Magnetolipogels: a combined strategy for controlled drug release

Sérgio R. S. Veloso, a Miguel A. Correa-Duarte, b Paula M. T. Ferreira, c and Elisabete M. S. Castanheira, a

a Centro de Física (CFUM), University of Minho, Campus de Gualtar, 4710-057 Braga, Portugal.
b Department of Physical Chemistry, Center for Biomedical Research (CINBIO), University of Vigo, Vigo, Spain.
c Centro de Química, University of Minho, Campus de Gualtar, 4710-057 Braga, Portugal.

sergioveloso96@gmail.com

Supramolecular magnetogels comprise supramolecular hydrogels and magnetic nanocomposites, which allow the tailoring and modulation of the matrix structure and properties [1,2]. Here, the nanosystems stabilization remains a main challenge, as it has to ensure efficient drug encapsulation and avert the leashing out of nanoparticles. Hereby, in this work, lipid-coated nanoparticles incorporated in peptide hydrogels (magnetolipogels) were evaluated as a strategy for magnetogels development. Lipid-fibre interface domains averted leaching out of nanoparticles (figure 1). Further, the heating generation profiles were improved and triggered-release of doxorubicin was reproducible (figure 2). Overall, the here developed lipid-coated nanoparticles showed promising results for the development of supramolecular magnetolipogels aiming at the control of drug release.

References


Figures

Figure 1: STEM image of the magnetolipogel (in a carbon honey-type mesh). Nanoparticles are adsorbed to fibres.

Figure 2: Comparison of cumulative doxorubicin released after 6 h from the hydrogel and magnetolipogel, with and without application of an alternating magnetic field for 30 min (AMF).