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The complexity of intestinal permeability and its implications on oral drug absorption and bioavailablity

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In this lecture, regional-dependent intestinal permeability will be discussed, including dissolution aspects, as well as pathophysiological conditions. Permeability is location dependent, and pertains to each point throughout the gastrointestinal tract. A drug may exhibit significantly different intestinal permeability not only between the small and large intestine, but even within the small intestine, i.e. between the proximal jejunum and the distal ileum. The asymmetrical pH profile throughout the small intestine may be the underling mechanism for such segmental-dependent permeability of certain ionizable drugs. An asymmetrical expression pattern of different transporters throughout the intestinal tract may also cause such regional-dependent permeability. Asymmetrical intestinal enzymes expression may significantly influence the systemic bioavailability of a drug, although not necessarily affect the permeability. In these cases, rapid vs. sustained dissolving drug products may result unexpectedly different systemic drug levels. In conclusion, it is prudent to consider the intestinal permeability pattern when deciding on a certain dissolution profile.

Biography

Arik Dahan is an Associate Professor of Pharmaceutics and Biopharmaceutics at the Department of Clinical Pharmacology and the School of Pharmacy, Ben-Gurion University of the Negev in Beer-Sheva, Israel. He is also an Adjunct Professor of Pharmaceutical Sciences at the College of Pharmacy, University of Michigan, USA. He received his PhD (2007) from the Hebrew University of Jerusalem. From 2007 until 2009, he was a Post-Doctoral Research Fellow at the University of Michigan College of Pharmacy with Professor Gordon Amidon. His research interest is the integration of up-to-date molecular and cellular mechanistic investigations of drug disposition in the context of the human body, in order to enable successful drug delivery and therapy. In implementing this molecular biopharmaceutical approach to ADME research, he is seeking to enable mechanistic-based successful solutions to drug delivery, especially (but not only) oral, in challenging scenarios e.g. low-solubility, low-permeability, efflux transport, extensive metabolism, poor site targeting, various pathophysiological conditions (e.g. obesity, inflammatory bowel disease), and pediatrics patient care. He has authored over 70 top-notch journal papers, and contributed chapters to 7 books.

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