K31 Driving Under the Influence of the Synthetic Cannabinoid Receptor Agonist XLR-11

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After attending this presentation, attendees will become aware of a Driving Under the Influence of Drugs (DUID) case involving the synthetic cannabinoid receptor agonist XLR-11 including driving pattern, driver's demeanor and behavior, performance on field sobriety tests, and analytical findings.

The presentation will impact the forensic science community by reporting for the first time a complete case report of a driver who was found driving under the influence of the synthetic cannabinoid receptor agonist XLR-11.

A 22-year-old White man was involved in a traffic collision when the truck he was driving rear-ended a passenger vehicle lawfully stopped at a busy San Francisco intersection. Witnesses at the scene reported that the driver had a blank stare on his face and kept looking straight ahead. He was reportedly "very high." His speech was described as mellow and his voice was barely audible; he appeared rigid and his muscle tone was described as tense. A police Drug Recognition Expert (DRE) performed an evaluation of the driver and found, among other signs, low body temperature, rigid muscle tone, normal pulse, lack of horizontal gaze nystagmus, lack of vertical gaze nystagmus, non-convergence of the eyes, dilated pupil size, and normal pupillary reaction to light. The DRE concluded that this driver was driving while under the influence of cannabis. A standard toxicology DUID protocol was employed utilizing: (1) headspace gas chromatography equipped with flame ionization detection for ethanol and related volatiles; (2) Enzyme Linked Immunosorbent Assay (ELISA); and, (3) Gas Chromatography coupled with Mass Spectrometry (GC/MS) for amphetamines, barbiturates, benzodiazepines, cannabinoids, cocaine, methadone, phencyclidine, opiates/opioids, and more than 100 other drugs and metabolites, but produced completely negative results. Additional screening of the whole blood specimen was then undertaken by a reference analytical laboratory for synthetic cannabinoid receptor agonists by Liquid Chromatography-Tandem Mass Spectrometry (LC/MS/MS) on a Waters ACQUITY® Ultra Performance Liquid Chromatographic (UPLC) system coupled with a Tandem Quadrupole mass spectrometric Detector (TQD). The analytical column utilized was an ACQUITY® UPLC BEH C18 reversed-phase column (1.7µm, 2.1mm x 100mm) which has a very wide usable pH range (pH 1-12) and is suitable for UPLC separations due to its trifunctionally-bonded Ethylene Bridged Hybrid (BEH) particles. The mobile phase was a mixture of 0.1% formic acid in deionized water and 0.1% formic acid in methanol. The injection volume was 20µL. Data analysis was performed on the MassLynx™ MS Software platform. The synthetic cannabinoid receptor agonist XLR-11 was identified by monitoring the MS/MS ion transitions 330.3 → 125.2 and 330.3 → 232.3. XLR-11 was quantified in a fresh aliquot of blood using calibration curves made by spiking drug-free blood at 0.10, 0.20, 1.0, 4.0, 10.0, and 20.0ng/mL. XLR-11 was quantified in this driver's whole blood at a concentration of 1.34ng/mL. Although other synthetic cannabinoid receptor agonists have previously been encountered by the Division in postmortem toxicology cases and drug-facilitated sexual assaults, this is the first documented case involving a San Francisco driver driving under the influence of the synthetic cannabinoid receptor agonist XLR-11.

DUID, Spice XLR-11, DRE

 ** Presenting Author*