LIPOSOME NANOFIBROUS HYDROGEL FOR THERANOSTIC APPLICATIONS

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Metastases are developed in 45-50% of soft tissue sarcoma (STS) and melanoma patients, leading to reduced quality of life and high mortality. Standard first-line therapies often fail to control metastasis and cause systemic toxicity [1]. In this project we aim at developing a system that is able to give mechanical support to the soft tissue of a patient after a surgical procedure and also to prevent the relapse of the tumor mass thanks to the in-situ release of antitumoral drug. We use an electrospun fibre mat (polymeric matrix) in order to give to the system structural rigidity and to have a high surface area to absorb the hydrogel-like medium where the antitumoral drug vector are embedded. To deliver the antitumoral drug we exploit Large Unilamellar Vesicles (LUV) which are highly exploited in literature for their low toxicity, good biocompatibility good pharmacokinetics and ease of synthesis [2]. In order to be able to follow the LUV fate inside this polymeric matrix we fluorescently stained the LUV and we studied the system via confocal microscopy coupled with Fluorescence Lifetime Imaging Microscopy (FLIM). These two high-resolution techniques, providing extensive molecular insights, allowed us to study the interaction of the free molecular fluorescent probe with the above-mentioned polymeric matrix and to compare it with the interaction of the fluorescent-tagged LUV with the polymeric matrix. These studies successfully showed that the fluorescent-tagged LUV retain their properties inside the polymeric matrix.

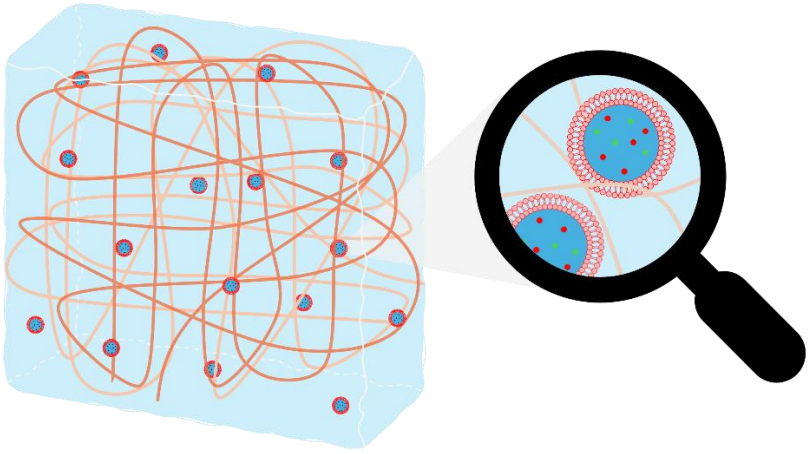

Figure 1: schematic representation of the system: LUV embedded in a polymeric matrix composed of an electrospun fibre mat and a hydrogel-like medium

Key words: Tumors, LUV, Polymers, Fluorescent-probe, Confocal microscopy.

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