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Interfacial microrheology study of layer formation by staphylococcal nuclease protein and its disordered variant BILYANA TZOLOVA, Johns Hopkins University, DANIEL ALLAN, Brookhaven National Lab, DANIEL FIRESTER, BERTRAND GARCIA-MORENO, DANIEL REICH, ROBERT LEHENY, Johns Hopkins University — We study the formation of layers of staphylococcal nuclease protein adsorbing at the air-water interface. In a series of experiments, we follow the evolution of the rheological response of the layer using an active microrheology technique that involves tracking the rotational motion of magnetic nanowires at the interface in response to time-dependent external magnetic fields. At early stages of layer formation, the wire mobility can be interpreted using a model for viscous drag with an interfacial viscosity that increases rapidly with layer age; however, at later ages deviations from a simple viscous response indicating non-Newtonian behavior are observed. We compare the evolution in microrheology of layers forming from wild-type protein that assumes a folded conformation in solution with a variant that is disordered due to substitution of a single amino acid, thereby gaining a perspective on the impact of initial protein state on the layer formation and rheology.

Bilyana Tzolova
Johns Hopkins University

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