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Potential usefulness of solubility index for prediction of the skin permeation rate of 5-ISMN from pressure-sensitive adhesive tape

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Skin permeation of 5-ISMN from pressure sensitive adhesive (PSA) tape was evaluated using thermodynamic activity of the drug in PSA. Three acrylic adhesives were used as PSA. Since the drug activity in PSA is difficult to determine, a solubility index was defined. Several PSA tapes containing different amounts of 5-ISMN were prepared and heat of fusion at the dissolution of 5-ISMN in each PSA was determined by DSC. The bending point in the profile of heat of fusion versus 5-ISMN content in PSA was defined as the solubility index. *In vitro* skin permeation was determined using hairless rat skin from the PSA tapes. The obtained skin permeation of the drug decreased with increases in the solubility index. These profiles were confirmed by a theoretical approach using the differential equation corresponding to Fick's second law. These results suggested that the solubility index can be utilized for prediction of the skin permeability of drugs from PSA tape.