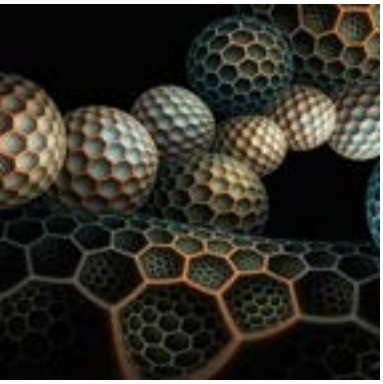
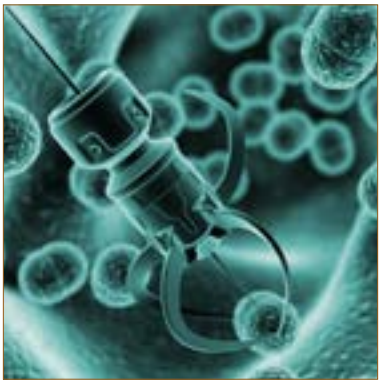
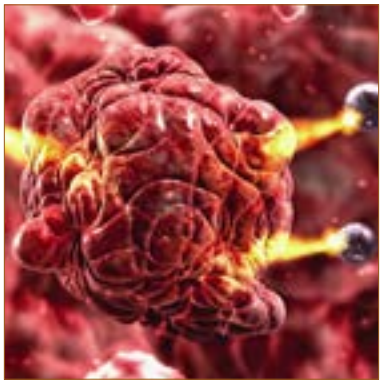
Keynote Forum
May 21, 2018

ICNST 2018







International Conference on

NANOSCIENCE & TECHNOLOGY

May 21-22, 2018 | New York, USA

Vladimir P Torchilin

Northeastern University, USA

Multifunctional stimuli-sensitive combination nanopreparations for cancer

Tumor therapy, especially in the case of multidrug resistant cancers, could be significantly enhanced by using siRNA down-regulating the production of proteins, which are involved in cancer cell resistance, such as Pgp or survivin. Even better response could be achieved is such siRNA could be delivered to tumors together with chemotherapeutic agent. This task is complicated by low stability of siRNA in biological surrounding. Thus, the delivery system should simultaneously protect siRNA from degradation. We have developed several types of lipid-core polymeric micelles based on PEG-phospholipid or PEI-phospholipid conjugates, which are biologically inert, demonstrate prolonged circulation in the blood and can firmly bind non-modified or reversibly-modified siRNA. Additionally, these nanopreparations can be loaded into their lipidic core with poorly water soluble chemotherapeutic agents, such as paclitaxel or camptothecin. In experiments with cancer cell monolayers, cancer cell 3D spheroids, and in animals with implanted tumors, it was shown that such co-loaded preparations can significantly down-regulate target proteins in cancer cells, enhance drug activity, and reverse multidrug resistance. In order to specifically unload such nanopreparations inside tumors, we made them sensitive to local tumor-specific stimuli, such as lowered pH, hypoxia, or overexpressed certain enzymes, such as matrix metalloproteases. Using pH-, hypoxia-, or MMP2-sensitive bonds between different components of nanopreparations co-loaded with siRNA and drugs, we were able to make the systems specifically delivering biologically active agents in tumors, which resulted in significantly improved therapeutic response.

Speaker Biography

Vladimir P Torchilin, Ph.D., D.Sc. is a University Distinguished Professor of Pharmaceutical Sciences and Director, Center for Pharmaceutical Biotechnology and Nanomedicine, Northeastern University, Boston. His interests include drug delivery and targeting, nanomedicine, multifunctional and stimuli-sensitive pharmaceutical nanocarriers, biomedical polymers, experimental cancer therapy. He has published more than 400 original papers, more than 150 reviews and book chapters, wrote and edited 12 books, and hold more than 40 patents. Google Scholar shows more than 52,000 citations of his papers with H-index of 102. He is Editor-in-Chief of Current Drug Discovery Technologies, Drug Delivery, and Open Nano, Co-Editor of Current Pharmaceutical Biotechnology and on the Editorial Boards of many other journals. He received more than $30 M from the governmental and industrial sources in research funding. He has multiple honors and awards and in 2011, Times Higher Education ranked him number 2 among top world scientists in pharmacology for the period of 2000-2010.

