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水晶発振子を用いた薬物の in vitro 皮膚透過迅速測定法に関する検討 : Rapid measurement of in vitro skin permeation of a drug using quartz crystal microbalance

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A quartz crystal microbalance was tested and evaluated for a rapid measuring method of permeation of indomethacin as a model drug through a skin membrane. A cultured dermal membrane (Living Dermal Model, LDM) was set between two half-cells of a diffusion cell set. The chamber facing the upper surface of the model membrane contained indomethacin in ethanol (5 mg/mL) as a drug donor and the other 10% ethanol as a receiver. The quartz crystal adsorbed with dimethyl distearyl ammonium chloride was set into the receiver chamber to determine the time course of the LDM permeation of indomethacin by the decrease in vibration numbers of the quartz crystal. Separately, the skin permeation was determined by HPLC. Although the cumulative amount of indomethacin permeation determined by the quartz crystal microbalance method was slightly lower than that by HPLC, the steady state flux was almost the same. The difference in the initial permeation profiles was due to a short lag time before a constant vibration numbers in a constant concentration of indomethacin solution was expressed by a simple equation. Deconvolution was used to correct the skin permeation profile. The corrected one was very close to that this quartz crystal microbalance can be used to rapidly obtain the membrane permeation profiles of drugs.