Interactions of Prion fragments with artificial membranes: chemical-physics aspects.

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Scrapie in sheep, bovine spongiform encephalopathies in cattle, Creutzfeldt-Jakob disease in humans are transmissible neurodegenerative disorder characterized by prion protein PrP^{c} aggregation and deposition in the brain as PrP^{sc}. Biochemical evidences report the two fragments PrP 106-126 and PrP180-193 of prion as toxic to neurons expressing PrP^{c} and interacting with cell membranes. The present study, by means of thermodynamic models, predicts the interaction of PrP fragments with model membranes of DPPC or DPPE lipids. The parallel study of thermotropic behaviour of peptide/lipid systems by DSC and CD experiments has allowed to obtain information about the topology of the system. The whole of theoretical and experimental data has allowed us to propose a molecular model of peptide-membrane interaction which depicts the spontaneous insertion of "pathological" fragments in membrane and the consequent formation of aggregates (protofibrils) characterized by a β-sheet structure.

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