



Research on the effects of chemical substances on children, elderly people, and those with gene disorders

Title of Research:

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Quantitative prediction of the pharmacokinetics of chemical substances by the use of mathematical model with considering the age-dependent functional changes of metabolic enzymes and transporters

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Summary of Research:

To predict the effect of age on the pharmacokinetics of chemical substances, a clinical study will be performed to evaluate the molecular functions of metabolic enzymes and transporters of chemical substances with probe drugs. By mathematical modeling, pharmacokinetic data in elder people can be predicted based on PKs in healthy volunteers. In this year, Cluster Newton Method was created for rational settings of model parameters and its effectiveness was proven. Moreover, we performed in vitro experiments to characterize the property of probe drugs for various molecules such as CYP2E1 and OCT1 and also prepared for the future clinical study.

Timeline: November 1, 2013-

Topics: None

Publications:

Kazuya Maeda, "Quantitative prediction of the impact of drug transporter function on human in vivo pharmacokinetics", 7th Young Investigators Symposium on Clinical Pharmaceutical Sciences, Sendai, 2013.11

Kazuya Maeda, Kenta Yoshida, Akihiko Konagaya, Hiroyuki Kusuhara, "Integrative analyses of the drug-drug interactions with Cluster Newton Method", 29th APSTJ Annual Meeting, Saitama, 2014.5

Xuan Zhang, Kazuya Maeda, Hiroshi Suzuki and Hiroyuki Kusuhara, "Contribution of hepatic OCT1 to the pharmacokinetics of triptans", 29th APSTJ Annual Meeting, Saitama, 2014.5

Kazuya Maeda, Kenta Yoshida, Yuichi Sugiyama, Akihiko Konagaya and Hiroyuki Kusuhara, "Precise estimations of the inhibition constants by PBPK analyses of metabolites' pharmacokinetic alterations using Cluster Newton Method", 19th North American ISSX Meeting/29th JSSX Meeting, San Francisco, CA, USA, 2014.10

Xuan Zhang, Kazuya Maeda, Hiroshi Suzuki and Hiroyuki Kusuhara, "Hepatic Organic Cation Transporter 1 (OCT1) Regulates the Hepatic Clearance of Triptans, But Not Beta-blockers", 19th North American ISSX Meeting/29th JSSX Meeting, San Francisco, CA, USA, 2014.10