Investigation of the percutaneous penetration of prostaglandin E1 and its ethyl ester.

許明照
Sheu MT;Lin LH;Spur BW;Wong PYK and Chiang HS

Abstract

The optimization of percutaneous delivery of PGE1 and its ethyl ester in alcoholic buffer solution through hairless mouse skin was investigated. A reversed-phase HPLC system with a photodiode array detector was used to differentiate the UV spectra of the penetration products. By comparison of the UV spectrum for each chromatographic peak, the conversion of PGE1 ethyl ester to PGE1 by enzymatic hydrolysis was found to be the predominant degradation pathway during the in vitro penetration. The quantification of ethyl ester was developed based on the same principle as that for PGE1. It was then applied to monitor the penetration of prostaglandins through hairless mouse skin from the vehicles containing various fractions of alcohol. Results demonstrated that the alkyl group promoted the penetration mainly as a result of enhancing the drug partitioning into the stratum corneum at its maximal thermodynamic activity. The alcohol fraction around 20% seemed to be optimal for the percutaneous delivery of the ethyl ester. The use of collagen gel to carry PGE1 ethyl ester for percutaneous application was included for comparison. The effect of adding alcohol in the collagen gel on the penetration of PGE1 ethyl ester was found to be slightly lower than that from the same vehicle without collagen.