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Mechanical Destabilization of Lipid Membranes by Nanoparticles: From Microplastics to Gold Nanoparticles.

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Abstract:

The interactions of nanoparticles with lipid membranes can have a rich phenomenology and involve numerous mechanisms. Apart from studied translocation mechanisms, pore formation and collective diffusion, the mechanical stretching of the lipid membrane due to adsorption to the surface may lead to new phenomena. One of the aspects is the global reduction of the available membrane area that leads to a strong reduction of membrane lifetime and destabilization of the cell membrane. We discuss microplastics that attach and deform red blood cells due to mechanical stretching and gold nanoparticles attaching to bacterial cells and inducing cell death.