THE PECULIAR INTERACTION BETWEEN MAMMALIAN PRION PROTEIN AND RNA

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In the past decade, the interaction between prion protein (PrP) and nucleic acids has garnered significant attention from the scientific community. For many years, the participation of nucleic acid molecules in prion pathology has been largely ruled out by the "protein-only" hypothesis, but this is now being reconsidered based on emerging evidences that an adjuvant factor may be involved, lowering the energy barrier between the two isoforms. Our group identified that interaction of PrP with double-stranded DNA lead to a higher β-sheet content, with similar characteristics of PrP^{Sc} and have structurally characterized the PrP:DNA complex. We also investigated PrP:RNA interactions and reported aggregation and formation of toxic species of PrP upon RNA binding. Here we present experimental data on the interactions between murine recombinant PrP (rPrP23-231) and RNA extracted from different cell types, using a spectroscopic approach. We verified that incubation of RNA extracts both from prokaryotic and eukaryotic cells, led to aggregation of rPrP23-231. We also observed that ionic interactions are important to PrP:RNA complex formation and that heparin binding can prevent aggregation caused by RNA. Our results show that PrP:RNA interaction can be modulated depending on the chemical environment the protein finds itself. These data are interesting in the view of the possible pathways the infectious or the non-infectious prion proteins can follow through the cellular milieu.
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