1.1.1 Absorption

Drug oral absorption is a complex transfer process across the intestinal lining which includes passive diffusion through the paracellular space or absorptive cells membranes, vesicular uptake (endocytosis/pinocytosis), and release at the basolateral space. Absorption depends initially on the dosage form dissolution in the aqueous contents of the gastrointestinal tract (GIT) to reach the blood (Le Ferrec *et al.* 2001a; Smith *et al.* 2012; Toutain and Bousquet-mélou 2004). Drug absorption from the GIT depends on various factors such as drug physicochemical properties (lipophilicity, size, molecular volume, stereochemistry, pK_a, solubility, chemical stability, partition and structure), gastric and intestinal motility, gastric emptying, physicochemical properties of small intestine environment, intestinal pH and the Surface area available for absorption (Dressman and Reppas 2010; Le Ferrec *et al.* 2001b). Drug absorption takes place at different sites of the GIT which include duodenum, jejunum and ileum. Many biological *in vitro* methods are used as an assessment for the permeability of the GI mucosa to predict *in vivo* drug absorption such as everted rat intestinal sacs (ERIS) and *in situ* single pass intestinal perfusion (*in situ* SPIP) (Dressman and Reppas 2010).

In situ SPIP technique is used for the assessment of permeability of drugs through intestines while keeping intact blood supply to the intestinal tract throughout the experiment, making it a reliable tool for simulating real *in vivo* conditions following oral drug administration (Amidon *et al.* 1995; Amidon *et al.* 1988; Varma *et al.* 2004; Varma and Panchagnula 2005). Everted rat intestinal sac model is used for measuring absorption and permeability at different sites in the small intestine via passive diffusion and/or