

〈シンポジウム〉

ナノテクノロジーの化粧品、医薬品への応用：化粧品分野への応用

細胞内 DDS によるナノ治療システムの開発

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Development of Nanomedicine System using Intracellular DDS

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Abstract

In recent years, sustained release system using nanospheres or microspheres is noticed in systemic pharmacokinetics. However, in the near future, not only “systemic pharmacokinetics” but also “intracellular pharmacokinetics” seems to be important in Drug Delivery System research. Technology for delivering sustained release particles such as nanospheres into cytoplasm is indispensable to control the intracellular pharmacokinetics. However few studies have ever tried to delivery the nanoparticles into cytoplasm without using micromanipulator. We have developed fusogenic liposomes (FL) that presented envelope glycoproteins from Sendai virus on the surface of liposome membrane, and reported that FL could efficiently introduce encapsulated contents, such as plasmid DNA and protein, into cytoplasm by direct fusion with cell membrane without inducing cytotoxicity. We suggested that FL also could deliver the nanospheres into cytoplasm. In this study, we established a protocol to encapsulate the nanospheres into FL and demonstrated that FL efficiently delivered encapsulated-nanosphere into cytoplasm via the membrane fusion pathway. In addition, we succeeded in observing that antisense oligonucleotides as a model drug were released gradually from the nanospheres delivered into cytoplasm by FL. We conclude that this technology is very important to control the intracellular pharmacokinetics, and can be also applied to any nanoparticle which will be produced by the nanotechnology in the future.

Key words: fusogenic liposome, nanoparticle, nanotechnology, drug delivery system, antisense oligonucleotide DNA.