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Smart Polymeric System (SPS) for lipophilic drug transdermal delivery without using solvent via dissolving microneedles

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Lipophilic drugs have been considered as potential candidates among drug development history. However, due to the need for hazardous organic solvents for their solubilization, these drugs often fail to reach the pharmaceutical market, and in doing so highlight the importance of solvent free systems. Although transdermal drug delivery systems (TDDSs) are considered prospective safe drug delivery routes, a system involving lipophilic drugs in solvent free or powder form has not yet been described. Here, we report, for the first time, a novel approach for the delivery of every kind of lipophilic drug in powder form based on a smart polymeric system (SPS). The phase transition of powder form of lipophilic drugs due to interior chemical bonds between drugs and biodegradable polymers and formation of nano-sized colloidal structures allowed the fabrication of dissolving microneedles (DMNs) to generate a powerful TDDS. We showed that SPS based DMN with powder capsaicin enhances the therapeutic effect for treatment of the rheumatic arthritis in a DBA/1 mouse model compared to a solvent-based system, indicating the promising potential of this new solvent-free platform for lipophilic drug delivery.

Biography

Huisuk Yang has graduated at both Department of Mechanical Engineering and Biotechnology from Yonsei University, South Korea. He is currently pursuing PhD in the Nanobiotechnology Laboratory of Yonsei University, South Korea. He has received "Best Technology Transfer and Industrialization Award" and "Best Trial Product Award" for his achievements in the field of Biotechnology.

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