

Ordering and Interpreting Urine Drug Tests

Two Tests: What to Order?

Two tests are available, the enzyme linked immunoassay (EIA) kit and gas chromatography/mass spectrometry (GCMS). They provide different information.

- Illicit drugs: EIA
- Confirm taking prescribed meds (specify meds when order test): GCMS. (EIA will provide this information if your laboratory runs the test for each med. However, laboratories usually do not. *Ask!*)
- Use of non-prescribed medication: GCMS
- Testing for heroin: GCMS. Check for one of its specific metabolites, e.g., 6 monoacetyl morphine (6-AM) duration 2-4 hrs only is positive as morphine in 2-3 days

Enzyme linked immunoassay – EIA.

- Screening test for illicit substances amphetamine/methamphetamine, marijuana, PCP, cocaine, “opiates” (e.g., morphine/codeine)
- Inexpensive, fast, point of care or lab
- Detects class of substance, not specific medication
- Will be negative for hydrocodone, hydromorphone, oxycodone, methadone, buprenorphine, benzodiazepines (particularly clonazepam) unless specific test kit for those meds is in use. *Ask your lab!*
- High false positive rates caused by numerous prescribed or OTC meds

Gas chromatography/mass spectrometry – GCMS. You must tell the laboratory the drugs you are seeking (patient is taking).

- More expensive, labor intensive
- Confirming test identifies specific meds and their metabolites. Use to confirm patient is taking prescribed meds and not taking non-prescribed meds
- High sensitivity
- False positives still occur

Results and Possible Causes

Results may be due to several possible causes.

- Illicit substance present: Use by patient; false result related to prescribed or OTC med exposure
- Non-prescribed medication present: Illicit use by patient; false positive testing – cross-reaction or possible known metabolite (morphine or codeine may → hydromorphone)
- Prescribed medication absent: diversion or binging and running out early; false negative (incorrect use of EIA rather than GCMS testing); urine adulterated

False positives. Are the results due to illicit use, a false positive on the screen, or a known metabolite of a prescribed medication? In considering prescribed medications, false positives on EIA (and GCMS where specified) may result from:

- Amphetamines/methamphetamine: bupropion, tricyclic antidepressants, phenothiazines, propranolol, labetalol, OTC cold rx, ranitidine, trazodone. Vicks Nasal Spray can test positive even on GCMS.
- Barbiturates: phenytoin
- Benzodiazepines: sertraline
- LSD: amitriptyline, doxepin, sertraline, fluoxetine, metoclopramide, haloperidol, risperidone, verapamil
- Opiates
 - EIA testing: quinolones, dextromethorphan, diphenhydramine (Benadryl), verapamil, poppy seeds
 - GCMS testing
 - Morphine: from codeine, heroin (for a few hours) and poppy seeds for 48 hrs
 - Hydromorphone: from morphine, codeine, hydrocodone, heroin
 - Oxycodone: from hydrocodone
 - Codeine: from hydrocodone
 - Fentanyl: from trazodone
 - Methadone: from quetiapine (Seroquel)
- PCP: dextromethorphan, diphenhydramine, NyQuil, tramadol, venlafaxine (Effexor), NSAIDs, imipramine
- Propoxyphene: methadone, cyclobenzaprine (Flexeril), doxylamine (Ny-Quil), diphenhydramine (Benadryl), imipramine
- Cannabinoids (on EIA not GCMS): pantoprazole (Protonix), efavirenz (Sustiva, Atripla), NSAIDs

False negatives. Are the results due to the patient running out of medication early, diversion, a tampered specimen, or a threshold issue (e.g., workplace testing using a high threshold for reporting a positive test to avoid false positives that require a job intervention)? For EIA (and GCMS where specified) false negatives may result from:

- Unless bundled (*ask your lab!*), opiate immunoassays will miss fentanyl, meperidine, methadone, pentazocine (Talwin), oxycodone and often hydrocodone
- Morphine: GCMS may miss it unless glucuronide hydrolyzed. Can pick up with a specific test such as a specific qualitative EIA kit such as MSOPIATE. (*Ask your lab!*)
- Illnesses that cause lactic acidosis can cause false negatives
- Insensitivity of benzodiazepine screen: only 40% for lorazepam; clonazepam (Klonopin) frequently negative on both EIA and GCMS.