The Mesoporous silica nanoparticle: a good nanocarrier

María Vallet-Regí

Department of Chemistry in Pharmaceutical Sciences, School of Pharmacy, Universidad Complutense de Madrid, Instituto de Investigación Sanitaria Hospital 12 de Octubre i+12, Plaza Ramón y Cajal s/n, Madrid, 28040 Spain.

Networking Research Center on Bioengineering, Biomaterials and Nanomedicine (CIBER-BBN), Madrid, Spain

Mesoporous silica nanoparticles have already proven to be adequate nanocarriers for various chemical and biological species (1). For instance, they are valuable tools when carrying antitumor agents selectively to a tumor tissue, and releasing them there thanks to the application of an external stimulus. We use the term smart because those nanocarriers are able to release the drugs when and where they are needed. The surface of our nanosystems can be decorated with molecules able to recognize specifically tumor cells and to trigger the penetration of nanocarriers into them. The main advantage of developing selective nanocarriers able to accumulate only in tumor tissues are: increased selectivity of the therapy, which allows reducing the cytotoxic dosage; higher control over the administered doses; and the reduction of side effects, because the drugs will not be distributed throughout the whole body. Taking into account that most anticancer drugs are cytotoxic, their release must take place only inside tumor cells (2, 3).

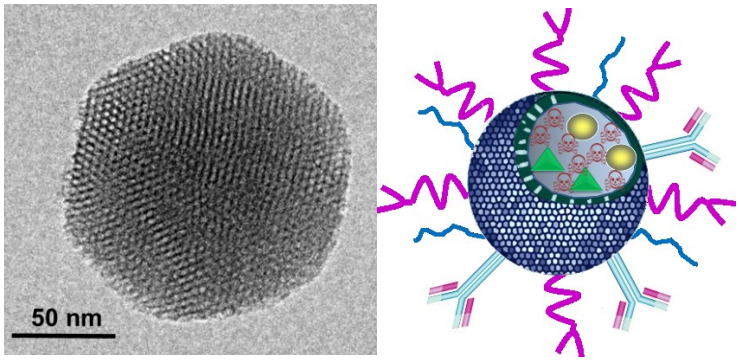

Figure 1. TEM-image of a mesoporous silica nanoparticle and schematic layout of potential modifications to its inner and outer surfaces.

[1] J.L Paris, M. Manzano, M.V. Cabañas, M. Vallet-Regi, *Nanoscale* **2018,** 10, 6402-6408
[2] A. Baeza, D. Ruiz, M. Vallet-Regí, *Expert Opin. Drug Del.* **2017,** 14, 783-796
[3] B. González, M. Colilla, J. Díez, D. Pedraza, M. Guembe, I. Izquierdo-Barba, M. Vallet-Regí, *Acta Biomaterialia*.**2018**, 68, 261-271