

Skin, Drugs, and the Microbiome: Utilizing Metabolomics for Noninvasive Drug Detection and Drug Metabolism

Department of
Biomedical
Informatics



THE OHIO STATE
UNIVERSITY
COLLEGE OF MEDICINE

Abstract: Precision medicine involves understanding the factors influencing individual variability and optimizing therapy accordingly. Monitoring drugs often requires invasive blood or tissue sampling in order to optimize efficacy and minimize toxicity. A noninvasive method for detecting drugs and other endogenous chemicals would be very beneficial. Utilizing untargeted mass spectrometry and molecular networking, we demonstrated a time course of an orally administered drug, the antihistamine diphenhydramine and its metabolites, in plasma and skin. We have also developed a machine learning model to predict which drugs will be detected on the skin based upon physicochemical properties. Untargeted metabolomics can also be a powerful tool to provide insight into the dynamics between the gut microbiome and drugs. We have identified novel drug metabolites after perturbing the microbiome with antibiotic therapy.

About the Speaker: Shirley M. Tsunoda, Pharm.D. is a Professor of Clinical Pharmacy at the Skaggs School of Pharmacy and Pharmaceutical Sciences, UC San Diego. She is a clinical pharmacologist and clinical pharmacist practicing in liver transplant at UC San Diego Health. Dr. Tsunoda's research focuses on factors influencing the variability and activity of intestinal and hepatic metabolism of drugs and the pharmacokinetics/metabolism and clinical use of immunosuppressive agents. Previous work has included using probe compounds such as midazolam and cyclosporine to predict activity of CYP3A4, the major drug metabolizing enzyme in the intestine and liver and the effect of red wine on cyclosporine pharmacokinetics. She is also interested in studying the increasingly complex interplay of the metabolic enzymes and transporter proteins in the intestine and investigating the role of the microbiome on intestinal and hepatic drug metabolism. Recent work has included investigations into utilizing skin swabs to noninvasively detect drugs and drug metabolites. She is a PI on the recently funded MPRINT P50 Maternal and Pediatric Therapeutic Center of Excellence at UC San Diego.

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Friday, April 15th, 11:00am-12:00pm

Carmen Zoom

<https://osu.zoom.us/j/92106557653?pwd=RXh3VThrRXVhQmdQV1oxelJJdkdsQT09>