K12 Analytical Method Development for Determining the Biomarker, 2-Aminothiazoline-4-Carboxylic Acid (ATCA), in Mice Liver After Cyanide Exposure

Katelyn A. Stafford, 6407 Kury Lane, Houston, TX 77008; Randy Jackson, MS, Sam Houston State University, Room 221, 1003 Bowers Boulevard, Huntsville, TX 77341; Kelsie D. Simons, MS, Sam Houston State University, PO Box 2525, Huntsville, TX 77340; Jorn Chi Chung Yu, PhD, Sam Houston State University, 1003 Bowers Boulevard, Box 2525, College of Criminal Justice, Huntsville, TX 77341; and Ilona Petrickovics, PhD, Sam Houston State University, Department of Chemistry, PO Box 2117, 1003 Bowers Boulevard, Huntsville, TX 77341*

After attending the presentation, attendees will learn about new methods of detecting cyanide exposure and the analytical techniques that are being developed to test the presence in mice livers. The attendees will also learn about 2-Aminothiazoline-4-Carboxylic Acid (ATCA) as a biomarker for cyanide.

This presentation will impact the forensic science community by demonstrating a forensic application being developed to detect cyanide poisoning postmortem. This research will be able to be applied to human remains that are in autopsy under investigation for poisoning. ATCA is a stable biomarker for cyanide so this technique will be able to be applied to cold cases.

The objective of this research was to develop a new analytical technique to determine the chemically stable urinary metabolite of cyanide, 2-aminothiazoline-4-carboxylic acid (ATCA), in mice liver samples. Two extraction techniques, solid phase extraction (SPE) cation exchange and molecular imprinted polymer stir bar (MIP-SB), were tested to determine the efficiency of ATCA extraction from mice liver samples. Mice were exposed to different doses of cyanide, and a method was developed to dissect, preserve organs, and homogenize the livers.

This research will be able to be applied to human remains that are in autopsy under investigation for poisoning. ATCA is a stable

without the use of any derivatization process. The solid phase extraction cation exchange was preformed with Oasis® MCX (mixed-mode cation exchange) columns and underwent several washes to prepare the cartridges for absorbing the ATCA and then was eluted with ammonium hydroxide with the assistance of a vacuum pump.

An effective method of preparing liver samples from the cyanide exposed mice for extraction will be presented. In additions, the two extraction methods (SPE *vs*. MIP-SB) will be compared. The effectiveness of the extraction techniques will be determined by employing known concentrations of ATCA evaluated by the LC/MS/MS. Liver ATCA contents will be compared to the dose of cyanide mice were given. This new analytical method may serve as great potential benefits for the toxicology field and forensics in general.

Molecularly Imprinted Polymer (MIP), 2-aminothiazoline-4- carboxylic acid (ATCA), Cyanide

 ** Presenting Author*