



W20 Fentalogs: The Chemistry, Pharmacology, and Toxicology of Illicit Fentanyl and Emerging Opioids

Amanda L.A. Mohr, MSFS, Center for Forensic Science Research & Education, 2300 Stratford Avenue, Willow Grove, PA 19090; Barry K. Logan, PhD*, NMS Labs/CFSRE, 3701 Welsh Road, Willow Grove, PA 19090; Lionel Raymon, PhD*, 25041 SW 207th Avenue, Homestead, FL 33031; Robert A. Middleberg, PhD*, NMS Labs, 3701 Welsh Road, Willow Grove, PA 19090; Audrey M. Williams, PhD*, 7000 E Avenue, L-091, Livermore, CA 94550; Erin Artigiani, MA*, University of Maryland, Center for Substance Abuse Research, College Park, MD 20740; Timothy Wiegand, MD*, University of Rochester Medical Center, 601 Elmwood Avenue, AC-3, Rochester, NY 14642; Paul Wax, MD*, University of Texas Southwestern, 5323 Harry Hines Boulevard, Dallas, TX 75390; Erin M. Worrell, BSc*, Cuyahoga County Medical Examiner's Office, 11001 Cedar Avenue, Cleveland, OH 44106; Nicole A. Yarid*, King County Medical Examiner's Office, 325 Ninth Avenue, Seattle, WA 98104; and Alex J. Krotulski, MS*, Center for Forensic Science Research & Education, 2300 Stratford Avenue, Willow Grove, PA 19090*

After attending this presentation, attendees will be able to describe the origination of fentanyl and fentanyl analogs and describe their pharmacology as well as identify and implement methods for the safe handling of these compounds. In addition, attendees will be able to describe methods used to profile and disseminate information on emerging opioids, assess the findings of fentanyl and fentanyl analogs in casework, and implement appropriate analytical techniques used in their identification

This presentation will impact the forensic science community by providing current information on the opioid epidemic with a specific focus on fentanyl and fentanyl analogs and their chemistry, pharmacology, and toxicology seen in forensic casework.

The opioid epidemic, which has recently proliferated to include fentanyl and its analogs, is a serious public health concern as many users are unknowingly ingesting these drugs under the misconception they are using heroin. The rate with which these compounds are being illicitly and clandestinely synthesized creates a major challenge for seized drug, forensic, and clinical toxicology laboratories in identifying the compounds and developing methods for their analysis. Fentanyl and fentanyl analogs or "fentalogs," many of which are several times more potent than traditional opioids, have been implicated in several case reports and adverse events associated with overdoses. Limited information related to their pharmacology, often embedded in the pharmaceutical patents from which they are derived, further complicates interpretation related to these cases. In just the past year, case reports of fentanyl analogs, including furanyl fentanyl, carfentanil, butyryl fentanyl, para-isobutyryl fentanyl, cyclopropyl fentanyl, acryl fentanyl, and the reemergence of 3-methylfentanyl, have been implicated in postmortem and Driving Under the Influence (DUI) cases, demonstrating the high rate of turnover and overall prevalence.

This workshop will provide background information related to origin of fentalogs, history derived from the patents where they are originally described, the pharmacology related to receptor binding, and potency. The actual and perceived risk of accidental overdoses of first responders, police officers, and laboratory personnel encountering these substances will be presented, and current recommendations regarding the safe handling of these substances will be discussed. Additional topics included in this workshop will focus on early detection and dissemination of the identity of novel opioids, methodologies used in profiling seized drug materials, and analytical approaches for detecting and confirming the presence of fentanyl-related analogs. This workshop will conclude with case reports, including toxicological data for incidents involving fentanyl and its analogs.

Fentanyl Analogs, Novel Opioids, Opioid Epidemic