

The Microsponge: A Novel Topical Programmable Delivery System

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I. THE NEED FOR BETTER SKIN DELIVERY SYSTEMS

Over the past 40 years, the ability to control the delivery rate of active agents to a predetermined site in the human body has been one of the biggest challenges—met by continued innovative solutions—that has faced the medical profession and drug industry.

During this time, some areas of pharmaceutical research have been focused on the controlled delivery of systemic drugs. Several predictable and reliable systems were developed for systemic drugs under the heading of *transdermal delivery* using the skin as a portal of entry (1). Transdermal patches, developed in the 1970s, improved the delivery of drugs such as nitroglycerin and scopolamine, resulting in better control of therapeutic doses, simpler dosage regimens, and fewer side effects than the more traditional oral or parenteral administration of the same drugs. In general, these delivery systems have improved the efficacy and safety of many drugs that now may be better administered through the skin.

Although transdermal delivery systems can be efficient in supplying drugs for systemic effects, they are not practical for controlling the delivery of materials whose final target is the skin itself.

Controlled release of drugs onto the epidermis, with assurance that the drug remains primarily localized and does not enter the system in significant amounts, is an area of research that has only recently been addressed with success. No efficient vehicles have been developed for the controlled and localized delivery of drugs