That's why it comes up in a urinary analysis as an opiate.

<http://www.drugs.com/mtm/naltrexone.html>

Votes: +0

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Urinary Problem Solutions



symptomfind.com/UrinaryProblems

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Marvell

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Answers/Comments written by Marvell

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What is the cost comparison between oral monthly boniva and yearly iv injection?

Question asked 25 Aug 2013 · 1 answer

[Support](#) groups: [boniva](#), [injection](#)

Marvell's answer: "For cost comparison the best person to talk to is your doctor/nurse and your insurance [company](#)."

Misoprostol - I have blood clots and a lot of blood stuck in my uterus it started 2days after a?

Question asked 27 Jan 2015 · 1 answer

[Support](#) groups: [misoprostol](#), [blood clot](#), [blood](#), [abortion](#)

Marvell's answer: "I realize this answer is late for you and hopefully your situation resolved without any problems. In these cases you have to give it time. The pill needs to be absorbed properly and then effect takes place."

What do oxycodone 5mg immediate release capsules pills look like?

Question asked 3 Dec 2011 · 1 answer

[Support](#) groups: [oxycodone](#), [pain](#)

Marvell's answer: "Please see the link below ... it has pill images of immediate release oxycodone 5mg capsules. You may need to scroll down a bit and go to other pages. <http://www.drugs.com/...>"

Can you take lipozene with metformin for type 2 diabetes?

Question asked 4 Oct 2014 · 1 answer

[Support](#) groups: [metformin](#), [diabetes](#), [type 2](#), [lipozene](#)

Marvell's answer: "If you do take them together then take it with caution. The supplement that is present in Lipozene might not be studied enough to have data to say whether taking Lipozene and metformin together will or will not have an interaction. You may need to ..."

Does Benzonatate make you loopy like a narcotic cough medication or just sleepy like Benadryl?

Question asked 4 Oct 2014 · 1 answer

[Support](#) groups: [cough](#), [benzonatate](#), [medication](#)

Marvell's response: "Benzonatate is non-narcotic so you shouldn't have narcotic like side effects. And it should not make you sleepy. <http://www.drugs.com/...> Benzonatate is a non-narcotic cough medicine. It works by numbing the throat and lungs, making the cough ..."

Invokana - Does fatigue discontinue after continued use?

Question asked 22 Feb 2015 · 1 answer

[Support](#) groups: [fatigue](#), [nausea/vomiting](#), [invokana](#), [diabetes](#), [type 2](#)

Marvell's answer: "Invokana (canagliflozin) is an oral [diabetes](#) medicine that helps control blood sugar levels. Canagliflozin works by helping the kidneys get rid of glucose from your bloodstream. Invokana is used together with diet and [exercise](#) to treat type 2 ..."

Had sex 3 days after my projected period start date. Then took plan B. When should I get my period?

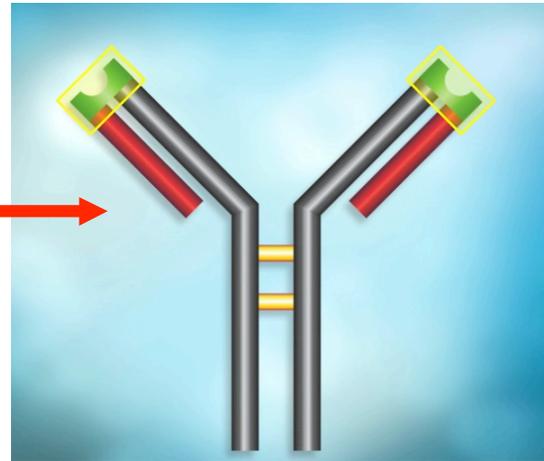
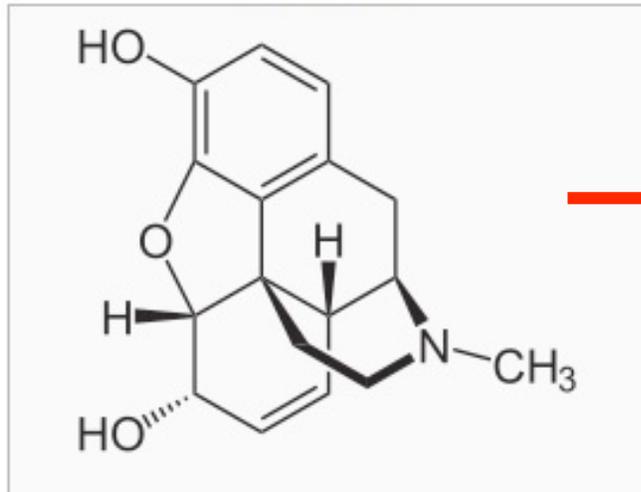
Question asked 18 Feb 2015 · 1 answer

