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Polymeric film releasing nitric oxide under light stimulation, reported by fluorescence- Marta Perez Lloret - University of Catania

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Global health organizations are concerned about the multi-drug resistance (MDR). This phenomenon is presumed to line off one among the foremost important health crisis in our history. Because of the misuse of antibiotics, along side the capacity of microorganisms to adapt them to survive in hostile conditions, traditional antibiotics are getting obsolete. Here in born the necessity to make smart material acting as antibiotics. a stimulating approach to defeat this issue is that the production of cytotoxic species, like NO, singlet oxygen and warmth , which don't present MDR. Some advantages of light-triggered production of cytotoxic species are its good spatiotemporal release control, fast reaction rates and therefore 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's expected to watch a fluorescence-quenching effect between the NO-photodonor and therefore the fluorophore through Forster resonance energy transfer (FRET). After the NO release, no energy transfer occurs, resulting in the revival of fluorescence of the coumarin. because of the transparency of this biocompatible polymeric film, after the NO release, fluorescence emission will allow us to watch indirectly its release by fluorescence imaging. The importance of monitoring NO photo-production resides in its dosagedependent effect. A relation between irradiation time and death rate was proved during antibacterial tests.

For an extended time, gas (NO) has been considered only an atmospheric pollutant. In fact, NO plays important roles within the physiological activities of animals, plants, and microorganisms. NO is an endogenously synthesized diatomic molecule with a radical character that exists in various tissues and cells of the physical body and is widely involved within the regulation of the many physiological and pathological processes. Within the 1980s, Murad, Furchgott, and Ignarro discovered that NO is an endothelium-derived relaxing factor which may dilate blood vessels, thus regulating vital sign. This research aroused great interest among researchers, and within the ir later researches NO was identified to be an important signaling molecule for the regulation of the many physiological activities in the physical body . NO was selected as Science Magazine's Molecule of the Year in 1992. In October 1998, Furchgott, Ignarro, and Muard won the Nobel prize within the field of physiology and medicine for his or her outstanding add NO research. Since then, the keenness for researches on NO has almost reached the height, and it's been increasingly valued in biology and medicine. NO was selected as Science Magazine's Molecule of the Year in 1992. In October 1998, Furchgott, Ignarro, and Muard won the Nobel prize within the field of physiology and medicine for his or her outstanding add NO research. Since then, the keenness for researches on NO has almost reached the height, and it's been increasingly valued in biology and medicine. To sum up, the roles played by endogenous NO within the physical body are as follows: (i) NO may be a n endothelium-derived relaxing factor that relaxes vascular smooth muscle and prevents platelet aggregation; (ii) NO is a reverse messenger of nerve conduction and plays a crucial role within the process of learning and memorization; (iii) when activated upon phagocytosis and stimulation, macrophages release NO as toxic molecules that kill foreign invading microorganisms and tumor cells; (iv) as a radical , NO can damage normal cells, which plays a crucial role in myocardial and brain ischemia–reperfusion injuries; and (v) NO can regulate the inflammatory reaction and cell proliferation processes, which are key to the wound healing process.