

## **Feasibility of Bubble liposomes as novel gene delivery tools in the new generation**

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Gene therapy is expected as a novel therapy for congenital disease, tumor and ischemic disease. To establish effective gene therapy, it is necessary to develop a carrier that could safely and effectively deliver gene into target tissue. In this situation, non-viral vector systems are drawing the attention. It is especially used lipofection method with cationic liposome. However, this method is unsuitable for gene introduction in vivo because of low transfection efficiency. To improve this problem, many researchers attempt to develop novel gene delivery tool instead of existing vectors.

We have developed novel liposomal bubbles (Bubble liposomes) which were liposomes entrapping perfluoropropane gas known as ultrasound contrast agent. When Bubble liposomes were exposed with ultrasound, the bubbles oscillated and finally disrupted. This phenomenon is called cavitation. Cavitation made jet stream, then transient pores was provided on the cell membrane. In the same time, extracellular plasmid DNA or siRNA is delivered into cytosol. Therefore, Bubble Liposomes could directly and effectively deliver plasmid DNA or siRNA into cytosol. In this study, we report the feasibility of Bubble liposomes as gene delivery tools.