Chromogenic chemodosimeter based on capped silica nanoparticles to detect spermine and spermidine.

Mariana Barros[1]

Alejandro López-Carrasco[1], Pedro Amorós[3], Salvador Gil [1,2], Pablo Gaviña[1,2], Margarita Parra[1,2], Jamal El Haskouri[3], M. Carmen Terencio[1,4], Ana M. Costero[1,2]

[1] *Instituto Interuniversitario de Investigación de Reconocimiento Molecular y Desarrollo Tecnológico (IDM). Universitad Politècnica de València, Universitat de València, Doctor Moliner 50, Burjassot, 46100, Valencia, Spain.*

[2] *CIBER de Bioingeniería, Biomateriales y Nanomedicina (CIBER-BBN) (Spain)*

[3] *Instituto de Ciencia de Materiales (ICMUV), Universitat de València, P.O. Box 2085, 46071, Valencia, Spain.*

[4] *Departamento de Farmacología, Universitat de València. Vicente Andrés Estellés S/n, Burjassot, 46100, Valencia, Spain*

mariana.barros@uv.es

High levels of polyamines such as spermine (Spm) and spermidine (Spd) have proven to be interesting biomarkers in the detection of diverse pathological situations[1-3]. Therefore, the design and synthesis of new probes is a field of research in constant development and of great interest[4-5] since they can be used to detect the presence of these polyamines in biological fluids and tissues with no need of expensive instruments.

Hence, a new material based on MCM-41 functionalized with a N-hydroxysuccinimide derivative and loaded with rhodamine 6G has been developed for the sensing of Spm and Spd. The dye is kept inside the porous due to a double layer formation of organic matter. The inner layer is covalently bound to the silica nanoparticles and the external one is formed through hydrogen and hydrophobic interactions. Removal of the external coverage, in amine groups presence, opens the pores allowing the dye to release. The release studies were performed through fluorimetric titrations, obtaining limits of detection of 2.7x10-5 M for Spm and 4.5x10-5 M for Spd. The sensor remains silent in the presence of other biologically important amines and can detect Spm and Spd in aqueous solution and in cells.

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FIGURES

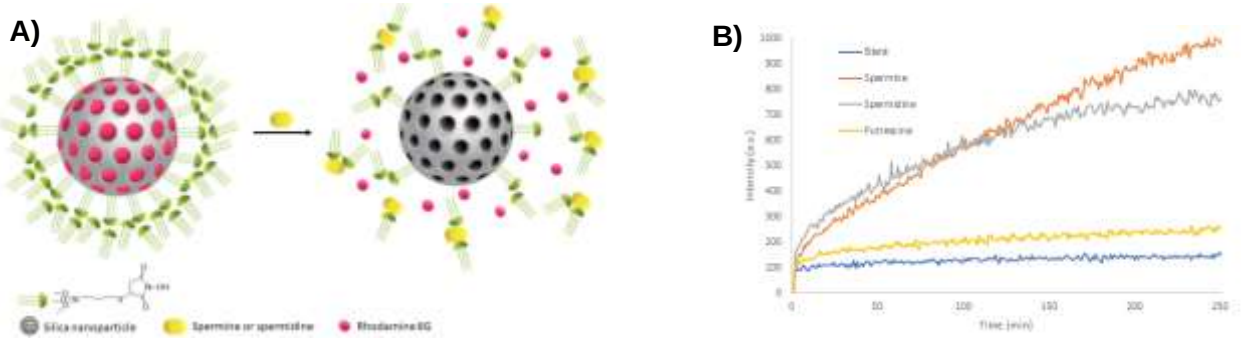

Figure 1: A) Sensing protocol for detecting Spm and Spd. **B)** Rhodamine 6G delivery profiles from the material in the absence and presence of Spm, Spd and putrescine.