B14 Hand Odor Volatiles and Drug Abuse: A Pilot Study Using a Chemical-Dependent Target Group

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After attending this presentation, attendees will better understand the usefulness of employing hand odor volatiles as an alternate bio-specimen for monitoring drug use using a criminal justice population.

This presentation will impact the forensic science community by providing a proof-of-concept study that uses a novel bio-specimen, such as hand odor, which has proven to be a valuable forensic tool with human scent canines, by extracting further traits (i.e., drug use bio-markers) from a single odor sample. Odor sampling could become another favorable sampling technique for use in forensic laboratories due to its non-invasive character as well as its low adulteration possibility during routine treatment programs mandated by court systems.

Different types of drugs are commonly sampled and detected in urine, sweat, blood, hair, and other biological materials of the human body; however, little or no information has ever been available on the physiognomies of drug excretion and detection in human hand odor under any controlled or designed drug admission.

The main purpose of odor sampling in this study was to obtain a chemical representative of the odor source in order to monitor drug use by the subjects. This pilot study was designed to "chemically fingerprint" different hand odor samples, their concentration, variability of the drug metabolite excreted, and dose dependency by human subjects undergoing court-ordered drug treatment programs at the Lubbock County Community Corrections Facility/ Court Residential Treatment Center (CRTC). Human odor was collected using Solid Phase Micro-Extraction (SPME) -gas chromatography and kept for 24 hours to allow maximum headspace volatilization before analysis. Due to the organic origin by nature, human odor contains Volatile Organic Compounds (VOCs) that are generated by the body and excreted through superficial pathways, such as skin. The collection method was a passive, contact-surface source (i.e., the mass flow from the cotton gauze into the headspace through volatilization of odor to achieve equilibrium distribution.) Gas Chromatography/Mass Spectrometry (GC/MS) was the main technique used to analyze the odor as carrier gas aids in the transfer of odor from the headspace into the analyzer. There were various types of drugs excreted in odor depending on the individual cases observed for each subject in this study.

A total of five male individuals receiving drug abuse treatment at the CRTC were monitored on a bi-weekly basis to obtain the chemical odor profile as a function of rehabilitation time. Detailed histories and subjective reports of chemical dependency of the individuals' substance use patterns were gathered for comparison with collected samples. To further obtain a baseline as to the types and amounts of volatiles observed, the same number of non-drug users were sampled to evaluate a drug free hand odor profile. It was hypothesized that a small number of drugs or their metabolites would be detected from odor samples following drug administration and would constantly increase upon repeated administration or lengthy abuse periods. Hence, due to the cessation of drug administration and use by the subjects at the facility, this resulted in decreased excretion and detection of drug-related volatiles and/ or their metabolites in the excreted hand odor over time.

Odor excretion can become an important mechanism that can be used to monitor drug use in forensic settings,

other than its extensive detection by canine use. The data from this pilot study could be implemented to shift the already established drug testing sampling methods. Thus, hand odor can serve as an important non-invasive, low-adulteration method to monitor drugs of abuse among individuals in criminal justice settings.

Hand Odor, Drug Abuse, SPME-GC/MS