instituto IMdea nanociencia

seminars

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conference

Monday January 28th

c/ Faraday, 9
Sala de Conferencias
Imdea Nanociencia
Ciudad Universitaria de Cantoblanco

12.00h **Light-Controllable Polymer Nanocarriers**

Prof. Dr. Yue Zhao
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I will give an overview of our studies on polymer nanocarriers (micelle, vesicle and nanogel) whose association states in aqueous solution can be controlled or altered by light. An optical trigger offers the possibility of remote activation and increased spatial and temporal control in releasing species loaded in these nanocarriers. I will discuss the general polymer design, the underlying mechanisms of photocontrol and the excitation wavelength issue. Most photoresponsive polymer nanocarriers developed for biomedical applications require the use of high-energy ultraviolet (UV) or visible light, while longer-wavelength near infrared (NIR) light is preferred because it can penetrate deeper into the tissue and is less detrimental to healthy cells. Our recent studies demonstrated possible solutions to the excitation wavelength problem. On the one hand, we developed polymer micelles that can be disrupted via two-photon absorption of NIR light. On the other hand, we proposed a general strategy based on loading lanthanide-doped upconversion nanoparticles (UCNPs) in photosensitive polymer micelles or hydrogels. Upon continuous-wave NIR light excitation, UCNPs emit UV or visible light from the interior of the polymer carriers, which, in turn, can activate the photoreaction leading to the disassembly of micelles or gel-sol transition.

Nanociencia y Nanotecnología: Lo pequeño es diferente
Nanoscience and Nanotechnology: small is different

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