BIOMIMETIC PARTICLES FOR BIOTECHNOLOGICAL APPLICATIONS

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Biomolecules immobilization on particles is becoming increasingly important for biotechnological applications such as hybridization kits, gene therapy, infection diagnostics, detection of microbial resistance to antibiotics and production of DNA chips among many others. Polystyrene sulfate (PSS) microspheres were covered with bilayer fragments (BF) of the cationic lipid dioctadecyldimethylammonium bromide (DODAB), characterized by means of dynamic light scattering, zeta-potential (?) analysis and effects of λ-DNA. Over a range of [DODAB] (0.0001 - 0.05 mM), polystyrene sulfate (PSS) particle sizes (83 -626 nm mean diameters) and particle concentrations (66 -1x10^9 particles/mL), about 0.02 mM DODAB was enough to cover 1.43 x 10^{-3} m^2 on particles with a cationic bilayer. λ-bacteriophage DNA was added over a range of concentrations (1 - 20 μg/mL) to one of the particulates (D_z = 301 nm) and D_z or ? were determined as a function of DNA concentration. From 1 - 4 μg/mL DNA, the particles were still positively charged and stable with sizes remaining close to 300 nm. Around 5 μg/mL DNA, particles show zeta-potentials close to zero and they aggregate. Over the 6 - 9 μg/mL DNA, the system was remarkably homodisperse resembling the low polydispersity of latex samples. The novel nucleosome-mimetic system will possibly find many uses in strategical applications.

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