

SCIENCE NEWS FLASH ECETOC reports on February 2013 workshop addressing 'omics

Brussels, September 2013

'Omics is a general term used in biological sciences describing the study of genes and cells. For example, the study of DNA in a cell is termed genomics, the study of proteins - proteomics, metabolites - metabolomics and RNA transcripts - transcriptomics. There has been growing interest in the use of 'omics data for risk assessment of chemicals. In particular, how the combined analysis of transcriptomics, proteomics and metabolomics can be used to understand how chemicals produce toxic effects. The aim of this workshop, that attracted scientists from industry, regulatory agencies and academia (several European and North American Universities), was to review progress on the application of 'omics technologies to chemical safety and assess their potential impact on the risk assessment of chemical substances.

Using several worked examples and case studies, the participants of the workshop concluded that 'omics data are particularly valuable for understanding modes of action (MoA)*. By studying exposure-associated differential gene expression patterns, it is becoming possible to examine each key event in the pathway leading from an early molecular event in a cell to an adverse outcome, such as liver disease, in an individual. Analysis of the most sensitive pathway for transcriptomics allows for a reasonable approximation of the NO(A)EL of an individual compound.

Progress is gaining pace and 'omics tools are being used to identify biomarkers and guide study design towards shorter, more targeted studies, with potential to reduce the numbers of animal studies currently required to assess chemical safety. While more work remains before it is possible to predict adversity from 'omics data, the workshop provided guidance on further standardisation of 'omics study protocols and how to obtain a better understanding of the association of differentially expressed genes with MoA. The information and ideas developed at the workshop add to the knowledge base that will ultimately result in improvements in human and environmental risk assessment.

A description and the findings of the workshop can be found in ECETOC Workshop Report No.25: 'Omics and Risk Assessment Science, and can be downloaded without charge via <http://bit.ly/ecetoc-wr25>





EUROPEAN CENTRE FOR ECOTOXICOLOGY AND TOXICOLOGY OF CHEMICALS

Previous 'Omics workshop reports are also available:

Workshop Report No.19: 'Omics in (Eco)toxicology: Case Studies and Risk Assessment 22-23 February 2010, Málaga (Published June 2010) <http://bit.ly/ecetoc-wr19>

Workshop Report No.11: The Application of 'Omics in Toxicology and Ecotoxicology: Case Studies and Risk Assessment 6-7 December 2007, Malaga (Published July 2008) <http://bit.ly/ecetoc-wr11>

*Further information on Mode of Action (MOA) is found in the following ECETOC reports:

Workshop Report No.26: Mode of Action: Recent Developments, Regulatory Applications and Future Work. 21-22 February 2013, Vienna (Published June 2013) <http://bit.ly/ecetoc-wr26>

2011 Article: Carmichael N, Bausen M, Boobis AR, Cohen SM, Embry M, Fruijtjer-Pölloth C, Greim H, Lewis R, Bette Meek ME, Mellor H, Vickers C, Doe J. 2011. Using mode of action information to improve regulatory decision-making: An ECETOC/ILSI RF/HESI workshop overview. *Critical Reviews in Toxicology* 41(3):175-86
Doi: 10.3109/10408444.2010.541225

TR102 Intelligent Testing Strategies in Ecotoxicology: Mode of Action Approach for Specifically Acting Chemicals (December 2007) <http://bit.ly/ecetoc-tr102>

ECETOC is Europe's leading industry association for developing and promoting top-quality science in human and environmental risk assessment of chemicals.

Avenue E. Van Nieuwenhuysse 2 Bte 8, B-1160 Brussels
Tel. (32) 2 675 3600 Fax. (32) 2 675 36 25 E-mail: info@ecetoc.org
Visit www.ecetoc.org for the latest news from ECETOC