SL09 **Transporter Mediated Drug-Drug Interactions in the Kidney: Implications to Drug Development**

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The kidney is responsible for the elimination of the vast majority of clinically used drugs or their polar metabolites. Over the past decade, considerable progress has been made in identifying and characterizing the transporters in the kidney that mediate the elimination of basic drugs and their metabolites. Three transporters have emerged as playing a significant role in the active tubular secretion of basic drugs. These are organic cation transporter 2, OCT2, and multi-drug and toxin extrusion proteins, MATE1 and MATE2-K. Factors that affect the expression level or activity of these transporters can modulate the renal secretion of basic drugs. These factors include genetic polymorphisms or concomitant administrations of drugs that are inhibitors of transport. During drug development, candidate drugs should be evaluated as potential substrates or inhibitors of renal transporters. For candidate drugs that are found to be substrates or inhibitors of renal drug transporters, follow-up clinical drug-drug interaction studies should be considered. However, many questions have been raised about the methodology and interpretation of data obtained in *in vitro* studies. Importantly, which criteria should be used to trigger a clinical study and if a clinical study is indicated, how should it be designed and conducted? Recently, the International Transporter Consortium has proposed guidelines for the *in vitro* and *in vivo* evaluation of transporter based drug-drug interactions. These guidelines have stimulated a wide international discussion focused on transporters that are most important clinically, *in vitro* and *in silico* methodologies, and the conduct of clinical studies. In this overview presentation, I will describe the recommendations of the International Transporter Consortium focused on renal drug-drug interactions. Gaps in current knowledge in the area of renal drug transporters will be identified. Further, recent studies conducted in my laboratory in the area of genetic polymorphisms in renal transporters and renal drug-drug interactions will be described. Collectively an overview of the evaluation of transporter based drug interactions during the drug development process will be presented.