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DNA Molecules Adsorbed on Rippled Supported Cationic Lipid Membranes – A new way to stretch DNAs LEONARDO GOLUBOVIC, Physics Department, West Virginia University — We discuss a novel approach to control to shapes of DNA molecules. We elucidate the recent experimental work of M. Hochrein, L. Golubovic and J. Raedler, on the conformational behavior of DNA molecules adsorbed on lipid membranes that are supported on grooved microstructured surfaces. We explain the striking ability of the edges formed on these supported membranes to adsorb and completely orient (stretch) very long DNA molecules. Here we explain the experimentally observed DNA stretching effect in terms of the surface curvature dependent electrostatic potential seen by the adsorbed DNA molecules. On the curved, rippled membrane, we show that the DNA molecules undergo localization transitions causing them to stretch by binding to the ripple edges of the supported membrane. In the future, this stretching will allow to directly image, by the common fluorescence microscopy, fundamental biological processes of the interactions between DNA and single protein molecules.

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