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#### Abstract

The present study was carried out in order to develop a transdermal therapeutic system (TTS) for 8-THC. The in vitro permeability studies of 8-THC in human skin and hairless guinea pig skin with and without a rate-controlling membrane were conducted in flow-through diffusion cells. 8-THC pharmacokinetic parameters were determined after topical application of transdermal patches and intravenous administration in guinea pigs. The in vitro results indicated that there was no significant difference in the mean flux or in the permeability coefficient of 8-THC in human skin versus hairless guinea pig skin. The flux of 8-THC through the human skin/membrane composite was not significantly lower than that through the hairless guinea pig skin/membrane composite; and the skin controlled the 8-THC delivery rate. Intravenous doses of 8-THC followed a two-compartment model with a significant distribution phase. On application of the TTS patch, the plasma concentration of 8-THC reached a mean steady-state level of 4.4 ng/mL within 1.4 h and was maintained for at least 48 h. Significant amounts of metabolites were observed in the plasma after topical application. The in vitro-study predicted plasma concentration following application of the transdermal patch was in agreement with the observed guinea pig plasma concentrations of 8-THC. © 2004 Wiley-Liss, Inc. and the American Pharmacists Association J Pharm Sci 93: 1154-1164, 2004

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