EuroSciCon

17th Edition of International Conference and Exhibition on

Pharmaceutics and Novel Drug Delivery Systems

October 04-06, 2018
Moscow, Russia

Olga V Dementeva et al., Int J Drug Dev & Res 2018, Volume 10
DOI: 10.21767/0975-9344-C1-002

One-pot synthesis and loading of silica nanocontainers using surface active drugs as templating agents

Olga V Dementeva[1], Victor M Rudoy[1] and **Svetlana K Zhigletsova[2]**
[1]Frumkin Institute of Physical Chemistry and Electrochemistry of RAS, Russia
[2]State Research Center for Applied Biotechnology & Microbiology, Russia

Mesoporous silica nanoparticles (MSNs) are of significant interest as vehicles for different drugs. The main route to their producing is a gel sol synthesis using inert surfactant micelles as a template. After the synthesis is completed, a micellar template is removed, while the obtained MSNs are loaded with a targeted substance. This route results in low drug uptake and its burst release that are insufficient for the most applications. We propose a new approach that overcomes these drawbacks. This approach is based on the use of targeted drug itself (instead of inert surfactant ones) as templating agent at MSNs synthesis. As a result, it becomes possible to combine the stages of silica nanocontainers synthesis and their loading with the targeted drug. The prospects and benefits of the approach are exemplified by the encapsulation of surface active bactericidal drug benzyldimethyl[3-(miristoilamino) propyl]ammonium chloride, known under the trade name of Myramistin. It is shown that the synthesized mesoporous nanocontainers are characterized by an extremely high drug content (about 1g and over per 1g of SiO_2) and are also pH-sensitive. The release of the encapsulated drug from the silica nanocontainers is studied and some features of this process are discussed. The bactericidal activity of encapsulated Myramistin against the *Staphylococcus aureus* is evaluated. Moreover, it is shown that it is possible to create the so-called protocells by self-assembly of lipid bilayers on the surface of nanocontainers in which the drug is loaded.

Acknowledgement This work was financially supported by RFBR (Project no. 16-03-00118).

Biography

Olga V Dementeva has obtained her PhD in Physical Chemistry at Frumkin Institute of Physical Chemistry and Electrochemistry of Russian Academy of Sciences (IPCE RAS). She is the Leading Researcher of Laboratory of Surface Phenomena in Polymer Systems at IPCE RAS. She has published more than 60 papers in reputed journals. Her main research interest is the creation of drug delivery systems based on the mesoporous silica nanoparticles.

dema_ol@mail.ru