Programmable Synthesis of Liposomal Biomolecular and Plasmonic Hybrid Nanoparticles

유수연, 강태욱†
서강대학교
(twkang@sogang.ac.kr†)

Liposome is one of promising in vivo delivery vehicles because of its biocompatibility and high delivery efficiency. Due to this reason, many studies have been done to encapsulate molecular drug, genetic materials such as DNA and RNA, and inorganic nanoparticles by liposome. Recently, few attempts to encapsulate these materials together by liposome have been reported. However, these methods generally suffer from low selectivity. Herein we propose simple, yet innovative two-step method for selective synthesis of liposomal biomolecular and plasmonic hybrid nanoparticles. First, negatively charged biomolecules such as DNA and RNA are encapsulated within positively charged liposome with ascorbic acid inside. Next, we expose liposome that encodes the biomolecules and ascorbic acid to gold ions. Then, gold ions diffuse into the liposome and grow into gold nanoparticles due to the reduction by ascorbic acid. DNA modified with fluorescent molecule and RNA without fluorescent tag are tested. The results show that biomolecules are encapsulated by liposome with gold nanoparticle. Hybrid nanoparticles are characterized by TEM, fluorescence and UV-vis spectroscopy, and dark-field microscopy.