

Antigen on nanoparticles enhances anti-tumor immune responses as well as humoral antibody responses *in vivo*

Junichiro Mizuguchi¹, Hiroko Toyota¹, Noriko Yanase¹, Takayuki Yoshimoto¹, Mitsunori Harada² and Yasuki Kato²

¹Tokyo Medical University, Japan

²NanoCarrier Co. Ltd., Japan

Background: Nanoparticles (NPs) have been demonstrated to function as carriers to manipulate immune responses as well as specific drug delivery system. In the present study, we examined whether ovalbumin conjugated on NPs (OVA-NPs) modulate anti-tumor immune responses as well as humoral antibody responses *in vivo*.

Results: When C57BL/6 mice were immunized with OVA-NPs, anti-OVA IgG1 responses were potentiated with a poor IgE synthesis. Pretreatment with OVA-NPs delayed the growth of E.G7 thymic lymphoma cells expressing a model tumor antigen OVA (E.G7-OVA) that were inoculated subcutaneously. OVA-NPs encapsulating IL-7 completely blocked the growth of E.G7-OVA tumor cells, although NPs-IL-7 had a meager effect. However, the pretreatment with OVA-NPs-IL-7 failed to reduce the growth of parental thymic tumor cells, suggesting that the anti-tumor effect is antigen-specific. When tumor-free mice inoculated with OVA-NPs-IL-7 plus EG.7 cells were re-challenged with E.G7-OVA cells, they demonstrated the reduced growth compared with control mice. Moreover, vaccination with OVA-NPs-IL-7 induced the generation of cytotoxic T cells (CTLs) specific for OVA, as revealed by tetramer assay. Thus, a single subcutaneous injection of mice with OVA-NPs entrapping IL-7 induced tumor-specific cytotoxic immune response, resulting in regression of tumor cells.

Conclusion: Antigen on NPs entrapping IL-7 would be a promising carrier for developing and enhancing immune responses including humoral and cellular immunity as well as drug delivery to a specific target of interest.

mizu@tokyo-med.ac.jp