[Support](#) groups: [peri-ds](#), [plan b](#), [sex](#), [period](#), [unprotected sex](#), [emergency contraception](#)

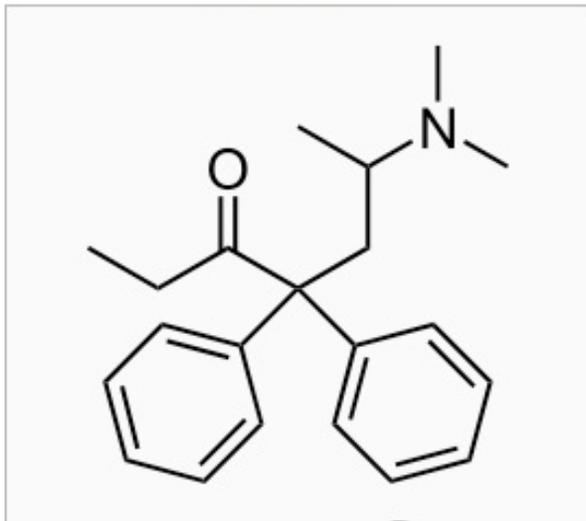
Opiates - Results Interpretation

- all opiates are narcotic analgesics
 - ◆ relieve pain & controlled substances
- not all narcotic analgesics are opiates
 - ◆ meperidine (Demerol[®])
 - ◆ propoxyphene (Darvon[®])
 - ◆ methadone
 - ◆ pentazocine (Talwin[®])
 - ◆ fentanyl (Sublimaze[®])
 - ◆ buprenorphine: (Suboxone[®])
 - ◆ naltrexone: (ReVia[®], Vivitrol[®], Depade[®])

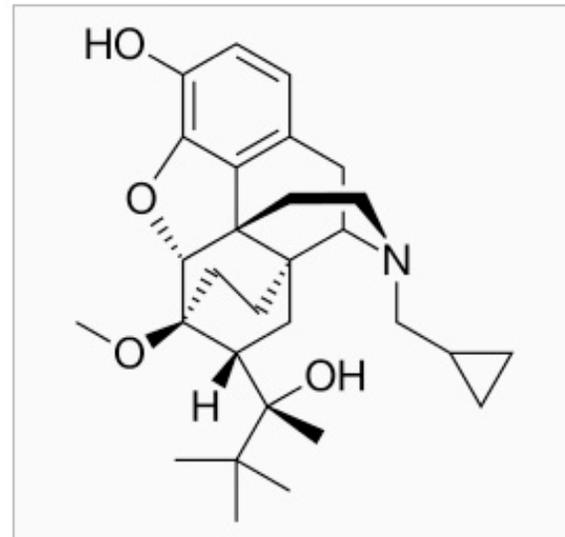
Morphine



Methadone



Buprenorphine



Siemens Negative Reactivity Data

Azithromycin	1000
AZT (Zidovudine)	2000
Benazepril	1000
Benzoylcegonine	1000
Buprenorphine	1000
Bupropion	1000
Caffeine	1000

= 1,000,000 ng/mL

Thermo-Fisher Negative Reactivity Data

Negative Compounds	Trade Name	Concentration Tested (ng/mL)
Bromocriptine mesylate	Ergoset, Parlodel	500,000
Brompheniramine	Dimetane, Dimetapp, Nasahist, ND-Stat, Oraminic II	500,000
Bupivacaine	Marcaine, Sensorcaine	500,000
Buprenorphine	Buprenex	100,000
Bupropion	Wellbutrin, Zyban	100,000

Siemens Negative Reactivity Data

Metaproterenol	1000
Metformin	1000
Methadone	100
d-Methamphetamine	35
Methaqualone	1500

= 100,000 ng/mL

Thermo-Fisher Negative Reactivity Data

Metaproterenol hemisulfate salt	Alupent, Metaprel	500,000
Metaraminol bitartrate	Aramine	500,000
Methadone HCl	Dolophine	500,000
Methamphetamine	Desoxyn	500,000
Methaqualone HCl	Normi-Nox, Pallidan, Somnomed, Quaalude	100,000

