SPRi ANALYSIS OF THE INTERACTION BETWEEN SILICA GEL NANOPARTICLES AND HIBRID BILAYER MEMBRANES

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Silica gel nanoparticles modified with Methylene Blue (silMB nanoparticles) are new photoactive systems with a variety of applications including Photodynamic Therapy. The coating of silMB nanoparticles with amphiphilic molecules and polymers can improve both the stabilization of the nanoparticle suspensions and their affinity with biological membranes. In this work SilMB nanoparticles were coated with different lipids and Polyethyleneglycol (PEG) and the affinity of uncoated and coated nanoparticles against hybrid bilayer membranes (HBMs) was studied through Surface Plasmon Ressonance imaging (SPRi). HBMs are biomimetic membranes composed of a monolayer of dodecanethiol and monolayer of different charged phospholipids. We have observed that uncoated particles have greater affinity for HBMs compared to coated particles, however, they are not specific as they can bind at negative (Phosphatidilglycerol;PG) and neutral (Phosphatidylcholine; PC) HBMs to the same extension. The coating with PC:PG (1:1), PEG and PC improves the stability of the suspensions but only the particles coated with PEG presented specific high affinity to PC HBMs. These results indicate that the coating PEG can be the most appropriate to improve nanoparticles affinity to plasmatic membranes, whose major lipid component is PC. This work was supported by FAPESP and ALFA-MEDIS program.