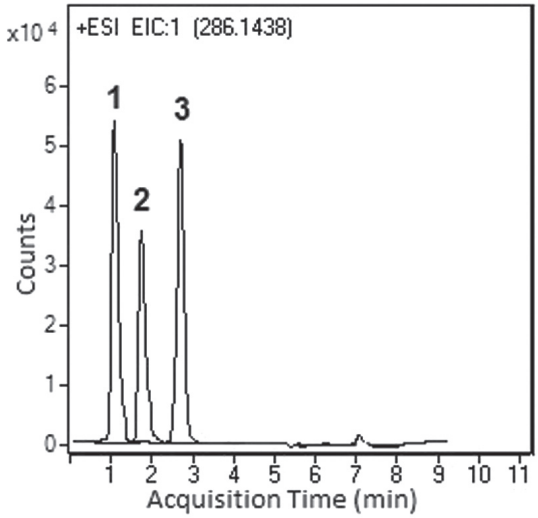
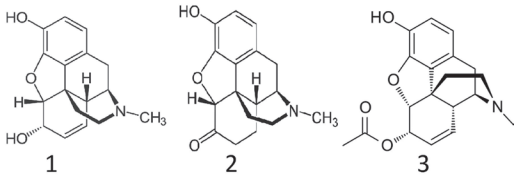
Morphine, Hydromorphone, and 6-MAM

LC-MS analysis in plasma samples





Note: Morphine is used as an analgesic drug in the treatment of the severe pain. Hydromorphone, a semi-synthetic derivative of morphine is used in cases of morphine-resistant cancer-related pain and 6-monoacetyl morphine (6-MAM) is a specific indicator for heroin use. All three drugs remain the selected substances in monitoring of drug abuse and addiction. Heroin use remains a serious public health issue which accounts for a substantial proportion of the health costs. Analysis of plasma samples for the presence of the three substances is essential in assessing short or long term exposure to the drugs.

Method Conditions

Column: **Cogent Bidentate C18 2.ō™**, 2.2µm, 120Å

Catalog No.: 40218-05P-2

Dimensions: 2.1 x 50 mm

Mobile Phase: A: DI H_2O / 0.1% formic acid (v/v)
B: 50% acetonitrile / 50% methanol / 0.1% formic acid (v/v)

Gradient:

time (min.)	%B
0	5
4	50
5	90
6	90
7	5

Post Time: 3 min

Injection vol.: 1µL

Flow rate: 0.4mL/min

Detection: ESI – POS - Agilent 6210 MSD TOF mass spectrometer

Sample: To a spiked plasma sample (1 mL), 1 mL of an ammonia solution (0.1% v/v) was added and vortex-mixed for 30s to alkalize the plasma. Then, the alkalized plasma sample was extracted with two 4 mL ethyl acetate aliquots by vortex for 5 min, and centrifuged at 4000 rpm for 8 min at room temperature. The supernatant was separated and evaporated to dryness under a gentle stream of nitrogen. The residue was reconstituted with 200 microL mobile phase, and a 1 microL aliquot of the reconstituted solution was injected into the RP-HPLC–ESI-MS for analysis.

Peaks: 1. Morphine 286.1438 m/z $[M+H]^+$
2. Hydromorphone 286.1438 m/z $[M+H]^+$
3. 6-Monoacetylmorphine (6-MAM) 328.1543 m/z $[M+H]^+$

Discussion

The Cogent Bidentate C18 2.ō column was successfully used in the analysis of an important class of drugs in plasma samples. The presented procedure after validation can be used as a routine analysis of plasma samples (or whole blood samples – after changing the extraction procedure) for the presence of morphine, hydromorphone, or 6-MAM (indicator of heroin use).

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