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Presentation title: Easy Way for Fabricating Porous Carriers for Controlled Drug Delivery: Focus on the Loading of Hydrosoluble and Hydrophobic Cargoes

Abstract (250-300 words): The delivery of hydrophilic and hydrophobic drugs still encounters difficulties. Indeed, hydrophilic drugs having high solubility in water and low molecular weight, their release into an aqueous biological medium induces side effects in patients and a restricted therapeutic effect. Likewise, hydrophobic drugs have disadvantages since they are on the contrary poorly soluble in water and can accumulate in fat tissues resulting in drawbacks for the patient's recovery. To overcome these problems, the encapsulation of these drugs in delivery systems enables to improve their pharmacokinetics and biodistribution. In this sense, we have developed a simple approach to prepare microparticles and nanoparticles of calcium carbonate allowing respectively the encapsulation of hydrophilic and hydrophobic compounds. Calcium carbonate particles present several benefits such as non-toxicity, biocompatibility, low cost and easy way to produce them. The use of these particles alone allows the loading of one or several hydrosoluble probes (rhodamine B, blue dextran and methylene blue). The as-obtained particles are stable in a physiological medium (pH 7.4, 0.15 M of NaCl) and degrade in an acidic medium (pH lower than 5) thus allowing the release of the probes. In addition, we also took advantage of the negative surface charge of calcium carbonate particles in order to modify the surface of the particles with biopolymers, i.e. polysaccharides diethylaminoethyl-dextran, which can avoid recognition of the particles by the immune system. Furthermore, by modifying the preparation conditions of calcium carbonate particles by introducing an additive such as poly (vinylsulfonic acid) (PVSA) or glycerol, we can vary the particle size from 4-6 µm to 260 nm. Moreover, the addition of cyclodextrin, a host-guest molecule, allows the loading of tocopherol acetate in the hydrophobic cavity of cyclodextrin. In the same way, this compound is released in an acidic environment thanks to the dissolution of calcium carbonate particles.

Biography: Clea Chesneau is a PhD student (east paris institute of chemistry and materials science/ University of Paris, France). Her core expertise is in polymer science, and surface modification. This includes the polymer modification; the study of the physical chemistry of surfaces/interfaces; and the use of controlled assembly at the sub-micrometer scale (e.g. nanoparticle). Current applications of her research are mainly for biological application.