

of Complexation in the Formulation of Insoluble Compounds,” “Liposomes in Solubilization,” “Micellization and Drug Solubility Enhancement,” and “Polymeric Micelles in Water-Insoluble Drug Delivery.”

Both dispersion and solution systems can be used to formulate oral liquid dosage forms to enhance bioavailability for water-insoluble drugs (Pouton, 1997; Yamashita and Furubayashi, 1998; Porter and Charman, 2001; Wasan, 2001). These systems can also be used to develop solubilizing systems for parenteral dosage forms to deliver water-insoluble drugs (Sweetana and Akers, 1996; Corswant et al., 1998; Pace et al., 1999; Sarker, 2005). Formulation techniques used to enhance bioavailability for oral liquid dosage forms and to solubilize water-insoluble drugs for parenteral dosage forms can be found in the chapters “Solubilization Using Cosolvent Approach,” “Micellization and Drug Solubility Enhancement,” “Polymeric Micelles in Water-Insoluble Drug Delivery,” “Liposomes in Solubilization,” “Particle Size Reduction,” “Emulsions, Microemulsions, and Lipid-Based Drug Delivery Systems for Drug Solubilization and Delivery (Parenteral and Oral Applications),” “Soft Gelatin Capsules Development,” “Prodrugs for Improved Aqueous Solubility,” and “Pharmaceutical Salts.” The chapter “Oral Modified-Release Drug Delivery for Water-Insoluble Drugs” provides a systemic review on various controlled-release technologies, which may be suitable to be used on longer-lasting applications of water-insoluble drugs. Finally, the chapter “Scalable Manufacturing of Water-Insoluble Drug Products” provides some useful discussion in process development, especially for large scale-up manufacturing of finished dosage forms of water-insoluble drugs.

In many cases in drug development, the solubility of some leads is extremely low. Fast dissolution rate of many drug delivery systems, for example, particle size reduction, may not be translated into good GI absorption. The oral absorption of these molecules is usually limited by solubility (Willmann et al., 2004; Qiu et al., 2016). In the case of solubility limited absorption, creating supersaturation in the GI fluids for this type of insoluble drugs is very critical as supersaturation may greatly improve oral absorption (Tanno et al., 2004; Shanker, 2005; Taylor and Zhang, 2016). The techniques to create the so-called supersaturation in the GI fluids may include microemulsions, emulsions, liposomes, complexations, polymeric micelles, and conventional micelles, which can be found in some chapters in the book.

There are still some drug delivery strategies under wide investigation in academic settings, including mesoporous silica particles (Latify et al., 2017), graphene oxide (Liu et al., 2008), other inorganic particles (Yue et al., 2011), all kinds of sensitive organic particles (Guo and Huang, 2014), and targeted or intracellular delivery strategies (Mitragotri et al., 2014). However, these strategies still have a long way until clinic, with lots of challenges to be figured out. The related studies are discussed in this book.

It is the authors’ hope that the concepts and techniques described in this book will lead to the development of improved dosage forms for water-insoluble drugs, and thus enhance the therapeutic advantage of this crucial class of drugs.

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