

CYCLE DE CONFÉRENCES DE CHIMIE

Avec le concours de : *Manufacture Française des Pneumatiques MICHELIN*
SIGMA Clermont
Institut de Chimie de Clermont-Ferrand (ICCF UMR 6296)
U.F.R. de Chimie

Jeudi 5 octobre à 16 h

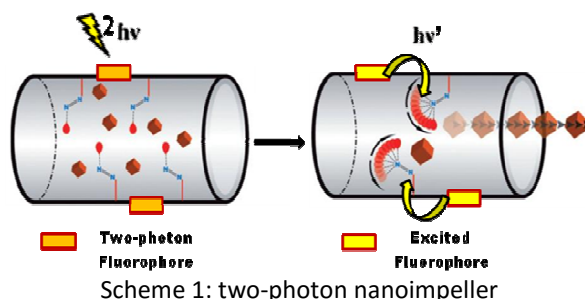
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Mesoporous silica, periodic mesoporous organosilica, for drug delivery and two-photon Photodynamic Therapy

Mesoporous silica nanoparticles (MSN) have attracted much attention the last decade for nanomedicine applications due to their biocompatibility, flexible functionalisation, tunable pore size and diameter. We describe here MSN engineered for two-photon triggered drug delivery or photodynamic therapy, in MCF-7 breast cancer cells. The two-photon triggered drug delivery system was based on a FRET mechanism from a two-photon dye in the walls of the MSN to an azobenzene moiety in the pores of the MSN which kicks the anti-cancer drug molecules out of the pores by isomerisation, (nanoimpellers, scheme 1). Concerning photodynamic therapy, a two-photon photosensitizer was encapsulated in the walls of the MSN. Two-photon photodynamic therapy was performed in vitro and in vivo on mice bearing colon xenografted tumors. Targeting of colon cancer was performed with mannose whereas mannose-6-phosphate analogue was used for prostate cancer. Alternatively, the synthesis of disulfide-based biodegradable Periodic Mesoporous Organosilica Nanoparticles (nanoPMOs) was performed and the nanoparticles were efficient in delivering doxorubicin in cancer cells.



References

Mannose-6-Phosphate Receptor, A Target for Theranostics of Prostate Cancer, Ophélie Vaillant, Khaled El Cheikh, David Warther, David Brevet, Marie Maynadier, Elise Bouffard, Frédéric Salgues, Audrey Jeanjean, Puche Pierre, Catherine Mazerolle, Philippe Maillard, Olivier Mongin, Mireille Blanchard-Desce, Laurence Raehm, Xavier Rébillard, Jean-Olivier Durand, Magali Gary-Bobo, Alain Morère and Marcel Garcia *Angewandte Chemie International Edition*, 2015, 54, 5952-5956.

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