

22nd International Conference and Expo on**NANOSCIENCE AND MOLECULAR NANOTECHNOLOGY**

November 06-08, 2017 | Frankfurt, Germany

**Christophe A Serra***University of Strasbourg, France***Development of microfluidic and low energy emulsification methods for the production of monodisperse morphologically complex nanocarriers**

This lecture will address the development and application of advanced technologies in mixing and emulsification for the preparation of morphologically-complex nanocarriers for potential uses in pharmaceuticals. Firstly, a micromixer-assisted nanoprecipitation process was used to get and to easily tune the size of Ketoprofen-loaded PMMA nanoparticles (100-200 nm). Combined with a commercial spray dryer, dry-state drug-loaded polymeric nanoparticles (NPs), which main physicochemical properties were close to those of non-spray-dried NPs, were successfully produced. This nanoprecipitation microprocess also allowed encapsulating 6 nm iron oxide NPs into 200 nm PMMA nanoparticles with a weight ratio of 60%. To increase the solid content of the above nanosuspension and get spherical polymeric NPs of smaller sizes (100 nm), an elongational-flow nanoemulsification method was used. Secondly, double nanoemulsions/nanohydrogels encapsulating a hydrophilic model drug in the aqueous core droplets/hydrogel were obtained by the combination of a commercial microfluidizer for the primary emulsion and a low energy emulsification method (spontaneous emulsification) for the double emulsification. The size of the double nanocarriers was varied by means of the surfactant to oil ratio (SOR) in the range 80 to 180 nm. Colocation of two fluorescent probes located in the core and in the shell was confirmed by fluorescence confocal microscopy. The spontaneous emulsification method was also employed to produce nanolipogels whose size could be tuned down to 60 nm. These nanolipogels were also loaded with iron oxide nanoparticles (6 nm) or gold nanoparticles (6 nm).

Biography

Christophe A Serra graduated in 1992 from the School of Chemical Engineering (ENSIC) in Nancy (France). He received his PhD in 1996 from the University Paul Sabatier in Toulouse (France). Then, he spent 18 months as a Postdoctoral Researcher at Rice University (Houston, TX). Since 1998, he has been a faculty member of the University of Strasbourg (France) teaching Chemical Engineering at the European Engineering School of Chemistry, Polymers and Materials Science (ECPM). His researches concern the development of new microfluidic-assisted polymer processes for the synthesis of architecture-controlled polymers and functional micro- and nanostructured polymer particles. In 2010, he was appointed as Full Professor at the University of Strasbourg and he joined in 2014 at the Charles Sadron Institute (ICS) becoming one of its Deputy Directors.

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