MS35-P32 | HIERARCHICAL DESIGN OF LIPID-POLYMER COMPOSITE NANOFIBERS: THE INTERPLAY OF MULTISCALE STRUCTURES AND BIOFUNCTIONS

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The unique features of lyotripoc liquid crystalline cubic particles (cubosomes) originate from their thermodynamically stable hierarchical arrangement of molecules in nanoscale. Their function as drug delivery systems is correlated with the complex structural reorganisation in response to variations of biophysical conditions [1]. Moreover, polymer electrospinning is a versatile technique to produce sub-micron sized interconnected fibers which offers a noble solid substrate for uptake of nanoparticles for wide range of applications in biomedical domain [2,3]. Our recent work has been focused on the fabrication and characterisation of novel smart nanofibers based on polymer-lipid cubosome composites, Qfibers.

In this contribution, we present our latest achievements on the design of novel Qfibers and understanding their multiscale structural variations, mainly by small and wide angle X-ray diffraction techniques. The interplay between cubosomes and polymers over electrospin processing and after fabrication and under different external mechanical/environmental conditions will be discussed. Electron microscopy and micro-CT techniques will also be linked to scattering/diffraction analysis. Eventually, the structural responses will be briefly communicated along with the functional behaviour i.e. kinetics of drug release.

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