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### **Encapsulin, an effective antigen-delivery nano-carrier, leads to antigen specific cytotoxic T-cell activation and tumor rejection**

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One of the primary goals of vaccination against cancer is to generate robust and effective cytotoxic T cell immune responses upon tumor generation. Dendritic cells (DCs) are the most potent antigen presenting cells and play a pivotal role in activating antigen-specific cytotoxic T cells. Here, we utilized encapsulin protein cage nano-particles (Encap) as antigen-delivery nano-platforms and evaluated their efficacy in inducing DC-mediated antigen-specific immune responses and subsequent melanoma tumor rejection *in vivo*. We genetically introduced the peptide SIINFEKL (OT-1 peptide) of ovalbumin (OVA) protein to the three different positions of Encap sub-unit. Encap and its variants (OT-1-Encaps) were then efficiently up-taken and processed by DCs, that significantly induced the proliferation of OT-1 peptide-specific CD8<sup>+</sup> T cells both *in vitro* and *in vivo* and activated OT-1 specific functional cytotoxic CD8<sup>+</sup> T cells resulting in selective killing of externally introduced melanoma tumor cell line B16 bearing the OVA protein (B16-OVA) *in vivo*. In a B16-OVA melanoma tumor challenge model, OT-1-Encap-C vaccination significantly suppressed tumor growth and tumor-infiltrating lymphocytes (TILs) isolated from the OT-1-Encap-C-vaccinated B16-OVA tumor group contained a large number of cytotoxic CD8<sup>+</sup> T cells secreting high amount of IFN- $\gamma$  cytokine. The approaches we describe herein may offer new strategies for developing novel vaccination systems that induce and/or regulate strong and selective cytotoxic T-cell immunity in non-pathogenic diseases, such as cancers and neurodegenerative diseases.

#### **Biography**

Bongseo Choi has obtained his Bachelor's degree from Busan National University in South Korea. He is pursuing his studies on nano-biochemistry as a graduate student in Ulsan National Institute of Science and Technology.

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