

Phase Transitions and Conformational Changes in Monolayers of Human Apolipoproteins CI and AII

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Aggregation of human apolipoproteins at membrane or lipoprotein surfaces may have important biological implications. To get an insight into their structure and molecular function, we have studied the monolayers of apolipoproteins CI and AII, proteins that present linear amphipathic alpha-helices, by synchrotron X-ray diffraction and surface pressure measurements at the air/water interface. In addition, the lateral order of protein arrays was studied by atomic force microscopy. A phase transition from a two-dimensional disordered fluid to an ordered state is detected in both cases, where unusual one-dimensional solid phases are discovered, where some helices are confined to the interface, whereas others are uniformly tilted toward the hydrophobic air. These results suggest that a similar ordering might also occur when the protein is attached to a lipoprotein particle.