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Computational viewpoints of interaction between nanoparticle and cell membrane

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ABSTRACT

Understanding the interaction between the nanoparticle and the bilayer cell membrane is an important issue for the development of biomedical applications. The basic mechanism, however, is primarily determined by the physics of particle–membrane interaction. In this work, the dissipative particle dynamics simulation is performed to analyze the evolution of free energy and force through the cell membrane. The interaction between the nanoparticle and cell membrane are also investigated. Simulation results indicate that the type of nanoparticles and the ratio of lipid numbers of two layers in the membrane have a significant effect for the cell uptaking the nanoparticles. Tantalizing interplay between these two parameters demonstrates the whole process that how the nanoparticles enter into the cell and therefore provide a feasible way to exploit the unconventional cell-based research.