

Seminar: Dr. Carmen Moya López-Peláez

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LMOPS, CentraleSupélec, 2 rue E. Belin, Metz
Salle de réunion (C102)

Understanding drug release from two nanoparticle-based systems through physicochemical characterisation



The pharmaceutical industry demands constantly the development of drug delivery systems that improve therapeutic efficacy and reduce side effects. The traditional strategy of manufacturing standardised drug doses is ineffective for 70% of patients, creating the need to replace mass production with personalised medicine. In particular, nanoparticles (NP) and generally from polymeric sources were largely investigated as drug nanocarriers to improve the stability and solubility of the encapsulated molecules. In addition, NP formulations improve safety and efficacy. However, the current gap between the characterisation of the physicochemical properties of polymeric NP and their performance under physiological conditions hampers the translation from research to the clinical level.

Poly(lactide) (PLA) is among the most commonly used polymers for NP formulation development due to its biocompatibility. Besides, PLA presents a wide variety of nanostructured derivatives featuring different physicochemical properties, which might enable attaining a wide variety of drug release rates. However, PLA is typically copolymerized with hydrophilic monomers such as glycolic acid which usually limits their physicochemical properties to the characteristic features of the amorphous phase that neutralize the PLA chirality effect on the molecular mobility relaxation process that typically affect drug release.

Herein, two examples are presented of how controlling the nanostructure of NP by characterising their physicochemical properties can help us understanding the factors that affect the release from drug delivery systems and thus tailor them.

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