MAT Drugs

■ Medications for Alcohol Dependence

- ◆ Naltrexone: **False Positive with Opiate Assay - NO!**
- ◆ Disulfiram: (Antabuse[®])
- ◆ Acamprosate: (Campral[®])

■ Medications for Opioid Dependence

- ◆ Methadone: **NO! with Opiate Assay**
- ◆ Buprenorphine: **NO! with Opiate Assay**
- ◆ Naltrexone: **False Positive with Opiate Assay - NO!**

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MAT Drugs

■ Medications for Alcohol Dependence

- ◆ Naltrexone: **False Positive with Opiate Assay - NO!**
- ◆ Disulfiram: **NO! with drug tests reviewed**
- ◆ Acamprosate: **NO! with drug tests reviewed**

■ Medications for Opioid Dependence

- ◆ Methadone: **NO! with Opiate Assay**
- ◆ Buprenorphine: **NO! with Opiate Assay**
- ◆ Naltrexone: **False Positive with Opiate Assay - NO!**

Result Interpretation for Therapeutic/OTC Drugs

Very Difficult Task

- not all drug tests are created equal
 - ◆ laboratory-based tests (numerous products)
 - ◆ on-site, instant, POC tests (dozens of products)
 - ◆ each test has unique selectivity (i.e. ability to distinguish between similar compounds)
- hundreds of therapeutic drugs
- hundreds of OTC medications

Court's Obligation

- limit use of therapeutic drugs
 - ◆ court must be notified
- prohibit the use of OTC medications without prior approval
- prohibit the use of dietary supplements, energy drinks, homeopathic substances, herbal products, sports nutrition powders, anything not regulated by FDA (anything from GNC)

Client Signed Releases

- doctors
- dentists
- other healthcare professionals
- pharmacies

Healthcare Contact Form

- form used by clients to document contact with healthcare professionals
- clients required to use contact form for each visit where medications are being used during a procedure or prescribed for use
- sanction for failure to use form
- place requirement in client contract
- client seek prior permission to see doctor

I (client name), am a participant in drug court. This program is a court monitored recovery program for addicts. As a result, I am subject to frequent and random drug testing. Therefore, I must report to the court my visit today. As I am in recovery, I would respectfully request that you take this into consideration and offer non-narcotic medications, if possible, when drugs are necessary for my medical treatment.

Physician (Name) _____

Physician (Signature) _____

If you have any questions or concerns, please feel free to call the court and talk to my case specialists.

If this patient fails to present this form to the nurse and physician prior to receiving medication or a prescription for medication, please notify the court.

Please list the medications prescribed today:

Other Control Strategies

- search & seizure (client contract)
 - ◆ car, home, possessions
- pill counts
- no out-of-state prescriptions
- use of specified pharmacies
- loss of completion credits/time while on certain prescription meds

Opiate Metabolites

Parent Drug: Codeine

Metabolites: Norcodeine, Morphine

Parent Drug: Morphine

Metabolites: Normorphine

Parent Drug: Heroin

Metabolites: 6-monoacetyl morphine (6-AM),
Normorphine, Morphine

Parent Drug: Oxycodone

Metabolites: Oxymorphone, Noroxycodone,
Noroxymorphone

Opiate Metabolites

Parent Drug: Hydrocodone

Metabolites: Hydromorphone, Norhydrocodone

Parent: Hydromorphone (may only as parent drug)

Metabolites: undetectable conjugated metabolites

Benzo Metabolites

Parent: Alprazolam

Metabolites: alpha-hydroxyalprazolam

Parent: Lorazepam

Metabolites: Detected as parent drug;
undetectable metabolites

Parent: Clonazepam

Metabolites: 7-aminoclonazepam

Parent: Diazepam

Metabolites: Temazepam, Nordiazepam,
Oxazepam

Benzo Metabolites

Parent: Temazepam

Metabolites: Oxazepam

Parent: Chlordiazepoxide

Metabolites: Norchlordiazepoxide,
Nordiazepam, Oxazepam

Parent: Triazolam

Metabolites: only as parent drug;
undetectable metabolites

Parent: Clorazepate

Metabolites: Nordiazepam, Oxazepam

Therapeutic/OTC Drugs

Drug/Class

Potential F/P Results

■ antihistamines/decongestants	amphetamines
■ Adderall	amphetamines
◆ confirm by GC/MS - ensure no methamphetamine	
■ chlordiazepoxide	benzodiazepine
◆ confirm by GC/MS - look for other benzos not metabolites of chlordiazepoxide	
■ dextromethorphan	phencyclidine (PCP)
■ <i>l</i> -methamphetamine (OTC nasal inhaler) Vick's	amphetamines
■ diet pills (eg, clobenzorex, fenproporex)	amphetamines
■ quinolone antibiotics (eg, levofloxacin)	opiates
■ antidepressants (Stertraline)	benzodiazepine

