

Description of the Session:

Trends in Analytical Toxicology – New Matrices, New Methods, New Analytes

(Gesellschaft für Toxikologische und Forensische Chemie, GTFCh)

München, April 11, 2018

(Chairman: Hans H. Maurer, Homburg/Saar, hans.maurer@uks.eu)

Analytical toxicology is a dynamic science field with always new tasks to be discovered and solved. Progress in analytical sciences with novel technologies and in discovering new biosamples or analytes for better interpretation of poisoning cases quicken the development in clinical and forensic toxicology, in doping analysis, and in other fields of toxicology. One important issue in forensic toxicology is the interpretation of post-mortem cases. In almost decomposed corpses, there are limited samples available for analysis. Thus, analysis of dental materials and interpretation of the results will be the topic of Merja Neukamm from the Institute of Legal Medicine in Freiburg. Another issue in post-mortem assessment is the question whether observed relation of parent drugs to metabolites could be used for pharmacokinetic calculations or whether they were caused by genetic polymorphisms. They can be detected by genotyping but post-translational modifications cannot be observed. Classic phenotyping is only possible in living persons, but in dead persons, proteomic approaches are necessary to discover potential differences. The potential and limitations will be presented by Brigitte Desharnais from the Laboratoire de sciences judiciaires et de médecine légale in Montreal.

In times of so-called New Psychoactive Substances (NPS) flooding the drugs of abuse market, the analytical approaches lag behind the appearance of new chemical variations of known compounds. To overcome this cat-and-mouse play, Christophe Stove from the Department of Toxicology of the Ghent University started to develop novel receptor activation assays covering all chemical variants e.g. of opioids or cannabimimetics as both groups act via particular receptors. Hans Maurer from the Department of Experimental and Clinical Toxicology of the Saarland University in Homburg will discuss the potential of miniaturization (e.g. with dried matrix spots) and simplification by direct analysis of the samples e.g. by dilute-and-shoot approaches or by coupling the novel paper spray ionization (PSI) technique to high-resolution mass spectrometry.

The last part of the symposium covers a further hot topic in toxicology, the confirmation of an exposure to compounds used as biological or chemical warfare in military or terror attacks. Brigitte Dorner from the Robert Koch-Institute in Berlin will highlight the recent progress to detect exposure with high molecular weight toxins (from ricin to botulinum toxins), which are bioterrorism-relevant agents. Harald John from the Institute of Pharmacology and Toxicology of the German Army in Munich will present interesting sample workup and mass spectral techniques for detection of protein adducts in post-exposure analysis for verification of chemical warfare agent poisoning.