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Design and feasibility assessment of topically applied drug formulations for electroporation

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Few studies have been reported on the design of topical formulations consisting of electrodes and active drugs for electroporation as a means to increase skin permeability of the drugs, although many studies were reported for the effect of this physical means using aqueous drug solutions. We, therefore, designed a prototypic reservoir and matrix topical formulations that are suitable for electroporation in the present study. Plate-plate Ag electrodes and sodium diclofenac were used as model electrodes and the drug, respectively. The in vitro skin permeations of the drug obtained from the reservoir and matrix formulations were slightly higher than that from an aqueous suspension. This may be due to slightly higher electric field in the skin barrier for the presently designed formulations than that for the aqueous suspension. The present feasibility test suggests that these reservoirs and matrix formulations are useful prototypic topical formulations for electroporation application to improve the drug permeability through skin.