Sources of “Incidental” Alcohol Exposure

- OTC medications (Nyquil, Vicks Formula 44)
- mouthwashes (Listermint & Cepacol)
- herbal/homeopathic medications (i.e., tincture of ginkgo biloba - memory)
- foods containing alcohol (such as vanilla extract, baked Alaska, cherries jubilee, etc.)
- “non-alcoholic” beers (O’Doul’s, Sharps)
- colognes & body sprays
- insecticides (DEET)
- alcohol-based hand sanitizers (Purell, GermX)

How to Drive a Toxicologist Crazy

My client claims he is testing positive for THC because he takes ibuprofen (Advil).

Urine Drug Screening: Practical Guide for Clinicians

KAREN E. MOELLER, PHARM.D, BCPP; KELLY C. LEE, PHARM.D, BCPP; AND JULIE C. KISSACK, PHARM.D, BCPP

Drug testing, commonly used in health care, workplace, and criminal settings, has become widespread during the past decade. Urine drug screens have been the most common method for analysis because of ease of sampling. The simplicity of use and access to rapid results have increased demand for and use of immunoassays; however, these assays are not perfect. False-positive results of immunoassays can lead to serious medical or social consequences if results are not confirmed by secondary analysis, such as gas chromatography-mass spectrometry. The Department of Health and Human Services' guidelines for the workplace require testing for the following 5 substances: amphetamines, cannabinoids, cocaine, opiates, and phencyclidine. This article discusses potential false-positive results and false-negative results that occur with immunoassays of these substances and with alcohol, benzodiazepines, and tricyclic antidepressants. Other pitfalls, such as adulteration, substitution, and dilution of urine samples, are discussed. Pragmatic concepts summarized in this article should minimize the potential risks of misinterpreting urine drug screens.

Mayo Clin Proc. 2008;83(1)66-76

Our goal is to provide clinically relevant information that can be used to interpret urine drug screens (UDSs) for commonly abused drugs (ie, alcohol, amphetamines, benzodiazepines, opioids, marijuana, cocaine, phencyclidine [PCP], and tricyclic antidepressants [TCAs]). Proper evaluation of urine specimens, including detection times, are discussed, as well as false-positive results and potential false-negative results. Interpretation of tests for performance-enhancing drugs is beyond the scope of this article and is not discussed.

METHODS OF DRUG TESTING

Urine, blood, hair, saliva, sweat, and nails (toenails and fingernails) are some biological specimens used to perform laboratory drug testing, and they provide different levels of

TABLE 3. Summary of Agents Contributing to Positive Results by Immunoassay^a

Substance tested via immunoassay	Potential agents causing false-positive result	Substance tested via immunoassay	Potential agents causing false-positive result
Alcohol ²⁰	Short-chain alcohols (eg, isopropyl alcohol)	Cannabinoids ^{1,8,43-48}	Dronabinol
Amphetamines ²¹⁻⁴⁰	Amantadine		Efavirenz
	Benzphetamine		Hemp-containing foods
	Bupropion		NSAIDs
	Chlorpromazine		Proton pump inhibitors
			Tolmetin

URINE DRUG SCREENING

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Investigation of Interference by Nonsteroidal Anti-Inflammatory Drugs in Urine Tests for Abused Drugs

Douglas E. Rollins,¹ Thomas A. Jennison,² and Graham Jones³

Anecdotal and uncontrolled studies have suggested that nonsteroidal anti-inflammatory drugs produce false-positive results in immunoassay urine tests for some drugs of abuse. This study was performed in 60 volunteers who took ibuprofen as either a single 400-mg dose, or 200 mg three times a day, or 400 mg three times a day, and in 42 patients taking ibuprofen, naproxyn, or fenoprofen in therapeutic regimens for more than 30 days. Of the 510 urines collected from 102 individuals during these dosage regimens, two gave false-positive tests for cannabinoid by enzyme-mediated immunoassay (EMIA), one after 1200 mg of ibuprofen in three divided doses for one day and one in a patient taking naproxyn on a chronic basis; none was falsely positive for

falsely positive report.

