K72 Characterizations of AB-PINACA, AB-FUBINACA, and Metabolites Identified in Driving Under the Influence (DUI) and Postmortem Cases by Liquid Chromatography/Time-of-Flight Mass Spectrometry (LC/TOF/MS) and Liquid Chromatography With Tandem Mass Spectrometry (LC/MS/MS)

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After attending this presentation, attendees will better understand the putative structural information of AB-FUBINACA and AB-PINACA metabolites in humans and their identification by mass spectroscopy.

This presentation will impact the forensic science community by raising awareness of a newly emerging synthetic cannabinoid category and the interpretation of toxicological results.

Following the previous wave of JWH Spice/K2 compounds, a new series of carboxamide-based synthetic cannabinoid receptor agonists with an indole or indazole motif have been identified. This new generation of synthetic cannabinoids, including but not limited to, AB-PINACA, ADB-PINACA, ADBICA, 5-fluoro-AB-PINACA, AB-FUBINACA and ADB-FUBINACA, were designated as Schedule I controlled substances in the United States since January 2014.

AB-FUBINACA was first synthesized by Pfizer® as a potent CB1 receptor modulator, with 10-fold greater affinity for the CB1 receptor (Ki=0.9nM) than that of JWH 018, for potential therapeutic use. AB-FUBINACA was found in illegal herbal products along with AB-PINACA in Japan in 2012. To date the biochemical, physiological, and toxicological properties of these synthetic cannabinoids in human have not been determined. The pharmacokinetics properties *in vitro* or *in vivo* via rat model have been reported by other laboratories. Here, synthetic cannabinoids and their metabolites were investigated by the analysis of DUI and postmortem casework samples.

Specimens were prepared by liquid-liquid extraction using 1:1 isopropanol/1-chlorobutane solvent mixture, followed by LC/TOF/MS screen in a water/methanol mobile phase system. The individual drugs were identified by a PCDL library with an identification criteria window of ±15ppm mass error and ±0.1 minute retention time of target analyte to yield scores greater than 55. The retro-analysis of LC/TOF/MS results revealed the presence of hydroxyl, dihydroxyl, and carboxylic adducts of AB-PINACA and ADB-PINACA, as well as hydroxyl modification to AB-FUBINACA, but without the observance of the carboxylic acid metabolite. The hydroxyl transformation was also found for other indazole-based synthetic cannabinoids.

The confirmation was later carried out by LC Triple Quad by the multiple reaction monitoring method, in which the parent compounds and their selected oxidized forms (i.e., ADB-PINACA-N-4-hydroxypentyl, ADB-PINACA-N-5-hydroxypentyl and ADB-PINACA pentanoic acid) were included. In consideration of ion interference, the isobaric and isomeric compounds were distinguished by HPLC separation. The metabolites were confirmed by the comparisons of retention times, fragment ions, and ion ratios from known standards.

By monitoring synthetic cannabinoids from the end of 2013 through 2014 in Harris County, frequent use of carboxamide-indazole-based cannabinoid receptors agonists was observed versus the fading, near absence of indole-based JWH compounds, except UR-144 and XLR11. Among them, AB-PINACA is the most commonly observed, followed by AB-FUBINACA and ADBICA.

Synthetic Cannabinoids, AB-PINACA, LC/TOF/MS