E18 Designer Drugs: Legal and Analytical Challenges for Forensic Laboratories and the Courts

Heather L. Harris, JD, 2401 Lombard St, Ste 1, Philadelphia, PA 19146; and Barry K. Logan, PhD*, NMS Labs, 3701 Welsh Rd, Willow Grove, PA 19090*

The goal of this presentation is to describe the evolution of the designer drug market in the United States, and describe the challenges laboratories and the courts are facing in detecting, identifying, quantifying, classifying, and reporting the latest round of synthetic drugs available on the street.

At the conclusion of this presentation, attendees will be able to: list the major classes of designer drugs and recognize something about their chemical differences; describe the limitations of current drug analysis techniques in identifying novel compounds; evaluate some of the approaches used by drug chemists in categorizing drugs; and, plan approaches to the prosecution or defense of drug possession cases based on accurate chemical information.

This presentation will impact the forensic science community by making attorneys and triers of fact more aware of the basis for the reliable forensic identification of novel drugs.

Over the past fifty years, a relatively small group of drugs including marijuana, cocaine, amphetamines, heroin, and a handful of diverted prescription opiates and sedatives made up the vast majority of illicit drug possession cases. The compounds were chemically distinct and diverse, well-characterized and well within the competencies of most forensic laboratories to detect and identify. Novel compounds appeared infrequently, for example MDMA or ecstasy in the late 1970's, and achieved low levels of adoption by the drug using community.

Starting in 2009, entrepreneurial chemists began clandestinely synthesizing drugs developed in the pharmaceutical industry as potential therapeutic agents, but with significant abuse potential, and introduced them first to the European, and in 2010 to the U.S., recreational drug markets.

The most popular of these drugs were synthetic cannabinoid agonists, drugs that bound to the cannabinoid receptors in the brain and produced marijuana-like effects. They included compounds like JWH-018 and HU-210. Around the same time drugs with stimulant and hallucinogenic properties that had been described in patents and publications in the 1980's began to appear, including methylone ("meow, meow"), and naphyrone ("NRG-1").

Following a series of deaths and intoxications resulting in injuries, state and federal legislators in the U.S. moved to schedule these compounds, but in a haphazard way resulting in a patchwork of inconsistent and difficult to interpret, laws and amendments to drug schedules. Drug manufacturers quickly moved to make new compounds whose scheduling status was less clear and possibly evaded the new laws.

The result was a mushrooming in the number of drugs now on the market. Initially dozens, and now hundreds of new chemical entities, are sold on the street, and in more mainstream outlets like smoke shops, convenience and novelty stores. Although the federal government in mid-2012 passed more comprehensive legislation to control these nationally, within weeks new classes of drugs began to emerge.

The compounds present challenges to forensic laboratories first in detecting and identifying the presence of novel compounds that may not be in their libraries or databases, confirming and quantifying drugs for which commercially available standards often don't exist, determining whether they are controlled substances or not, and determining whether they are reportable under the rules of their jurisdictions.

Specific challenges in the analysis and litigation of these cases arise from the fact that traditional analytical methods may not differentiate closely related compounds and even the latest techniques such as time-of-flight (TOF) mass spectrometry which are invaluable in providing molecular formula information, don't differentiate between isomers. Additionally, there has been insufficient time for the field to develop consensus around the interpretation of both legacy and the latest drug analog laws, which give either vague or very complex definitions.

The presentation will include some specific examples of emerging recreational drugs and assess their status as controlled substances or analogs to illustrate the challenges faced by forensic laboratories and the courts.

Designer Drugs, Controlled Drugs, Analog Laws

 ** Presenting Author*