OP-27
Determination of metabolites of 5-fluoro ADB in four fatal cases

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Objective: A synthetic cannabinoid was involved in four deaths that occurred within a three-week period in Sendai, Japan, in 2014 [1]. All deceased individuals possessed the same designed sachets labeled "Heart Shot BLACK", which contained dried plants and 5-fluoro ADB. It is estimated that within a short duration, more than 20 people throughout Japan have died from using this product. Unfortunately, the mechanism of death by this designer drug is still unclear. Thus far, we have identified not only 5-fluoro ADB itself but also its metabolites in the blood and urine samples of our cases. In this study, we measured the concentration of these metabolites in four fatal cases.

Methods: Several 5-fluoro ADB metabolites were synthesized in our laboratory. Both 5-fluoro ADB and its metabolites were extracted from whole blood and urine (non-hydrolyzed) samples through acetonitrile deproteinization. The extracts were subsequently purified by using a Captiva ND cartridge and were analyzed by liquid chromatography-tandem mass spectrometry.

Results: The 5-fluoro ADB metabolites were considered to be generated through a combination of methyl ester hydrolysis, defluorination, carboxylation, and hydroxylation of 5-fluoro ADB. The metabolites were detected in both the blood and urine samples of the deceased subjects. The concentration of the metabolite generated through methyl ester hydrolysis was the highest in the blood samples, whereas that of the metabolite produced through methyl ester hydrolysis followed by defluorination and carboxylation was the highest in the urine samples. The presence of these metabolites revealed a possible metabolic pathway of 5-fluoro ADB in humans.

Conclusion: We determined the concentration of 5-fluoro ADB metabolites in blood and urine samples and provided a possible metabolic pathway of 5-fluoro ADB in humans. This is the first step in the investigation of the mechanism of 5-fluoro ADB poisoning-induced death. In future studies, the tissue distribution of this drug will be investigated.

Reference: [1] Usui K, Fujita Y, Kamijo Y, Kokaji T, Funayama M, Identification of 5-fluoro ADB in human whole blood in four death cases. J Anal Toxicol. 2018;42(2):21-25