Conversely, adulterants (e.g., acids or bases or stances with a high ionic strength) added to specimen may give falsely negative immunoassay (1). Moreover, the excretion of drugs, drug metabolites, and food substances in the urine could also interfere with immunoassays and cause a false-positive or false-negative result for a urine drug assay. Ibuprofen and other nonsteroidal anti-inflammatory drugs (NSAIDs) reportedly cause false-positive test results with the EMIA (EMIT™; Syva Co., Palo Alto, CA) for cannabinoids (2-4), false-negative mass-spectrometric confirmations for cannabinoids (5), and false-positive results for opiates and benzodiazepines by the FPIA (TDx™; Abbott Laboratories, Abbott Park, IL) (6).

oid tests (14).

Brunk (5) describes a false-negative GC/MS cannabinoid confirmation caused by high concentrations of urinary ibuprofen that competed with the analyte for the cannabinoid-derivatizing reagent. This is an unlikely explanation for the data presented in this study. In his GC/MS tests, Brunk extracted 10 mL of urine, which would contain large amounts of potentially competing substances. He used tetramethyl ammonium hydroxide as a derivatizing reagent, and did not use a deuterated internal standard. For cannabinoid confirmation in this study we used only 1 mL of urine, hexafluoroisopropanol and pentafluoropropionic anhydride as the derivatizing reagents, and deuterated COOH-THC as an internal standard. If competition between ibuprofen and COOH-THC for the derivatizing reagents had occurred, no peak for the internal standard would have been observed—a situation that did not occur for any specimen in this study.

In conclusion, these data demonstrate that ibuprofen taken as either a single dose or in acute multiple doses or ibuprofen, naproxyn, or fenoprofen taken as chronic doses is unlikely to result in a positive immunoassay test for urine cannabinoids, benzodiazepines, or barbiturates. All positive immunoassay results should be considered as presumptively positive. A second chemical test such as GC/MS, performed properly, will markedly reduce the possibility of falsely accusing of substance abuse someone who was taking NSAIDs.

Partial support for this study came from Abbott Laboratories, Diagnostic Division, Abbott Park, IL.

1. Article used by the Mayo paper claiming ibuprofen could cause a false positive cannabinoid test is 25 years old.
2. Even though the Rollins paper is 21 years old, it concludes “unlikely”.
3. Assay used to conduct the 25-year old paper has not been available commercially for two decades
4. Confirmation testing resolves potential “false positive” concerns.
5. Doesn't prohibit Mayo from publishing a misleading paper.

Commonly prescribed medications and potential false-positive urine drug screens

NANCY C. BRAHM, LYNN L. YEAGER, MARK D. FOX, KEVIN C. FARMER, AND TONY A. PALMER

The potential for false-positive urine drug screen (UDS) results for substances of abuse presents a therapeutic selection dilemma for the treating health care professional. While this problem is reported with specific medications, the extent of the problem in a clinic serving indigent patients and the medically underserved has not been evaluated. In particular, the use of medications with the potential for false-positive UDS results may present a significant liability for individuals required to undergo random or periodic UDSs as a component of a recovery or court-ordered monitoring program^{1,2} or as a condition of employment.^{1,3,4} In addition, false-positive UDS results may affect the clinician–patient relationship by raising issues of trust.⁵ This article identifies commonly used medications associated with reports of false-positive UDSs.

Literature review

A comprehensive literature review

Purpose. The implications of potential false-positive urine drug screen (UDS) results for patients receiving commonly prescribed medications were evaluated.

Summary. A comprehensive literature review was conducted to identify false-positive UDSs associated with all clinic formulary medications, as well as common nonprescription medications. The references of each report describing a medication whose use was associated with false-positive UDS results were also reviewed. If a class effect was suspected, additional agents in the category were searched. A total of 25 reports of false-positive UDS results were identified. Categories of medications included antihistamines, antidepressants, antibiotics, analgesics, antipsychotics, and nonprescription agents. Reports of false-positive results were found for the following formulary and nonprescription medications: brompheniramine, bupropion, chlorpromazine, clomipramine, dextromethorphan, diphenhydramine, doxylamine, ibuprofen, naproxen, promethazine, quetiapine, quinolones (ofloxacin and gatifloxacin), ranitidine, sertraline, thioridazine, trazodone, venlafaxine,

verapamil, and a nonprescription nasal inhaler. False-positive results for amphetamine and methamphetamine were the most commonly reported. False-positive results for methadone, opioids, phenylclidine, barbiturates, cannabinoids, and benzodiazepines were also reported in patients taking commonly used medications. The most commonly used tests to screen urine for drugs of abuse are immunoassays, even though false-positive results for drugs of abuse have been reported with a number of these rapid-screening products. Results from such tests should be confirmed using additional analytical methods, including gas chromatography–mass spectrometry.

