

Analytica Conference, April 2, 2014 in Munich, Germany

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The „Analytica Conference 2014“ took place combined with the 24th „analytica“ in Munich in April. On behalf of the GTFCh (German speaking Society of Toxicological and Forensic Chemistry), Prof. Dr. Dr. h.c. Hans Maurer has been organizing always one of the symposia at this conference since 2000. This year, he titled the symposium „Drug Testing and Metabolism in Samples Beyond Conventional Matrices“. Because of the great interest in the GTFCh symposia in the last years, the lectures were held in a much bigger auditorium what the audience did appreciate. All lectures were presented by top class speakers. Their highly relevant topics are summarized here:



Fig. 1. Analytica Conference speakers: Markus Baumgartner, Olof Beck, Adrian Covaci, Christophe Stove, Hans H. Maurer, Markus R. Meyer, Frank T. Peters (from left to right).

„Drug Testing in Dried Blood Spots“ was the interesting talk by Christophe Stove (Laboratory of Toxicology, Ghent University, Belgium). Christophe showed an overview of the recent trends and the potentials of dried blood spots (DPS) analysis. Since many years, a large population of newborns was screened for metabolic disorders after sampling blood with this minimal invasive method. Today „almost everything“ can be analyzed in this matrix. Christophe highlighted the advantages and the challenges of DBS and concluded that dried blood spots is a promising sampling technique for toxicology as well as for therapeutic drug monitoring.

Olof Beck (Department of Laboratory Medicine, Division of Clinical Pharmacology, Karolinska University Hospital, Stockholm, Sweden) spoke about the highly interesting topic „Drug Testing in Exhaled Breath“. Olof presented a nice story: Once he was asked whether drugs were detectable in breath. His answer was no. But he had to prove it. Working for the answer he found out: it *is possible* to detect drugs in exhaled breath. Up to now with this non-invasive method more than 3'500 compounds were identified in exhaled breath. Olof developed a (patented) sampling device for collecting the aerosol particles in breath. Analysis is carried out by LC-MS/MS. For interpretation it has to be considered that exhaled breath has a shorter detection window than urine. Many applications are possible, for example clinical, drugged driving, criminal justice and more.

The talk of Markus Baumgartner (Institute of Legal Medicine, University of Zurich, Switzerland) was titled „Drug Testing in Nails“. After an overview about hair analysis in forensic casework for long-term monitoring of substance abuse, he raised the question: are nails an alternative matrix for hair analysis? Markus described the incorporation mechanism into nails. Nails were received by clipping, scraping and – in post mortem cases – whole nails were collected. The time window to detect drugs in finger nails was described with 3-6 months after intake, toe nails with 8-16 months. The Swiss group showed that nail clippings can be a suitable alternative to hair for monitoring a repeated consumption of xenobiotics.

With his talk „Drug Testing in Wastewater“ Adrian Covaci (Toxicological Center, University of Antwerp, Universiteitsplein 1, B-2610 Wilrijk, Belgium) explained the hypothesis that „wastewater is a diluted urine sample of a large population“. Drugs are quantified in wastewater allowing back-calculations which reflect the amount of drugs used in the population. Results of analysis in different European cities were shown. So it could be seen, which drug was consumed in high amounts in which country. Determination of trends in illicit drug use is possible.

From another perspective, Markus Meyer (Department of Experimental and Clinical Toxicology, Saarland University, Homburg/Saar, Germany) looked as well at wastewater: „Drug Metabolism by Wastewater microbes“. Markus answered the question how microorganisms do contribute to drug metabolism and what the real target is for drug testing in wastewater. Studies showed that some drugs were degraded in wastewater to a high extent (90%: e.g. ibuprofen, naproxen) while others were affected much less. In addition to microbial degradation, other parameters such as exposure to sun light can influence degradation. Thus, for monitoring stability/degradation of drugs in wastewater it is important to perform the studies under defined conditions to figure out which metabolite/degradation product is the predictor for tracking the use of compounds.

The last highly interesting lecture was presented by Frank T. Peters (Institute of Forensic Medicine, University Hospital Jena, Germany): „Drug Metabolism by Fungi Colonizing Decomposing Human Cadavers“. After death in the advanced stage of decomposition, microbes colonize the entire corpse. Frank isolated and characterized more than 150 fungal strains from postmortem materials. His results were discussed and showed the importance of his conclusions. It could be shown that some fungi are very active to metabolize drugs and some (like candida) are not. So fungi can affect the metabolic profile in catalyzing the phase I metabolism, which can have an effect on the concentrations of drugs. This knowledge can be very relevant for the interpretation of analytical results in post mortem cases.