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Studies of Amyloidogenic Peptide Dynamics by Dielectric Relaxation Spectroscopy FIOLEDA PRIFTI, DONALD BARRY, IZABELA STROE — Recent theoretical studies[1] show that amyloidogenic peptides associate to form oligomers through long-range hydrophobic attractions. When peptides aggregate in larger composites, their hydrophobic patches are buried inside the newly formed amyloidogenic assembly. This gradually changes their interactions with the surrounding water molecules. The various amyloidogenic structures can then be differentiated based on the partition of the interface water and the dielectric signal of water. Here, we present dielectric relaxation spectroscopy measurements of amyloidogenic (human IAPP and Aβ (1-42)) and non-amyloidogenic (rat IAPP and Aβ (1-42) scrambled) peptides over a frequency range of 10^{-3} to 10^{7} Hz, at different concentrations (5-100 μM), and over a large incubation time interval (0-220 h). In comparing the dielectric response of the amyloidogenic and non-amyloidogenic peptides, we find that it varies from peptide to peptide. Our experimental results also reveal a shift in the dielectric response as a function of time and concentration for each peptide. We attribute these variations in the dielectric signal to structural changes that affect the surrounding and cage water associated with the amyloid aggregates. Our results are in agreement with theoretical predictions.

[1]F. Despa et al., J. Biol. Phys. (2008) 34, 577

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