

World Drug Delivery Summit

August 17-19, 2015 Houston, USA

Novel approach for oral drug delivery

Michael Zhuo Wang

University of Kansas, USA

The epithelial enterocyte barrier of the gastrointestinal (GI) tract limits the absorption of many oral drugs to the systemic circulation. Modulation of intercellular tight junctions has long been considered a potential tool to enhance drug delivery across these biological barriers. However, early modulators (e.g., Ca²⁺ chelators, surfactants, modified fatty acids and esters, and polymers) had unspecific modes of action and insufficient separation between efficacy and toxicity, precluding their clinical use. Recent knowledge regarding the molecular composition and mechanisms regulating tight junctions and adherens junctions has led to a new generation of intercellular junction modulators based on junction protein/peptide mimetics and relevant signaling pathways. E-cadherin peptides (ECPs) represent a class of these new modulators and have shown promise in enhancing small molecule drug delivery across the blood-brain barrier via reversible modulation. Here we investigated the potential and safety of ECPs to enhance oral bioavailability of drugs that have limited gut absorption. In vitro permeability and in vivo pharmacokinetic studies have been performed to demonstrate the feasibility of the ECP-based oral drug delivery approach. Results showed that ECPs substantially increased the permeability of the model drugs/molecules, as well as their systemic exposure after oral administration. Based on the molecular size limit of the delivery approach, the prospect for oral delivery of biopharmaceuticals, e.g., peptides, proteins, and nucleic acids, will also be discussed. In conclusion, ECPs-based formulations should be further developed as a vehicle to enhance oral bioavailability of poorly permeable drugs.

Biography

Michael Zhuo Wang received his BS from Peking University in 1998 and his PhD from Duke University in 2003. He completed his postdoctoral studies at the University of North Carolina at Chapel Hill, School of Pharmacy. He is now an Assistant Professor in the Department of Pharmaceutical Chemistry, University of Kansas. He has published more than 30 peer-reviewed papers in the fields of analytical chemistry, drug metabolism, pharmaceuticals, and pharmacology.

michael.wang@ku.edu

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