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Polymeric film releasing nitric oxide under light stimulation, reported by fluorescence

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Global health organizations are concerned about the multi-drug resistance (MDR). This phenomenon is presumed to set off one of the most important health crisis in our history. Thanks to the misuse of antibiotics, together with the capacity of microorganisms to adapt them to survive in hostile conditions, traditional antibiotics are becoming obsolete. Here in born the need to create smart material acting as antibiotics. An interesting approach to defeat this issue is the production of cytotoxic species, such as NO, singlet oxygen and heat, which do not present MDR. Some advantages of light-triggered production of cytotoxic species are its good spatiotemporal release control, fast reaction rates and the absence of residues after the reaction. A hybrid compound was specifically design and produce in our group, containing a coumarin (fluorescent marker), linked to a NO-photodonor and posteriorly incorporated into poly (lactic- co-glycolic acid)-based (PLGA) film. It is expected to observe a fluorescence-quenching effect between the NO-photodonor and the fluorophore through Forster resonance energy transfer (FRET). After the NO release, no energy transfer occurs, leading to the revival of fluorescence of the coumarin. Thanks to the transparency of this biocompatible polymeric film, after the NO release, fluorescence emission will allow us to monitor indirectly its release by fluorescence imaging. The importance of monitoring NO photo-production resides in its dosage-dependent effect. A relation between irradiation time and death rate was proved during antibacterial tests.

Biography

Marta Perez Lloret has completed her MSc at Universidad de Zaragoza, Spain and she is currently a PhD candidate.

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