Development of glycosylated liposomes for cell-selective targeting and its application to gene therapy

○Shigeru Kawakami, Yuriko Higuchi, and Mitsuru Hashida
Graduate School of Pharmaceutical Sciences, Kyoto University

Cationic liposomes have been considered as a potential non-viral vector for gene delivery because they possess low immunogenicity, unlike viral vectors. The gene transfer efficiency of cationic liposomes is lower than that of viral vectors but recent advances have shown that it is possible to enhance the gene expression levels of cationic liposomes. The main problem with cationic liposomes seems to be the lack of organ or cell selectivity because the lung has the highest level of gene expression after intravenous injection.

Applying cell-specific targeting technology to liposomes would improve *in vivo* gene delivery and reduce any unexpected side effects. Both hepatocyte and macrophages exclusively express large numbers of high affinity asialoglycoprotein and mannose receptors, respectively. Receptor-mediated gene delivery systems are able to introduce foreign DNA and/or oligonucleotide into specific cell types *in vivo*. In this symposium, I will present our gene delivery approaches for gene therapy using plasmid DNA [1-4], oligonucleotides, i.e., siRNA [5] and NFκB decoy [6, 7].

1) ***J. Pharmacol. Exp. Ther.***, 315, 484-493 (2005); 2) ***J. Gene Med.,*** 8, 824-834 (2006); 3) ***J. Pharmacol. Exp. Ther.***, 318, 828-834 (2006); 4) ***J. Pharmacol. Exp. Ther.***, 317, 1382-1390 (2006); 5) ***Biomaterials***, 28, 532-539 (2007); 6) ***FEBS Lett.***, 580, 3707-3714 (2006); 7) ***Biomaterials***, 28, 1434-1442 (2007)