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# Electro spun materials: From encapsulation to templates for non-traditional vesicle fabrication

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Electrohydrodynamical techniques are versatile processing methods for producing sub micrometric structures. The application of tension to polymeric solution jets infused through a nozzle at a controlled speed, allows obtaining nanofibers or nanoparticles. There are many parameters involved: compositional (which define the conductivity, viscosity and surface tension of the fluid), processing (flow, tension, nozzle-collector distance) and environmental variables can be optimized for the fine tuning of complex architectures and controlled morphologies. The possibility to incorporate drugs, cells or other bioactive agents in fibers or submicron particles is extremely interesting for the manufacture of controlled release systems. Indeed, during the last two decades, electro spun materials have been applied in tissue engineering and drug delivery systems. Moreover, besides the encapsulation capability, electro spun structures can be also used as templates for the fabrication of vesicles by in-situ self-assembly when dissolved in water. This non-traditional fabrication method offer offers advantages for the storage, transfer and administration of vesicles, which derive in benefits in its functionality, stability, bio accessibility, etc. While conventional vesicles manufacture methods often require complex and expensive methodologies to trigger the self-assembly processes, this nanofabrication method pre-confines phospholipids and polymers inside solid micro-environments; so that they can generate liquid suspensions of vesicles when contacted with water, when required, without a mandatory sterilization step. In this presentation, different compositional and processing parameters were evaluated. Fibers composed of polyvinylpyrrolidone polymer and soybean lecithin as a source of phospholipids were electro spun in order to manipulate the molecular self-assembly for the synthesis of vesicles. The morphological and compositional features of the precursor fibers (solvent system, phospholipid type) and the involved processing parameters (voltage, flux) can be correlated with the vesicles sizes obtained when the Nano fibrous membranes are dissolved in water. These results are extremely encouraging to propose these structures as versatile and tunable carriers of active agents of different nature in controlled release systems.

## Biography

Guadalupe Rivero is an Associate Researcher from the National Scientific and Technical Research Council (CONICET) – Argentina, in the Institute of Materials Science and Technology Research (INTEMA). As Bachelor in Chemistry and PhD in Materials Science, she is the Deputy-Head of the Biomedical Polymer Division. During the last 10 years, she has gained experience in the fields of encapsulation of active agents, electro hydro dynamical techniques, biomaterials, drug delivery systems and tissue engineering. With an h-index=11, she has published 19 journal articles, 3 book chapters, 1 patent and over 60 works in scientific events. Her recent research lines focus on the design of electro spun Nano fibrous membranes for bone, dermal and neuronal regeneration; and smart materials for the targeted delivery of therapeutic agents.

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