

Establishment of the Analytical Method for Percutaneous Absorption of Substances Which Affect Physiological Function of Skin

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For the rational design of formulation of substances which affect physiological function of skin, it is important to establish analytical methods for their percutaneous absorption. A physiological skin diffusion model considering the first stratum corneum layer with polar and nonpolar routes and the second viable epidermis plus dermis layer combined with blood vessel compartment was constructed, and the corresponding Laplace transformed equations for percutaneous penetration in the finite dose system were derived from the Pick's diffusion law. By employing the numerical inversion of these image equations to the real time course by the fast inverse Laplace transform (FILT) algorithm, percutaneous penetration of drugs was theoretically discussed in connection with their lipophilicities. In addition, the mechanisms of action of penetration enhancer, which has been the most promising in the methodology for the enhancement of percutaneous absorption of impermeable drug's, were analyzed. Based on these analytical results, the fundamental directions for the use of an enhancer in formulations of various drugs was systematized.