Synopsis of Original Research Paper

Development of solid emulsions containing membrane permeability nanoassembly

Eiichi Toorisaka

Graduate school of science & engineering, Yamaguchi University

A transdermal administration on drugs has been limited due to very low permeability of drugs across skin. Especially, it is generally regarded that hydrophilic macromolecules such as proteins, peptides, and vaccines cannot penetrate across skin.

In this study, a solid emulsion containing membrane permeability nanoassembly was developed for the transdermal delivery of the protein drugs. The nanoassembly was formed by the complex of surfactant and protein. The usage of a solid fat and gel-vegetable oil as oil phase of the emulsions was examined. Moreover, the surface of oil droplets was coated by the layer-by-layer method with polymer electrolyte. These methods made the stability of the emulsion enhance.

In addition, the membrane permeability of protein was evaluated using the artificial epidermal membrane. In this study, the acceleration of protein transport was largely induced by the compatibility of the nanoassembly with the hydrophobic epidermal membrane. It is thus possible that the emulsion containing the nanoassembly resulted in the acceleration of protein transport across the epidermal membrane.