GS01-4 **Development of targeted cells selective and efficient gene transfection method by mannose-modified nanobubble lipoplexes and ultrasound exposure**

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Gene therapy is a promising treatment for several diseases that involve gene mutations. However, there are many obstacles such as selective gene delivery to targeted organs and improvement of gene introduction efficiency into cells. Recently, “sonoporation method” by ultrasound (US) exposure and microbubbles used as US contrast agents has been reported as one of the most promising approaches for effective gene transfection. On the other hand, to achieve the high therapeutic effects by gene therapy, it is necessary to transfect the therapeutic gene selectively and efficiently into the targeted organs/cells corresponding to an individual disease. Therefore, in this study, aimed at the application to gene therapy for cancer immunotherapy or anti-inflammatory therapy, we developed the novel method to transfect the therapeutic gene selectively and efficiently into antigen-presenting cells (APCs). First, we developed mannose-modified nanobubble lipoplexes which had the selectivity to mannose receptors expressed on the APCs and the properties of microbubbles responded to US exposure. We demonstrated that remarkably high gene expression was observed in the APCs of liver and spleen selectively by exposing US externally after intravenous administration of mannose-modified nanobubble lipoplexes into mice. Moreover, the transfected antigen specific anti-tumor effects were observed by utilizing this gene transfection method to cancer vaccine therapy. In this symposium, we describe our novel results of gene transfection method using mannose-modified nanobubble lipoplexes and US exposure.