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Alexander A Kamnev

Russian Academy of Sciences, Russia

Vibrational spectroscopy in characterizing biogenic selenium nanoparticles

Modern vibrational spectroscopy techniques (Fourier transform infrared (FTIR) and Raman spectroscopies) have long found wide-scope applications in virtually all branches of materials science. Their applications have been rapidly developing in biological and nanobiotechnological fields as well; however, there are a large number of methodological difficulties, especially in FTIR biospectroscopy, related to performing proper sampling of biomaterials, adequate measurements and, last but not least, with a correct interpretation of the spectroscopic data. In this keynote talk, examples will be presented of using vibrational spectroscopy techniques for characterizing selenium (Se) nanostructures of microbial origin obtained by microbial reduction of selenium oxoanions to elementary Se^0 nanoparticles (NPs). While Raman spectroscopy is sensitive to the structure of crystalline Se^0 NPs of different allotropic modifications and also allows amorphous Se (or S-containing) NPs to be distinguished, FTIR spectroscopy is highly informative in characterizing thin biomolecular coating layers of biogenic nanostructures

Speaker Biography

Alexander A. Kamnev (born in 1958 in Saratov, Russia), Professor and DSc in physical chemistry, is a leading scientist at the IBPPM RAS (Saratov, Russia). He has published over 120 papers in peer-refereed international journals and has been serving as an editorial board member of *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy* ("Elsevier") and Current Enzyme Inhibition ("Bentham Science Publishers").

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Keynote Forum
May 22, 2018

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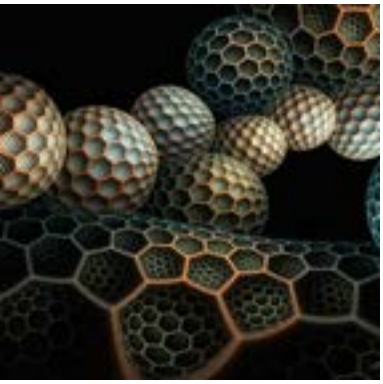

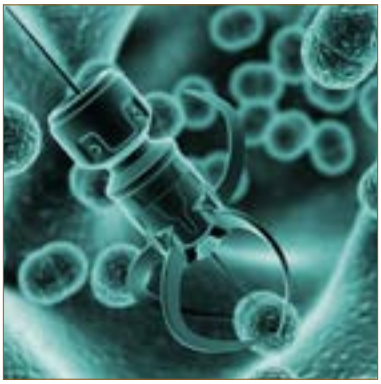

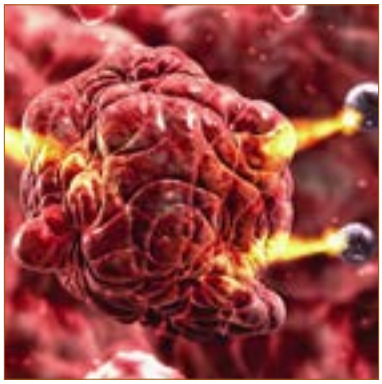

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Huaiyu Shao

University of Macau, China

Nanotechnology in Mg-based hydrogen storage materials

Hydrogen storage is one of the enabling technologies, which may be combined with hydrogen production and fuel cell ones and provide one of the future ultimate carbon-free energy storage solutions, for portable, onboard and stationary applications. Researchers have done studies on Mg-based materials for on board hydrogen storage (for fuel cell vehicles) for decades. From the study of downsizing effect on kinetics and thermodynamics, the author found that hydrogen storage kinetics can be significantly enhanced by nanosize and catalysts, however, desorption thermodynamics (enthalpy and entropy) in nanostructured system does not change with downsizing and catalysis in the size range of 5-300 nm. This means that nanostructured MgH2-Mg system is not suitable for onboard hydrogen storage in which case a working temperature of below 100 degrees is needed. Nevertheless, Mg-based materials show promising properties for stationary energy storage due to the advantages of low cost, high energy density and no need for low working temperature. Some recent results from the author on Mg-based materials focusing on kinetics enhancement, thermodynamics tailor and capacity improvement will be discussed in this work.

Speaker Biography

Huaiyu Shao, currently is a fast-track assistant professor at Institute of Applied Physics and Materials Engineering (IAPME) at University of Macau. Before this position, he was an assistant professor at International Institute for Carbon-Neutral Energy Research (WPI-I^{2}CNER), Kyushu University. His research focuses on development of hydrogen energy materials and fuel cell based technology for energy storage application, especially to store fluctuating renewable powers in order to provide stable energy supply. He got his phd in inorganic chemistry in Peking University, China.

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