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Exploring Structure, Shape, and Dynamics of Elastin-like Polypeptide Nanoparticles KIRIL A. STRELETZKY, Cleveland State University, KAITLIN VANDEMARK, ALI GHOORCHIAN, NOLAN HOLLAND, Cleveland State University — Environmentally responsive nanoparticles synthesized from elastin-like polypeptides (ELP) present a promising system for applications as biosensors, drug delivery vehicles, and viscosity modifiers. These nanoparticles undergo a transition from a soluble state at room temperature to micellar aggregates above the transition. The size, shape, and dynamics of micelles above the transition as well as effects of the solvent salt concentration and pH on the transition are important to understand from a fundamental science point of view as well as for potential applications. The system has been characterized with high resolution multiangle Dynamic and Static Light Scattering Spectroscopies. It was confirmed that the system undergoes a transition from mixture of ELP extended trimers and their non-spherical formations to a solution of micelles. It was discovered that micellar size and structure are very sensitive to solution's pH. The micelles were generally found to exhibit properties of the hyperbranched spheres below pH of 10 and above pH of 10.3 with their shape becoming significantly elongated in the pH window of 10 to 10.3. It was also found that the size of micelles strongly depends on salt concentration displaying at least two size regimes (20-45nm at 0-20mM and 100-150nm at 25-40mM) with different salt concentration dependences.

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