

Cleveland State University

EngagedScholarship@CSU

Undergraduate Research Posters 2012

Undergraduate Research Posters

9-6-2012

Size and Shape Characterization of Salt Dependent Thermoreversible Micelles Synthesized from Elastin-Like Polypeptides

Kaitlin W. Vandemark

Cleveland State University, K.VANDEMARK@csuohio.edu

Follow this and additional works at: https://engagedscholarship.csuohio.edu/u_poster_2012

 Part of the [Biophysics Commons](#)

[How does access to this work benefit you? Let us know!](#)

Recommended Citation

Vandemark, Kaitlin W., "Size and Shape Characterization of Salt Dependent Thermoreversible Micelles Synthesized from Elastin-Like Polypeptides" (2012). *Undergraduate Research Posters 2012*. 46.

https://engagedscholarship.csuohio.edu/u_poster_2012/46

This Book is brought to you for free and open access by the Undergraduate Research Posters at EngagedScholarship@CSU. It has been accepted for inclusion in Undergraduate Research Posters 2012 by an authorized administrator of EngagedScholarship@CSU. For more information, please contact library.es@csuohio.edu.



**Size and Shape Characterization of Salt Dependent
Thermoreversible Micelles Synthesized from Elastin-Like
Polypeptides**

College of Sciences and Health Professions

Student Researcher: Kaitlin Vandemark

**Faculty Advisors: Kiril A. Streletsky, Ph.D., Department of Physics;
Nolan B Holland, Ph.D., Department of Chemical and Biochemical
Engineering, T. Hugel, Technical University Munich**

Abstract

Environmentally responsive nanoparticles synthesized from Elastin-Like Polypeptides (ELP) present a promising system for applications such 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 ELP micelles have been found to be sensitive to various outside stimuli including pH, salt concentration, and solvent. Light Scattering Spectroscopy and Atomic Force Microscopy (AFM) were used to characterize size and shape of the ELP nanoparticles. The apparent radius and molecular weight of micelles had a strong dependence on salt concentration with three apparent regimes. At low salt (0-15mM), largely spherical micelles were found with $R_h=15\text{nm}$, and molecular weight of 3000-4000kg/mol. At the intermediate salt (15-30mM), the observed particles are transitioning from spherical micelles to significantly elongated particles. At high salt (30-60mM), the elongated micelles can be modeled by semi-flexible cylinders with a radius of 15nm and a length of 350-500nm having an apparent molecular weight of 55000-85000kg/mol. Further research has been done measuring Cross-Linked micelles with AFM at room temperature.