

The Observation of Protein Behavior on a Mimicked Cell Membrane

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Recently, specific type of protein aggregates has drawn particular interest due to its involvement in the pathogenesis of the so-called conformational diseases. More specifically, superoxide dismutase (SOD) aggregates, which are present in the cytosol and mitochondrial intermembrane space of eukaryotic cells, have been implicated in the neurodegenerative disease, familial amyotrophic lateral sclerosis (FALS), such as Lou Gehrig's disease. Thus, the investigation of the protein behavior in an organized molecular media that mimics in-vivo systems is one of the important approaches to understand their membrane associated-cytotoxic action. In this study, we describe the SOD aggregates behavior on a lipid membrane. The construction of the supported membranes was achieved by the fusion of DPPC vesicles on a hydrophilic surface. After injection of SOD aggregates, degradation of lipid membrane derived by the alterations in bilayer structure was observed by surface plasmon resonance (SPR) spectroscopy and atomic force microscopy (AFM). This biomimetic approach reported here suggests that damage of lipid membranes by the forming aggregation may be the direct cause for membrane permeabilization and cell death.