Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Controlling the Size and Shape of the Elastin-Like Polypeptide based Micelles KIRIL STRELETZKY, HANNAH SHUMAN, ADAM MARASCHKY, NOLAN HOLLAND, Cleveland State University — Elastin-like polypeptide (ELP) trimer constructs make reliable environmentally responsive micellar systems because they exhibit a controllable transition from being water-soluble at low temperatures to aggregating at high temperatures. It has been shown that depending on the specific details of the ELP design (length of the ELP chain, pH and salt concentration) micelles can vary in size and shape between spherical micelles with diameter 30-100 nm to elongated particles with an aspect ratio of about 10. This makes ELP trimers a convenient platform for developing potential drug delivery and bio-sensing applications as well as for understanding micelle formation in ELP systems. Since at a given salt concentration, the headgroup area for each foldon should be constant, the size of the micelles is expected to be proportional to the volume of the linear ELP available per foldon headgroup. Therefore, adding linear ELPs to a system of ELP-foldon should result in changes of the micelle volume allowing to control micelle size and possibly shape. The effects of addition of linear ELPs on size, shape, and molecular weight of micelles at different salt concentrations were studied by a combination of Dynamic Light Scattering and Static Light Scattering. The initial results on 50 M ELP-foldon samples (at low salt) show that Rh of mixed micelles increases more than 5-fold as the amount of linear ELP raised from 0 to 50 M. It was also found that a given mixture of linear and trimer constructs has two temperature-based transitions and therefore displays three predominant size regimes.

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Date submitted: 06 Nov 2015 Electronic form version 1.4