

2nd International Conference and Exhibition on

NANOMEDICINE AND DRUG DELIVERY

May 21-23, 2018 Tokyo, Japan

Versatile organic/inorganic nanohybrids for delivery systems

Nana Zhao and Fu-Jian Xu*Beijing University of Chemical Technology, China*

Organic/inorganic nanohybrids with favorable physical and chemical properties constructed from suitable surface functionalization of inorganic Nano Particles (NPs) with superior polycations are promising candidates as carriers with multi-functions. The morphology (size and shape) of NPs are considered to have an intense influence on their interaction with cells and biological systems, while the effect of morphology on gene carriers are poorly understood. We developed several facile strategies to construct organic/inorganic nanohybrids of polycations and inorganic nanoparticles. Grafting-from, grafting onto and host-guest interactions were all utilized for the fabrication of nanohybrids. Furthermore, we employed SiO₂ and Au NPs as model systems to investigate the morphology effect. A series of novel gene carriers based on polycation-functionalized SiO₂ and Au NPs with different morphologies were designed and synthesized, including nanospheres, nano-octahedras, nanorods, arrow-headed nanorods and chiral nanorods, etc. The morphology of both SiO₂ and Au NPs is demonstrated to play an important role in gene transfection. Based on the results, star-shaped hollow silica carriers with photothermal gold caps were synthesized for the co-delivery of drugs and genes. One dimensional nanohybrids of polycations and iron oxide or quantum dots were also designed and satisfying therapeutic effects were achieved. In addition, magnetic resonance (MR) or fluorescence imaging could be realized in the same nanostructure. Therefore, combining the intriguing properties of inorganic parts, the carriers could integrate the functions of imaging and be employed for theranostic platforms. These results may provide new avenues to develop promising carriers and useful information for the application of NPs in biomedical areas.

Biography

Nana Zhao has her expertise in strategic design, controlled synthesis and biomedical applications of organic/inorganic nanohybrids, including diagnosis of diseases, gene delivery, controlled drug-release and imaging.

zhaonn@mail.buct.edu.cn

Notes: