Photodegradable Organosilicone Pressure Sensitive Adhesive for Controlled Release in Transdermal Drug Delivery System

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In the clinical application of traditional transdermal drug delivery system, there are still some pain points including slow development of special excipients, low transdermal efficiency, and poor accuracy of drug release process. Pressure sensitive adhesive (PSA) plays the role of adhesive, drug carrier and controlled drug release in transdermal drug delivery system[1,2]. Organosilicone, a polysiloxane material, is composed of [$O_{1.5}Si{-}R$] structural units[3]. The organic groups R afford the materials high degree of flexibility, adjustability, and designability. The inorganic skeletons [$SiO_{1.5}$] give excellent thermal stability, physiological inertia, and biocompatibility. Therefore, the organosilicone PSA has been widely appllied in the transdermal drug delivery system, such as hemostatic patch, ophthalmic controlled release film, analgesic drug film, and hypotensive patch[4,5].

In this study, the clinical requirements are taken as the breakthrough point, and the active component of the chinese herbal medicine evodiamine is used as the drug model. The photodegradable organosilicone PSA is designed to be suitable for transdermal drug delivery system, effectively encapsulating and preciesely controlled releasing drugs. By optionally changing the irradiation time, dose, and location of the response parameters, the system can accurately control and optimize the release of active molecules, thus promoting their transdermal absorption rates and bioavailability. This study will hopefully promote the design and development of new organosilicone materials and broaden application of organosilicone in the biomedical fields.

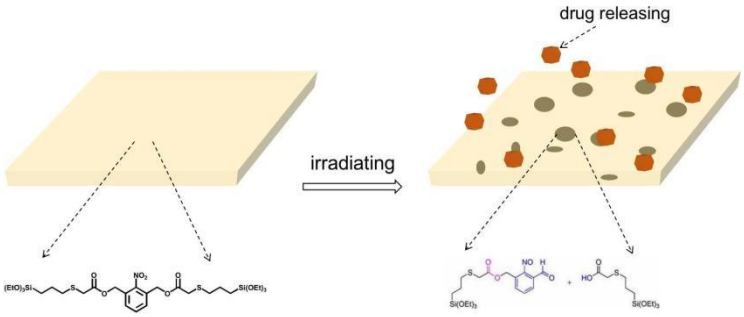

Fig.1 Light-controlled release of photodegradable organosilicone PSA for transdermal drug delivery system

References

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