Highlight report: high-resolution mass spectrometry

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Recently, Hans Maurer and Markus Meyer from Saarland University contributed a comprehensive review article about the current status and future perspectives of high-resolution mass spectrometry (HRMS) to the Archives of Toxicology (Maurer and Meyer 2016). The authors illustrate how HRMS became an indispensable tool in analytical toxicology, offering high power of identification and the possibility of quantitative measurements in very low concentration ranges. HRMS has already been developed in the early 1960 and meanwhile has intensively been used in protein analysis (Lesur and Domon 2015; Sajic et al. 2015). Fields of HRMS application discussed by Maurer and Meyer include:

- Elucidation of metabolite structures in drug metabolism studies (Meyer and Maurer 2012; Castaneto et al. 2015)
- Studies of pharmacokinetics (Richter et al. 2016; Wink et al. 2016)
- Screening for pharmaceuticals, drugs of abuse and toxins, making use of the flexibility of HRMS to add further compounds easily to existing screening approaches (Peters 2014; Patteet et al. 2015)
- Quantification of pharmaceuticals, drugs of abuse and toxins, where a reliable quantification is required for clinical decisions or forensic consequences (Maurer 2007). Here, LC-HRMS/MS has become the most applied technique for multi-target quantification (Meyer et al. 2014; Meyer and Maurer 2016).

In recent years, analytical methods have been further developed in various fields of toxicology, such as metabolite identification (Ali et al. 2015; Huybrechts et al. 2015; Godoy et al. 2013), characterization of volatile organic compounds (Schubert et al. 2015; Hutzler et al. 2014), DNA-adducts (Hu et al. 2015), inflammatory mediators (Patel et al. 2015; Kim et al. 2013), characterization of plant extracts (Khan et al. 2014; Simlai et al. 2014; Naghiloo et al. 2012) and metabolomics (Fang and Gonzalez 2014; Beger et al. 2015; Pink et al. 2014). The relevant basic principles of high-resolution mass spectrometry are given by Pleil and Isaacs (2016). Considering the rapid developments in mass spectrometry based technologies, the present review of Maurer and Meyer with its well-structured and realistic discussion of possibilities and limitations of the available techniques is of high interest to anyone interested in this field of analytical toxicology.

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