TABLE 14.1
Summary of the Effect of Occlusion on Percutaneous Absorption

Models				
	In Vivo			
In Vitro	Animals	Humans	Compounds	Results and References
Guinea pig skin			Methanol and ethanol	Enhanced the penetration of both chemicals. The nature of the occlusive material influenced the occlusion effect (30).
Human skin			Citropten and caffeine	Increased the permeation of citropten (lipophilic compound) but not of caffeine (amphiphilic compound). They found that occlusion does not increase the percutaneous absorption of all chemicals (28).
Human skin			Salicylic acid and formaldehyde	Occlusion affected the percutaneous penetration of the lipophilic salicylic acid more than of the hydrophilic formaldehyde. Thus, occlusion did not have a significant enhancing effect on both chemicals, i.e., a strong correlation was seen between occlusion and their partition coefficients (44).
Rat and human skin			Nicotinic acid, phenol, benzoic acid, and triclopyr butoxyethyl ester	Significantly enhanced the percutaneous absorption of the compounds but varied with the compound under study and the skin (rat or human) used (31).
Rat skin			Benzyl acetate in different vehicles (in ethanol, phenylethanol, and dimethyl sulfoxide)	Significantly enhanced absorption, but the effect varied with time and vehicle (32).
Human epidermis			Parabens in different vehicles (in acetone, ethanol, and ointment formulation)	Increased flux from acetone and ethanol and a decreased flux upon the occlusive application of the ointment formulation. The effect depended on the vehicle used (53).
Isolated perfused porcine skin flap			Phenol and PNP in two different vehicles (acetone and ethanol)	Increased the penetration of both compounds, but affected by used vehicles. The penetration was vehicle, occlusion, and penetrant dependent (45).
Rabbit ear skin			Progesterone in microemulsions with different ethanol content, saturated drug solution, and propylene glycol–water mixture	Occlusion enhanced drug flux from all formulations. The highest drug flux was obtained from microemulsions, i.e., the flux increase was vehicle dependent. Besides occlusion, supersaturation also played an important role (54).
Human skin			Estradiol in ultra-deformable vesicles	Occlusion resulted in a significant reduction of the transdermal flux of the drug from deformable vesicles compared to their nonocclusive application. Thus, the occlusion effect was vehicle dependent (58).
Rat and human skin			2-Phenoxyethanol applied in methanol	Reduced evaporation and increased total absorption (33).
Human skin	Rhesus monkeys		Safrole, cinnamyl anthranilate, cinnamic alcohol, and cinnamic acid	Resulted in greater permeation of all compounds. No correlation was found between skin penetration of compounds and their partition coefficients (34).

(Continued)