Wolfgang Sadee, J Bioequiv Availab 2014, 6:5
http://dx.doi.org/10.4172/0975-0851.S1.019

OMICS Group Conferences
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5th World Congress on
Bioavailability and Bioequivalence
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September 29-October 01, 2014 DoubleTree by Hilton Baltimore-BWI Airport, USA

Genomics in bioavailability and bioequivalence

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Rapid advances in genomics technologies exert profound impact on the biomedical sciences. The main goal of the pharmaceutical sciences is to understand individual differences in drug response and toxicity, as a foundation for developing and guiding therapy for each patient. Bioavailability and bioequivalence represent important factors in the design of optimal drug therapy. Both genetic variants and epigenetic factors, and interplay between them, determine a portion of inter-individual variability, with expression of drug metabolizing enzymes (DMEs) and transporters playing a key role. A number of genetic variants have already been incorporated into pharmacogenetic biomarker tests, but the vast majority of (epi) genetic variability remains hidden. We have implemented gene-by-gene and genome-wide methods to search for pharmacologically relevant variants and regulatory processes, using next generation sequencing of DNA and RNA (RNAseq of coding and non-coding RNAs). A survey of DME and transporter expression reveals distinct expression profiles in various tissues, and the presence of multiple RNA transcripts at each gene locus (such as splice variants). Broad understanding of the regulation of DMEs and transporters has the potential to guide drug development and clinical application.

Biography

Wolfgang Sadee is Professor of Pharmacology, Director of the OSU College of Medicine Center for Pharmacogenomics, and member of the NIGMS Pharmacogenomics Research Network. He had served on the pharmacy faculties of USC and UCSF until 2002. His research focuses on pharmacogenomics to discover genetic variants affecting drug response and develop biomarkers for optimizing an individual's therapy. He has published over 350 research papers, chapters, and monographs, served as founding editor of Pharmaceutical Research and The AAPS Journal, and received several awards, including the AAPS Distinguished Scientist Award.

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