

Transdermal iontophoretic delivery of diclofenac sodium form various polymer formulation: in vitro and in vivo studies.

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摘要

Abstract

The objective of this study was to evaluate the in vitro and in vivo transdermal iontophoresis of various diclofenac sodium polymer formulations. The excised rat skin, human skin as well as cellulose membrane were used to examine the in vitro drug permeation whereas the microdialysis technique was used to monitor the drug concentration in vivo. Polymer solutions based on polyvinylpyrrolidone (PVP) and hydroxypropyl methylcellulose (HPMC) binary system showed higher drug permeability than that of single polymer vehicle. The effect of formulations on drug permeation through cellulose membrane was quite different from those through rat skin and human skin, which can be explained by the different permeation pathways between them. It appeared to be a membrane-controlled mechanism but not the vehicle matrix-controlled mechanism for diclofenac hydrogels when using skin as the diffusion barrier. The recovery of diclofenac sodium in the in vivo microdialysis was approximately 80-90%, indicating this technique can be used in the intradermal drug monitoring. For all the polymer formulations tested, there was a good relationship between the in vitro and in vivo drug permeation. A synergistic effect on drug permeation was observed when transdermal iontophoresis combined with the pretreatment of cardamom oil as a permeation enhancer.