Investigation of supersaturation and permeation of a poorly water soluble drug Ezetimibe
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Introduction

Newly developed formulations of the poorly soluble drugs are designed to create supersaturation in vivo. The transport across the intestinal membrane can influence precipitation kinetics of a supersaturated phase. Thus, it is important to understand the interplay among supersaturation-precipitation-permeability.

Aims

• The effect of permeation across Caco-2 cell monolayers on supersaturation of Ezetimibe, a poorly water soluble drug was investigated and compared to the supersaturation in a cell free one compartment setup.
• Polymer effect was also investigated using PVP K-30

Methods

![Diagram of two compartment setup and one compartment setup]

Results

• The transport of EZ to the BL side was low for all sample solutions under study.
• Higher degrees of supersaturation were associated with high transport levels reaching the highest amounts with DS 40.
• In one compartment setup high degrees of supersaturation was associated with rapid precipitation.
• The polymer PVP K-30 had maintained EZ in the supersaturated state when added to the apical side in two concentrations 0.05% (w/v) and 0.1% (w/v) but only 0.05 % (w/v) showed an improvement in the transport.

Conclusions

• Caco-2 cell monolayers affect supersaturation and precipitation of EZ.
• One compartment setup provides underestimation of supersaturation, precipitation and permeation
• PVP K-30 improved supersaturation and permeation