

Benefits of Quantitative Confirmation Analysis with LC-MS/MS

Drug Screen Limitations

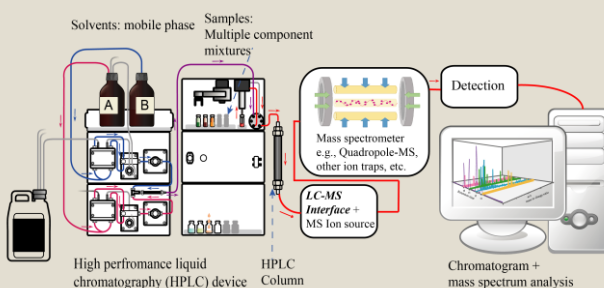
- **Lack specificity**
 - Drug classes vs. individual drugs
 - Ex: Opiates vs 6-monoacetylmorphine (heroin metabolite)
- **Cross reactivity**
 - High concentrations of other drugs can yield false positives
 - Ex: DRI Methadone EIA false positive with Tapentadol and metabolites
- **Lack sensitivity**
 - Cutoffs typically lower
 - Ex: Opiate cutoff = 300 ng/mL vs 50 ng/mL
- **Not comprehensive**
 - Covers approx. 20 drug classes and no focus on metabolites
 - Ex: Detection of noroxycodone (oxycodone metabolite) would indicate biological metabolism, not spiking of oxycodone into the sample
- **Semi-quantitative at best**

Interpretation of a Negative Drug Screen

- 1) Patient is not compliant
- 2) Patient did not follow dosing regimen
 - Less frequent or lower dose
- 3) Drug present but below the cutoff
 - Dilute or adulterated urine
 - False-negative
- 4) Test does not react with drug of interest
 - Appropriately targeted test may not be available
- 5) Altered pharmacokinetic variables
 - Ultra-fast metabolizer – no parent drug present, only metabolite
 - Poor drug absorption

Interpretation of a Positive Drug Screen

- 1) Patient is compliant and took the prescription as directed
- 2) Patient added drug to the urine after collection
- 3) Patient took one dose prior to collection
- 4) Patient took another drug which cross-reacts with the test, i.e. a false-positive
 - Ex: Pseudoephedrine can give a “Positive” result for an amphetamine screening test



Strengths of LC-MS/MS Analysis

- **High specificity**
 - Can differentiate between individual drugs
- **No cross reactivity**
 - Utilizes 3 unique analyte properties to ID
- **Increased sensitivity**
 - Cutoffs are lower than immunoassay techniques
 - Reduced false negatives
- **Comprehensive**
 - Can detect many individual compounds with respective metabolites
 - Current capability is 75 analytes
- **Quantitative**
 - Use of certified reference materials allow accurate quantitative values