Секция «Физико-химическая биология»

metal-organic framework nanoparticles accumulate in Chlamydia trachomatis inclusions and demonstrate anti-bacterial effect

Научный руководитель – Дурыманов Михаил Олегович

Qi Xiaoli

Postgraduate

Московский физико-технический институт, Москва, Россия

E-mail: qixiaoli@phystech.edu

Metal-organic frameworks (MOFs) are a promising class of hybrid materials for drug delivery. Some of them, including biocompatible iron carboxylates, have been proposed recently for encapsulation and delivery of antibiotics. High loading capacity for drugs, ability to biodegradate, and fast internalization kinetics make the MOF nanoparticles beneficial for the treatment of intracellular bacterial infections as compared with free antibiotics, which poorly accumulate inside the cells because of inability to cross membrane barriers. However, nanoparticles internalization does ensure their accumulation in the compartment that shelters a pathogen. Here, we evaluated the availability of MIL-100 (Fe) MOF nanoparticles to co-localize with *Chlamydia trachomatis*, an obligate intracellular bacterium. It was revealed that the particles accumulate in chlamydial inclusions of the infected RAW 264.7 macrophages. Surprisingly, MIL-100 (Fe) nanoparticles have shown significant anti-bacterial effect against *Chlamydia trachomatis* resulting in significant inhibition of inclusion formation and decrease in bacterial titer. Thus, our findings suggest the use of MIL-100 (Fe) nanoparticles as a drug delivery platform, which can contribute to anti-bacterial effect, for the treatment of chlamydial infections.