

270-ISMS09 **Responsive Nanocaplets Prepared via ‘Oxidative Polymerization’ for Intracellular Delivery of Anionic Proteins**

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Protein, a central macromolecule in biology control and maintain the diverse cellular functions and many of the diseases are associated with protein malfunctions. Hence new strategies towards the delivery of protein in active form is highly demanding, however largely hindered because of limited number of chemical moieties that can form a stable and non-toxic conjugate with protein. Here we present a novel approach utilizing ‘oxidative polymerization’, i.e. a designed guanidine (Gu^+) monomer bearing two thiol termini initially adhere to protein through ‘salt-bridge’ interaction and undergo disulfide polymerizations upon addition of oxidizing agent resulting a polymer-protein complex (Nanocaplet). The nanocaplet showed responsiveness to reducing agent such as glutathione present in cell cytoplasm. Previously we reported siRNA–Nanocaplet that efficiently internalized to Hep3B cancer cells and released the siRNA in the cell cytoplasm.¹⁾ In the present study, we achieved protein-nanocaplets using different proteins (BSA, Cytochrome C, β -galactosidase) for the intracellular delivery of proteins.²⁾

1) P.K. Hashim, K. Okuro, S. Sasaki, Y. Hoashi, T. Aida, *J. Am. Chem. Soc.* **2015**, *137*, 15608.

2) P.K. Hashim, K. Okuro, T. Aida, *Submitted*.