W14 Pharmacogenomics — Uses in Forensic and Clinical Toxicology

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After attending this presentation, attendees will be able to develop effective approaches for the development and validation of genetic assays for drug monitoring applications, identify the benefits associated with pharmacogenetic testing and understand their relevance to the practice of medicine, and utilize toxicology and pharmacogenetic test results in conjunction with other case histories for decisions regarding cause- and manner-of-death determinations.

This presentation will impact the forensic science community by illustrating the benefits and utility of pharmacogenetic testing. Case studies will be provided to assist attendees with the interpretation of toxicology and pharmacogenetic test results and explain how these findings can impact death investigation outcomes.

The purpose of this presentation is to familiarize participants with the study of pharmacogenomics and to cultivate an understanding about how an individual's genotype affects an individual's health status and influences their response to drugs. Without the benefit of an analytical test to help provide guidance, it is challenging at best, and perhaps not even possible, to predict who will benefit from a medication, who will not respond at all, and who will experience symptoms associated with an adverse drug reaction. To provide a working knowledge of pharmacogenomics, speakers will detail the development, validation, and utility of predictive genetic tests, address how genetic makeup influences drug metabolism, disease states and their progression, and describe how test results can have implications for cause- and manner-of-death determinations.

Pharmacogenetics is the specialized area of pharmacology concerned with the effect of genetic influences on reactions to medications and other drugs. In essence, genetic variability means that not all people within a population will react to the same drug in the exact same manner. Incorporation of genetic test outcomes into the prescribing process is one important aspect of personalized medicine and can improve efficacy while minimizing adverse drug reactions and therapeutic failures. Alternate uses involve the identification of genetic abnormalities associated with a life-threatening or a lethal outcome. Taking into account the possibilities for why this type of testing must be performed, laboratories need to identify those genetic factors (e.g., enzyme polymorphisms) that are most relevant to creating a personalized treatment approach to the practice of medicine, then develop and validate those testing procedures. This workshop will enable attendees to understand how metabolic and genetic influences affect the overall health of an individual, specifically in regard to drug metabolism, drug-drug interactions, and the disease process. In addition to using genetic testing results prior to prescribing a drug, test results can also be applied to interpretation of toxicology results in conjunction with provided case history. This becomes relevant to death investigations in which one main goal is to determine an individual's cause and manner of death. Was a drug purposely consumed in an overdose amount or was the individual as a direct consequence of their genotype unable to properly metabolize the drug? Can genetic testing be used in the event of a negative autopsy to identify a familial disease that contributed to death? Overall, this workshop will provide a thorough overview of pharmacogenomics from start to finish and provide an introduction to pharmacogenomics, cover development and validation of laboratory testing, and address where and how this genetic approach can be applied to both patient treatment and the death investigation process. Finally, this workshop will benefit attendees by broadening their approach when interpreting toxicology results.

Pharmacogenomics, Pharmacogenetics, Toxicology

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