

The Study of Dissolving Microneedle Patch for Androgenetic Alopecia

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Abstract : Microneedle patch is a painless transdermal drug delivery method, It could solve some problems in traditional drug delivery such as digestive system causing drug metabolism and subcutaneous injection causing some side effects. Coating drug on or loading drug in microneedle can carry active ingredient through stratum corneum, also can control dose well when microneedle patch apply on localized topical area. We used hyaluronic acid to fabricate dissolvable microneedle patch and encapsulated minoxidil into microneedles. Minoxidil is a drug for exterior use that can be used to treat Androgenetic alopecia, but related commercial products have some shortcomings, for example, propylene glycol which is used to soften stratum corneum cause skin allergic reaction, comparing chemical promotion, microneedle patch provide physical way to make drugs through nature barrier of skin. In this research, we designed a two-step process to fabricate microneedle patch, that can effectively reduce drug waste, and gentle production process could maintain drug activity well. We also do in vitro test on cadaver to make sure patch has enough mechanical strength to penetrate stratum corneum. In the release test and animal test, we found microneedle patch has higher delivery efficiency than tradition way. In this study, we may determine that germinal MNs patch is a potential commodity.

Keywords : dissolving microneedles, androgenetic alopecia, minoxidil, transdermal drug delivery

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