Electrospun lipid binding proteins composite nanofibers with antibacterial properties as potential wound dressing

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One of the promising new techniques in the production of biomaterials is the electrospinning process, whereby fibers of uniform thickness down to the nanoscale can be produced from solutions of polymeric material in a high electric field. Recent investigations exploited the use of fibrous proteins such as collagen, keratin, and fibroin. We have investigated here the feasibility of electrospinning a keratin/PEO mixture containing a lipid binding protein, hosting into its internal pocket a variety of selected small functional molecules. Here a complex of a bile acid binding protein with Irgasan, a broad spectrum antimicrobial agent, was employed for the production of biomembranes with excellent antibacterial properties. Solution NMR studies were employed to investigate structure-property relations in view of the optimization of the bactericidal tissue performance.