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Effect of Penetration Enhancers on the Permeation of Drugs across a Three-Dimensional Cultured Human Skin Model: Comparison with the Effects Using Excised Hairless Rat Skin

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Effect of penetration-enhancers on the skin permeation of drugs was evaluated using a three-dimensional cultured human skin model (LSE-high) as well as excised hairless rat skin. Seven kinds of enhancers were used, and ISMN and ISDN were selected as model drug. The rank order of the enhancement effect of enhancers in LSE-high was similar to that in the rat skin, although the effect across LSE-high was lower than that across the rat skin. The enhancing effect against ISMN was more marked than that against ISDN for both skins. Concentration dependence was then evaluated using l-menthol. Three and 10% l-menthol exhibited the highest effect on the skin permeation of ISMN and ISDN, respectively, for both skins. These findings suggest that LSE-high may be utilized as an alternative membrane to test the promoting effect of enhancers on the skin permeation of drugs.