Conclusion. A number of routinely prescribed medications have been associated with triggering false-positive UDS results. Verification of the test results with a different screening test or additional analytical tests should be performed to avoid adverse consequences for the patients.

Index terms: Drug abuse; Drugs, over the counter; Drugs; False positive reactions; Tests, laboratory; Urine levels

Am J Health-Syst Pharm. 2010; 67:1344-50

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The authors have declared no potential conflicts of interest.

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DOI 10.2146/ajhp090477

Table 1.
 Reports of False-Positive Results of Urine Drug Screens for
 Selected Formulary Agents⁶⁻³⁰

Medication	False-Positive Result						
	Amphetamine or Methamphetamine	Phencyclidine	Methadone	Opiates	Benzodiazepines	Cannabinoids	Barbiturates
Antihistamines/decongestants							
Brompheniramine	X						
Diphenhydramine			X				
Doxylamine			X				
Phenylpropanolamine	X						
Nonprescription nasal inhaler	X						
Antidepressants							
Bupropion	X						
Clomipramine			X				
Sertraline					X		
Trazodone	X						
Venlafaxine		X					
Antibiotics							
Quinolones (selected agents)				X			
Analgesics							
Ibuprofen		X				X	X
Naproxen						X	X
Antipsychotics							
Chlorpromazine	X		X				
Promethazine	X						
Quetiapine			X				
Thioridazine			X				
Other agents							
Dextromethorphan		X					
Ranitidine	X						
Verapamil			X				

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Confirmation: Best Practice



- gas or liquid chromatography-mass spectrometry - GC/MS or LC/MS/MS
 - ◆ drug molecules separated by physical characteristics
 - ◆ identified based on chemical “finger-print”
 - ◆ considered “gold standard”
- refer to NADCP Adult Drug Court Best Practice Standards - Volume II

Bad Cop – Good Cop

How should I deal with a client who claims to have used or ingested something that caused a “false” positive?

Client Accountability:

- the court should not assume the role of client “excuse evaluator”
- clients need to be held responsible for their own behavior and maintaining a drug-free physiology
- if testing performed appropriately (with confirmation) –
- HOW the drug got into their sample is mostly irrelevant
- a positive drug test results put the client in violation
- as a practical and resource matter – the court cannot afford to argue over or dispute with every client who has a positive test result or comes up with a new excuse

Therapeutic Use of Test Results

- Isn't any amount of drug in a client's sample a violation worthy of sanction?
 - ◆ punishment model vs. therapeutic model
- therapeutic – enhance behaviors that lead to recovery
- learning to live with addiction is a gradual process
- elimination of client resistance to change is critical
- drug testing is a large component of the drug court experience
- its perceived fairness is critical to outcomes

Therapeutic Use of Test Results

- drug testing has the potential to build resistance
- particularly if a client is falsely accused
- it may be better to let a client “get away with one”
- risk a false accusation & re-establishment of resistance
- resistance leads to learned helplessness & loss of engagement
- clients should be held responsible
- consequences are critical to outcomes But . . .
- the prudent use of drug testing results can certainly enhance the path to recovery

No Substitute for Knowledge/Expertise

- unethical to adjudicate based upon misinformation - violation of due process
- develop a relationship with your laboratory
- develop a relationship with your on-site device vendor
- don't be afraid to "call the company"
- seek expert advice

Drug Screening Question
Practitioner, Drug Court [DCP@yahoo.com]
Sent: Wednesday, August 15, 2015 3:31 PM
To: Cary, Paul L.

Hello Mr. Cary,

I have a client who is testing positive for cocaine.
He claims it's because he lives next to a farm that grows sugar cane.
He also says he recently watched a movie starring Michael Caine.

Can you help? Thank you for your time.

Drug

RE: Drug Screening Question
Cary, Paul L.
Sent: Wednesday, August 16, 2015 1:25 PM
To: Practitioner, Drug Court [DCP@yahoo.com]

Dear Drug:

That's COMPOST!

Sincerely,

PLC

email address:

■ carypl@health.missouri.edu